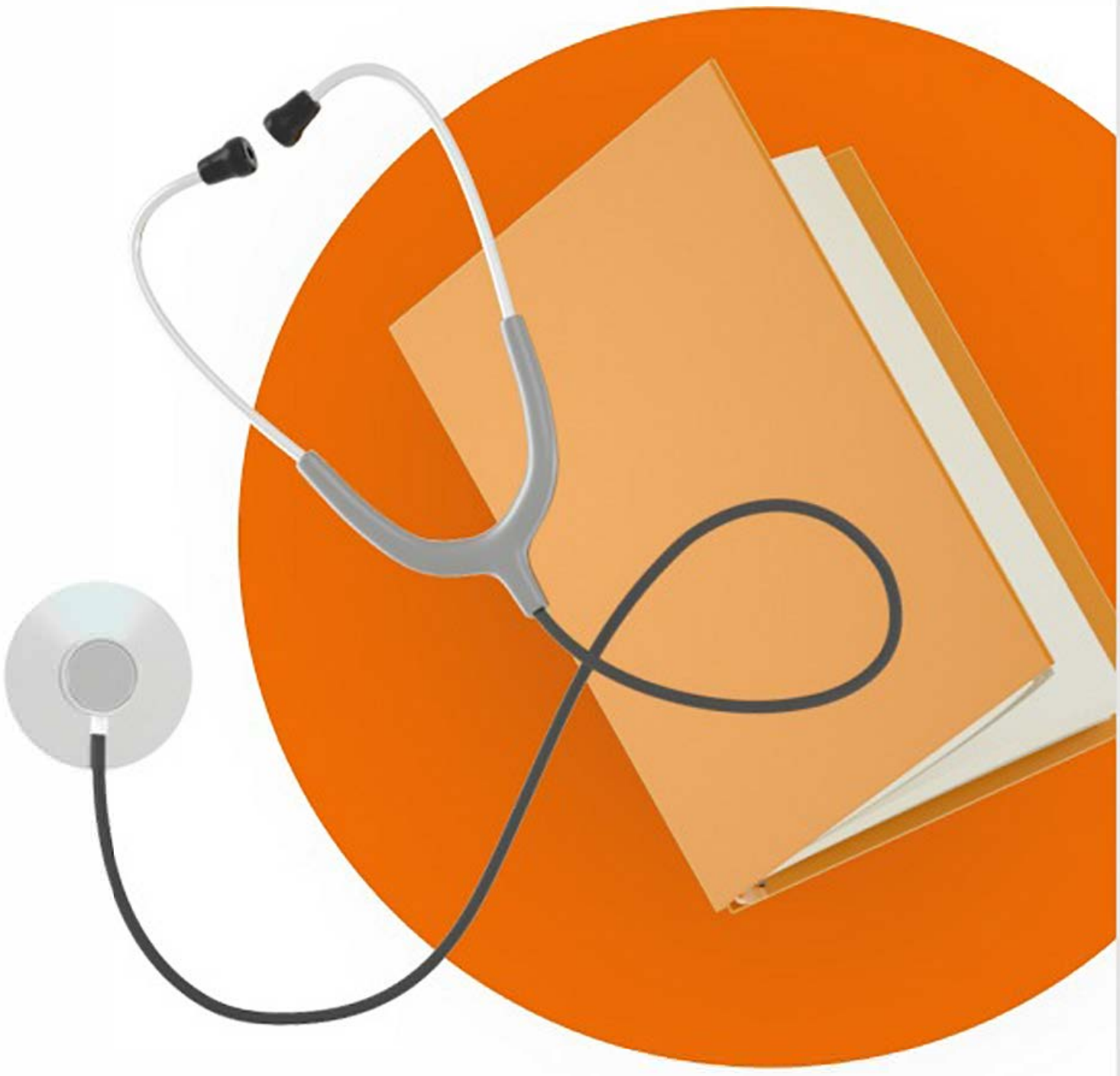
STRIDES in DEVELOPMENT of MEDICAL EDUCATION

Kerman University of Medical Sciences



Volume 18 | Issue 1 | Autumn 2021

Online ISSN: 2645-3452

Kerman University of Medical Sciences

Strides in Development of Medical Education

VOLUME 18, ISSUE 1, 2021

JOURNAL INFORMATION

AIM AND SCOPE

The aim of publishing Strides in Development of Medical Education is to promote the quality of the medical education and inform via publishing the conducted researches in all topics related to medical education. Such topics may include modern teaching methods, designing educational courses, evaluating the success rate of these courses, planning in medical sciences education based on the society's needs, and planning, management, and assessment of education. However, the Journal of Strides in Development of Medical Education welcomes any subjects causing a communication between the faculties and professors of the medical sciences and medical experts.

The Journal of Strides in Development of Medical Education is of the publications of the Kerman Medical Sciences Education Development Center and is financially sponsored by the aforementioned center. Now, the publishing of this journal is updated Continuous. Moreover, it is an online publication.

CONTENT COVERAGE

This journal publishes original, review, editorial, letter to the editor, short communication articles, all related to the journal goals.

Full Journal Title	Strides in Development of Medical Education
Abbreviation Title	Strides Dev Med Educ
Category	Medical Education
P-ISSN	1735-4242
E-ISSN	2008-272X
Language	English
Journal Country / Territory	IR Iran
Frequency	Continuous
Online Submission	www.sdme.kmu.ac.ir E-mail: medcj@kmu.ac.ir
Distribution	Iran (This Journal has published in Persian)
Price	**Online:** Open Access;
Indexing Sources	IMEMR, Index Copernicus, EBSCO, MagIran, IranMedex ,SID, ISC, Google Scholar
Editorial Board	**Postal Address:** Educational Development Center, Haft Bagh Blvd., No 8 Building, Kerman, Iran; Tel: +98-34-31325332; Fax: +98-34-31325347
Publisher	**Kerman university of medical education** **Postal Address:** • Kerman University of Medical Sciences, Medical University Campus, Haft-Bagh Highway, Kerman, Iran; Tell: 009834 31325829 Fax : 009834 31325830 **Electronic Address:** Website: www. Kmu.ac.ir

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This letter should be uploaded online as a word file. The author should state that the manuscript has not been and will not be published or submitted elsewhere. The financial d isclosure s hould b e d eclared. T he l etter m ust include a statement declaring that the study complies with current ethical considerations. Authors reporting experimental studies on human subjects must include a statement of assurance in the Methods section of the manuscript reading that: (1) informed consent was obtained from each patient included in the study and (2) the study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

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WORD COUNT LIMITS

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- Acknowledgments (not including research funding): 45-55 words.

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Use the font Times New Roman size 12 for the body, size 12 bold for subheadings, size 14 for headings, and size 14 bold for the title, Line spacing = Double.

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The title page should state:

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[required for research articles, review articles, case reports]

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- **Results:** Must be presented in the form of text, tables and illustrations. The contents of the tables should not be all repeated in the text. Instead, a reference to the table number may be given. Long articles may need sub-headings within some sections (especially the Results and Discussion).
- **Discussion:** This should emphasize the present findings and their differences or similarities with other work done in the field by other workers. Emphasize the new and important aspects of the study and the conclusions.
- **Acknowledgments:** All contributors who do not meet the criteria for authorship should be covered in the acknowledgment section. Persons who provided technical help and writing assistance should also be acknowledged.
- **Tables:** All tables must be included at the end of the manuscript.

➢ Tables in the word file should be separated by page break (each table on a separate page).

➢ Each table should have borders with normal style without any colored row or column.

➢ The style of table should be simple.

➢ Each cell contains only one paragraph or one line.

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REFERENCES

This journal accepts references according to Vancouver style (with some minor changes) rules established by the International Committee of Medical Journal Editors. In the Vancouver system, the only indication required in the text of a paper is a number, allocated in ascending sequence, and presented in the text either in brackets, or in superscript. For example:

"Recent randomized controlled trials in primary care showed benefits for patients with depression from increased telephone support, better cooperation between primary care and mental health professionals, and more systematic follow up (7)."

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The details needed to construct a book reference are presented below.

Each author's surname followed by the initials (in the same order as they appear on the title page), a comma should separate each author's name. Title of the book. Edition of the book if there has been more than one. Place of publication or town of origin followed by a colon, Publisher's name, followed by a semi-colon, Year of publication. e.g.

Ford MJ, Munro JF. Introduction to Clinical Examination. 7th ed. Edinburgh: Churchill Livingstone; 2000.

If only a part is cited, add the page numbers, and volume number in the case of multi-volume works, at the end of the reference.

Meltzer PS, Kallioniemi A, Trent JM. Chromosome Alterations in Human Solid Tumors. In: Vogelstein B, Kinzler KW, editors. The Genetic Basis of Human Cancer. New York: McGraw-Hill; 2002. p. 93-113.

If you need to reference a book written by more than six authors, list the first six authors' names followed by "et al" thus:

Cohen J, Brown A, Smith B, Jones G, Murphy M, McKay P et al.

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Meydani SN, Leka LS, Fine BC, Dallal GE, Keusch GT, Singh MF, et al. Vitamin E and Respiratory Tract Iinfections in Elderly Nursing Home Residents: a Randomized Controlled Trial. JAMA. 2004 Aug 18;292(7):828-36.

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For all websites references you need to note the date that you accessed the information, and database name or web address (URL). e.g.

Royal College of General Practitioners. The Primary Health Care Team. RCGP website 2003 [cited 2004 Sep 22]; Available from: URL: http://www.rcgp.org.uk/information/publications/information/PDFInfo/21_OCT_03.pdf

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Authors should report systematic reviews in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement. For Systematic Reviews, the abstract should be subdivided into the following sequential sections:

Context; Data Sources, Study Selection, Data Extraction, Results, Conclusions, and Keywords. Systematic reviews should be 3500-4000 words (abstracts to be structured as above). Consult: The Cochrane Reviewers' Handbook Meta-analysis of observational studies.

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In a review article both abstract and text of the manuscript, include following items:

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- **Conclusions:** Clearly state the conclusions to answer the questions posed if applicable, basing the conclusions on available evidence, and emphasize how clinicians should apply current knowledge.

• Brief Report

Reports should contain 1000 - 2000 words and should contain a structured abstract of 200 words maximum. Short reports should comprise sections of Introduction, Materials/Patients and Methods, Results, and Discussion with not more than 2 tables or figures and up to 20 references.

• Letters

Letters to the editor will be considered if they give significant comments on recent articles published in this journal or they contain relevant preliminary data providing new insights. Letters need no abstract and must cite the previous article in this journal that is being discussed, and should have no more than 10 references.

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Strides in Development of Medical Education

VOLUME 18, ISSUE 1, Autumn 2021

Table of Contents

Strides Dev Med Educ. 2021 December; 18(1):e1052. doi 10.22062/sdme.2021.195917.1052

Letter to Editor

It is Time to Demystify Research and Publishing in Africa's Undergraduate Pharmacy Education

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Received: 2021 March 25; Revised: 2021 April 11; Accepted: 2021 April 13; Published online: 2021 April 14

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Citation:Aluh DO, Adibe MO. It is Time to Demystify Research and Publishing in Africa's Undergraduate Pharmacy Education. Strides Dev Med Educ. 2021 December; 18(1):e1052.doi:10.22062/sdme.2021.195917.1052

Keywords: Publish, Research, Undergraduate Education, Pharmacy

Dear Editor,

In Nigeria, like most African countries, Academic pharmacy is the least appealing area of practice for most graduates(1). Apart from being known to be the least lucrative area of practice in terms of remuneration, many aspects of this career path seem to be shrouded in so much mystery. A vital aspect of an academic pharmacy career which many students are not privy to is research and publishing.

While there are various exposures to and simulations of most areas of pharmacy practice in undergraduate pharmacy education, none exists for a career path in academic pharmacy. Although it is widely known that academic pharmacy is the least appealing career path for many students, (1) no effort is being made to make it an attractive option for students as the lecturers are not very inviting. Academic pharmacy in Nigeria comprises teaching and research components in university settings and purely research in few available research institutes. One may argue that the final year project is enough exposure to research at the undergraduate level, and typically it is expected that graduands interested in research should pursue a post-graduate degree to learn more about research. However, the low levels of pharmacist graduates who come back for postgraduate degrees and perhaps, more importantly, pursue a career in research point to the ineffectiveness of this limited exposure to foster research interest. Also, in most cases, the students are not given the freedom to explore and pursue their research interests and are usually mandated to do the final year project in a particular area, with a designated supervisor, and of course on a designated topic assigned by the supervisor. This makes the project research more like a didactic learning experience and the students graduate acquiring little or no research skills.

Although research is not complete until it is published, (2)many students complete their research projects with little or no idea of the possibility of publishing their research. On rare occasions when some students ask their supervisors of the possibility of publication, a few supervisors would include their names, usually without their involvement in the writing and peer review process. To fully engage and foster undergraduate research, the students should be involved in the peer review and publication experiences.

There are a few lecturers who appreciate and encourage research among undergraduate pharmacy students, however, as pointed out by Jungck and colleagues "…. *many mentors of undergraduates involved in research may be reticent in promoting their students' efforts because they are intimidated or embarrassed by their own modest publication records.*"(2) This reason, in our opinion, is a major deterrent to promoting undergraduate research and publishing, especially in this setting where lack of funding for research limits the extent of research undertaken by the lecturers. With many competing needs on a paltry and often irregular salary, research is at the bottom of the priority list for many academic pharmacists in the region. Since research is most often self-funded, lecturers publish just the number of papers

required for their next promotion. This lack of funding for research may also be a limitation for students interested in research.

In our experience, however, the students interested in research are usually very willing to self-fund research liketheir senior colleagues. Besides, a lot of global funding opportunities abound for undergraduate students interested in research, and the pharmacy schools should make efforts to avail students of such information.

The rare achievement of a recent pharmacy graduate from the University of Ibadan in Nigeria who successfully published more than 50 papers in reputable leading journals before graduation,(3) lends credence to the fact that undergraduate students can be full participants in knowledge creation processes, including publishing. When lecturers invite undergraduates to do research as full participants in the knowledge creation process, including publishing, it is collaborative and they stand to gain too. Other disciplines have taken steps towards encouraging undergraduate research and publishing. Pharmacy schools in the region can learn from sister faculties of medicine and nursing that have journals dedicated to publishing undergraduate research to encourage undergraduate research and publishing. Although many pharmacy conferences have provisions for students, these are mostly Masters and PhD students, and the few undergraduates who participate are rarely presenting or corresponding authors.

It is time to end the archaic hierarchical model of postponing the right to publish until after postgraduatestudy. To increase the number of academic pharmacists in the region, then conscious efforts must be made to make research attractive and to nurture interests in research, early enough in pharmacy education.

Conflict of Interests: The authors declare that there is no conflict of interest.

Ethical Approvals: Not applicable

Funding/Support: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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Strides Dev Med Educ. 2021 December; 18(1):e91628. doi 10.22062/sdme.2021.91628

Letter to Editor

Modifying Medical Educational Curricula Based on an Interdisciplinary Approach: A Requirement of the Present Era

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Received: 2021 February 11; **Revised:** 2021 April 17 ; **Accepted:** 2021 May 05 ; **Published online:** 2021 May 24

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Citation: Salehi AM, Ahmadian M, Mohammadi HA, Khanlarzadeh E. Modifying Medical Educational Curricula Based on an Interdisciplinary Approach: A Requirement of the Present Era. Strides Dev Med Educ. 2021 December; 18(1):e91628. doi: 10.22062/sdme.2021.91628

Keywords:
Medical, Education, Interdisciplinary Study, Curriculum

Dear Editor,

In recent decades, human knowledge has rapidly progressed, especially in the evolution of new biomedical sciences and techniques, transforming all aspects of social life dramatically. In the new technology era in modern society, novel disciplines, not only theoretically but also from an empirical and practical points of view, have profoundly transformed bureaucratic policies.

Internationally, there is an agreement that the certification obtained at the end of university training no longer indicates sustained quality and the fact that graduates do not have enough skills to perform their professional roles and tasks in the real world.

The large volume of theoretical contents and allocating excessive time to different courses have caused learners to experience fragmented education. The lack of relevance of educational programs to the future work environment has conferred them dryness, dullness, and meaninglessness, delivering traditional discipline-centered training methods unresponsive to the present needs of societies.

Such training, which is offered in the separate disciplines of traditional curricula, is not enough for the current society, which always seeks new knowledge and skills to masterly overcome problems and dive into any conundrum of various sources (1). For this reason, it seems necessary to develop new educational approaches, including competency-based, interdisciplinary, and multidisciplinary education, during which the delimitation between various fields of knowledge is removed, and learning opportunities are provided in different methods (1).

Competency-based education is a shift in the academic culture, structure, and doctrine, ensuring that all students succeed, and the fundamental deficits of traditional models of learning are resolved. Schools and universities should move towards competency-based education for many reasons, including the achievement of more effective and deep learning and greater equity and the establishment of a continuously improving system, as well as to equip students with sufficient knowledge, psychomotor, communication, and decision-making skills and attitudes to enable them performing best at different actions and jobs. On the other hand, an interdisciplinary curriculum is required to achieve competency-based training.

Interdisciplinary refers to embarking on new areas of knowledge and studying more than one fields of knowledge (2). Interdisciplinary is not a specialty but a method of generating knowledge to manage complexities and discover fundamental facts; in other words, interdisciplinary is a process of answering a complex question that cannot be addressed through one particular

discipline or profession (3).

For the past hundred years, the basis of higher education has been stabilized on academic disciplines. The discipline-centered model has been popular for acquiring specialization in various fields, but today another approach (i.e., the interdisciplinary approach) must be employed to address the modern society's needs and rescue the scientists trapped in solitary cabins. Moreover, this approach can promote technological convergence for the benefit of society (4).

The theoretical base of interdisciplinary curricula can be found in the educational philosophy of progressivism. A progressive movement is an approach towards a training and learning model which emphasizes creativity, activity, natural learning, real-world experiences, and other experiences of this kind (5).

Another new theoretical base of the interdisciplinary approach is the theory of "constructivism." The theory believes that individuals should construct their own facts. One principle of constructivism states that experience is a meaningful key of learning, but of course the experiences that each person gains directly or indirectly and sharing them would be very effective, but not those experiences which have been offered in a textbook (6).

By following Cuba, Iran's medical education system was structurally separated from the body of higher education in the 1960s, proposing a social and community-centered medical theory and insisting on the intertwining of health and treatment with education. This system has important advantages, including no need to import physicians from other countries, appropriate geographical distribution of medical education, and growth of medical activities and research (7).

Amid the Corona pandemic, this integrated system became the strength of treatment and academic research with an independent decision-making power. On the other hand, ample evidence indicates that this system has caused the separation and distance of medical research from some complementary research fields like artificial intelligence and out-of-medical system research centers such as those working on Nanotechnology Biotechnology Information Technology and Cognition (NBIC) areas. At the time that the interdisciplinary approach is growing more than ever, this structural separation can become a weakness of Iran's medical education system.

Interdisciplinary communication seems as an impossible or at least inaccessible goal in Iranian universities. Students in most academic disciplines are trained without any perception of other disciplines and the skills required for interdisciplinary learning and communication (8). Meanwhile, the Corona crisis taught us that we need people who are able to travel the boundaries of knowledge and bring organizations together.

The Corona pandemic and its impacts on the education system have shown us that in order to have a sentence in scientific fields, we need a special culture that forces scientists to learn to speak the language of different scientific disciplines and work together. Many universities and academic medical centers around the world, although intellectually and theoretically supporting interdisciplinary programs, still scramble within the boundaries of traditional disciplines (8). However, the Corona pandemic has made it clear that interdisciplinary education is not an option but an obligation.

The Ministry of Health, Treatment and Medical Education of Iran, in its report entitled "Achievements, challenges, and agreements ahead of the Islamic Republic of Iran is the health system," recognized the emphasis on separation and specialization, island thinking, lack of horizontal and vertical integration of curricula, and lack of communication as the most important weaknesses of the country's medical education system (9). Hereafter, politicians and managers are obliged to design and implement interdisciplinary programs to train qualified students who can meet the country's current and future health needs.

Accordingly, among the solutions to promote interdisciplinary education are to pay attention to health-centered disciplines such as community medicine and update the curricula of such disciplines in accordance with the interdisciplinary view. The main problem of the current curricula is that they have been written by focusing on current technologies and considering the physician-patient communication model. However, considering the pace of changes and the challenges caused by the Coronavirus pandemic in medical education, current curricula cannot prepare students to face these changes. The hallmark of interdisciplinary education is the integration of notions and guiding principles from multiple disciplines to systematically form a more comprehensive and hopefully coherent analytic framework, offering a richer understanding of the issue under examination. The known boundaries between different fields of knowledge should not be the basis for designing medical education curricula. In fact, these curricula should emphasize on the interdisciplinary subject matter and outcomes and move towards being more and more integrated and effective to face real situations.

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Strides Dev Med Educ. 2021 December; 18(1):e1067 doi 10.22062/sdme.2021.196293.1067

Letter to editor

Whistle-Blower: Shadowing of the Pandemic on Indian Medical Residency

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Received: 2021 June 21; **Revised:** 2021 July 21; **Accepted:** 2021 July 22; **Published online:** 2021 July 31

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Citation: Gondode PG, Garg AM, Gaur DM, Vittobaraju M. Whistle-Blower: Shadowing of the Pandemic on Indian Medical Residency. Strides Dev Med Educ. 2021 December; 18(1):e1067.doi:10.22062/sdme.2021.196293.1067.

Keywords: COVID-19, Impact, Residency Programs, Medical, India

Dear Editor,

India has accomplished an astonishing rate of Corona Virus Disease (COVID-19) vaccination. Clever application of the prevailing immunisation infrastructure and logistics has facilitated in augmenting the reach of the vaccination program. Regardless, India is beholding an austere wave of the pandemic with a precipitous rise in number of cases. India ranks second in global covid tally with more than 31 million COVID-19 cases, ensuing a massive pressure on its existing healthcare infrastructure and medical workforce (1).

Before the covid era, the Indian medical residency was already besmirched. Stringent informal hierarchical organisational structure and consequential hounding of the resident doctors by their seniors, often go under reported due to the trepidation of failure in examinations (2). Lengthened working hours, derisory and irregular pay, skewed doctor to patient ratios, acute disparity of undergraduate to post graduate medical seats, ignorance in abiding international and national laws concerning working hours give rise to 'Resident Burnout' culture. Mental burnout sporadically results in suicide attempts (3). Poignantly, the unwarranted appalling working hours have been hailed as a convention of good training process (4).

COVID impact on Indian medical residency

The Indian medical residency program is traditionally of three years duration (MD – Doctor of Medicine/ MS- Master of Surgery/ DNB- Diplomate of National Board). The definitive outcome is to fashion resident accomplish pre-set competencies, skills and excellence in the particular field of speciality the resident opts in. It also includes Exposure to latest equipment, technologies, ever-evolving world of bio-medical research, challenging clinical scenarios and opportunities to diagnose and treat the commonest and rarest of diseases, hands-on skill development in surgical and technical branches. All of it has taken a blow as Covid has wrecked Indian medical training in a way no one could have envisaged. COVID has surely cast its shadows on teaching activities like clinical rounds, ward and bedside teaching; even academics and seminars, conferences, and workshops have come to a standstill.

Since early 2020, residents have been jostled to COVID duties heedlessly of their subject of specialization. They are dynamically occupied in wide spectrum of covid patient care, from collecting samples at ground zero to managing the clinical cases in wards and Intensive Care Units (5). This one year of covid obligations have left just two years remaining to complete a three-year curriculum. The recent grim wave of the pandemic trouncing the country puts them at risk for even lesser time to groom and upgrade themselves in their respective specialities and to attain basic competency, leave alone the anticipated echelon of excellence.

Residency mandates obligatory thesis/ dissertation submission with objectives of familiarizing residents to the basic methodology of biomedical research, ethical

considerations, good clinical practice and inculcating inquisitiveness. While Operating Rooms, Out-Patient Departments and Wards are on a hold and residents busy in covid duties, it is unmanageable for the resident to meet the standards they documented in the research project protocols- again perplexing their apprehension of residency completion.

Shall there be an extension of residency period for an offset year of covid onus? Will the government endure the monetary patronage and remuneration for the extended year? Will there be any amendment in the conduct of examinations? Will the thesis submissions be waived off? Will they be able to complete their thesis, academics and update their clinical skills? The above and other such analogous unanswered questions are creating a sense of exasperation and resentment in the minds of young residents, a result of this is already witnessed, where residents of recognised institutes threatened mass leaves against covid-only work, in the fear of their academic compromise (6-8). The dearth of communication between authorities and the residents doctors and the resultant failure in assuring the residents regarding their future will only act to add more fuel to the fire. An excuse by the authorities that covid itself is a teaching exercise is an example of shying away from answerability and accountability. The residents have a moral responsibility of helping the nation fight the pandemic and work for the patients, but that does not absolve the authorities from working in the interest of residents, and address their fervent concerns.

Conflict of Interests: Authors mention that there is no conflict of interests in this study.

Ethical Approvals: Not applicable.

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e1033 doi 10.22062/sdme.2021.195223.1033

Letter to Editor

Faculty Members' Promotion: Challenges and Solutions

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Received: 2020 November 04; Revised: 2021 January 16 ; Accepted: 2021 February 06 ; Published online: 2021 December 01

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Citation: Shafian S, Salajegheh M. Faculty Members' Promotion: Challenges and Solutions. Strides Dev Med Educ. 2021 December; 18(1):e1033.doi:10.22062/sdme.2021.195223.1033

Keywords: Medical Faculty , Promotion, Challenges, Medical Sciences

Dear Editor,

The importance of comprehensive andsustainable development, competition between countries to gain a superior cultural-political and economic position, and strengthening science and technology to expand the sphere of influence and national authority indicate the efficiency of universities and institutions of higher education, research, and technology to achieve country's scientific and technological goals. In the meantime, the effective and undeniable role of faculty members as the most important pillar in the process of promoting and guaranteeing the quality of higher education is irrefutable. This issue has caused science and technology policy-makers to seek to conduct the tasks of faculty members in line with the goals of the country's science and technology system. The faculty members' promotion is one of the most important tools to achieve such a goal. In addition to the importance of such an approach, which in itself underlies sustainable and comprehensive development, evaluating the challenges of the promotion system of faculty members requires an appropriate motivation to codify effective regulations aiming to guide the activities of faculty members as a basic need of the country's academic community.The following are some of the limitations and proposed solutions for the promotion regulations:

Incompatibility of the Scores of Faculty Member's Activities

One of the major problems of the faculty members' promotion regulations is the incompatibility of the scores of some faculty member's activities. The promotion regulations are similar to a multivariate game in which, changing the score of one activity affects not only the relevant section but also the other sections. The simplicity of achieving a full-scored activity will cause other activitiesof these regulations not to be implemented but to be forgotten. To overcome these challenges, it seems that the index with the minimum score should be considered mandatory in all sections; for example, the minimum cultural-research score should be considered equally, and after gaining the minimum score, action should be taken to calculate other scores in different articles (1).

Identical Look at All Disciplines

Another major problem with the promotion regulations is its identical look at all disciplines. Despite the differences in the requirements of various disciplines, the regulations have tried to evaluate all disciplines based on a single structure (2). It is suggested that promotion criteria be considered based on the expected goals and capabilities of each discipline (3).

Identical Look at All Geographic Regions

Another noteworthy point in the promotion's regulations is the identical look at all universities in the country, which is not fundamentally correct. Given that the needs of different regions of the country are different and some indigenous regions have special indigenous needs, it is obvious that the confrontation rate of all universities of the country with the mentioned issues is not the same and therefore, not everyone's duty is the same. Basically, solving some indigenous issues requires being present in the relevant area, which is easily possible for students and faculty members in the indigenous regions. Therefore,

in matching faculty members' promotion indices, more attention should be paid to the mission, needs, specific conditions, and scientific resources and opportunities of each university of medical sciences (4).

Lack of a Dynamic Structure in faculty members' Promotion regulations

Another important problem in the promotion regulations is the completely static look at the scoring agents. This approach hinders innovation and creativity in the performance of faculty members. Also, insufficiency in the implementation of homogeneous, transparent, and fair promotion processes, lack of mastery of faculty members over the promotion process and how to evaluate activities, and the impact of conflict of interests or disagreement on the outcome of the promotion process are among the problems of the executive instruction of the faculty members' promotion regulations (4). The provided suggestions based on the results of studies to resolve these challenges include changing the composition of the University Board of Auditors periodically, establishing a consulting and facilitating unit of preparing promotion files for faculty members, holding symposiums, and discussions between the boards of auditors of different universities, and holding faculty development programs aiming to teach the provisions of the promotion regulations (5, 6).

Bold Contribution of Research

Regarding faculty members' promotion, the regulations are inevitably publication-oriented, and publishing scientific texts in the form of articles has become the main point and daily concern of members. Despite such a regulation and other pressures on faculty, regarding gaining scores, the research has come to the text from the margin and had become the original from the branch. One of the consequences of such an atmosphere is the quantitative growth of the number of scientific texts. Given the role of research activities to solve the problems of society, one should try to lead these activities to real attention to the needs and scientific-research space of society, creating evolution and advancement of the scientific field, and also participation in establishing research policies (7). It is suggested that given the evaluation of the quality of faculty members' research works, their attention be paid to the quality of research and published works rather than worrying about increasing the number of works (8).

Conclusion

Considering the special position of the faculty members' promotion system in higher education policy-making and the main role of this system in directing their activities in the fields of culture, research, education, and administration, the present study provides the possibility of acquainting the country's scientific policy-makers with the challenges of the faculty members' promotion system and also constructs a suitable basis for establishing a comprehensive promotion system.

Supplementary Material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Conflict of Interests: Authors mention that there is no conflict of interests in this study.

Ethical Approvals: Not applicable.

Funding/Support: Not applicable.

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Strides Dev Med Educ. 2021 December; 18(1):e1073 doi 10.22062/sdme.2021.196522.1073

Letter to Editor

Impacts of COVID-19 Pandemic on Medical Education and Students of Bangladesh

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Received: 2021 August 08; Revised: 2021 August 27; Accepted: 2021 September 13; Published online: 2021 November 02

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Citation: Debnath K. Impacts of COVID-19 Pandemic on Medical Education and Students of Bangladesh. Strides Dev Med Educ. 2021 December; 18(1):e1073. doi:10.22062/sdme.2021.196522.1073

Keywords: COVID-19, Online learning, Distance learning, Medical Students, Absenteeism, Analytical Skills, Clinical Practice Patterns

Dear Editor,

The Coronavirus disease 2019 (COVID-19) pandemic is a public health disaster with massive and various social, financial, and health consequences (1), which is transforming the community in countless ways. It has affected lifestyle to economy, playground to pray-yard, primary education to professional education (2). The pandemic has led to unprecedented disruption in well-established, conventional face-to-face medical education and healthcare systems globally. It affects physical, mental, and social well-being of medical students as well as their intellectual skill to learn (3). Besides, high rate of infection and mortality of the physicians in Bangladesh all through the pandemic might be influencing future career plans of young graduates (4). These impacts have drawn limited attention and have been less discussed globally as well as in Bangladesh.

To control the spread of highly contagious COVID-19, governments all over the world have suspended face-to-face teaching in educational institutions(5). It lessens the range of gathering and interactions as well as increases physical distancing among the students, which potentially limits the transmission(6). The government of Bangladesh has closed all institutional activities since March 2020(4). As COVID-19 affected patients have been increasing in an exponential model, these types of interference were crucial to implement stay home approach at all points. But, at present, educational institutions, general to professional (e.g., Medical, Engineering), are facing numerous challenges due to prolonged closure(2). It causes student absenteeism at lectures due to their lack of interest in monotonous lectures that not have visual stimulation and provide tiny opportunity for them to involve in discussions (3). COVID-19 has also forced a number of students to resume job to assist their families (1).

Undergraduate medical students, the future of sustainable health systems expressed their worry about sudden changes in curricular delivery, struggling with virtual lectures, loss of peer interaction, applied activities like dead body or model study, laboratory skills, class-basis examinations, professional examinations, ward activities involving direct patient contact, clinical thoughts and experiences sharing, imposed financial burden and changing aspect of future career plan (4, 7). Finally, mandatory one-year clinical internship, which is a vital practice to make a clinically independent and confident graduate physician, was affected due to panic and fears and many interns have left out or not started their internship (2).

COVID-19 pandemic introduces digital home-schooling worldwide by a variety of methods using various online platforms without any uniformity. Consequently, the government of Bangladesh commenced remote learning. Here, most of the students have access to digital devices, but not internet due to plentiful inadequacy. Sometimes distance education becomes a double-edged sword. Some faculty who are unusual with technology encounter difficulties with electronic equipment, and students who lack initiative and time-management abilities, online learning made it complicated to keep up(8). There is a distinguished disparity between medical educations with general education. Here, virtual learning might be helpful for theoretical knowledge but its effectiveness

for preparing future physicians as competent clinicians is still questionable (4).

An online learning setting, comprising both asynchronous (e.g., recorded videos, podcasts) and synchronous (e.g., video conferences, virtual classrooms) distance education, and the introduction of innovative methods of student judgment has developed to face the challenges during and beyond the COVID-19 pandemic (7). During the changeover from traditional classroom teaching to tele-delivery of educational curriculum, medical students of Bangladesh have to overcome numerous social, economic, and cultural barriers (1). Now, the prolonged crisis has imposed serious implications on their lives, including their academic trajectories. This may lessen their potential of conceptual understanding of medicine, analytical skills, and critical thinking, which will decline their self-confidence in clinical practice (7). It is thus crucial to review the usability of online learning approaches and to establish their feasibility and adequacy for medical students (3). The extent and degree of the impact are yet to be established. Hence, facing and tackling the related challenges may be based on the principles of disaster management, including mitigation, preparedness, response, and recovery (9).

Though costs and benefits are inadequately recognized, educational institution closure has an enormous blow on students' learning (5). Subsequent physical distancing measures have resulted in continuous disruption of daily practices of medical students and institutions(7). Innovative transformations are also needed to overcome the impact of COVID-19 pandemic on medical education here in Bangladesh (4). Educational establishment closure is gambling with the potential of thousands of medical students. It will cost a lot to tone down the deficit as postgraduate students will also suffer in a sequel. Alternative revival options should be more realistic and logical to make a complete and safe physician for mankind.

Conflict of Interests: None.

Ethical Approvals: Not applicable.

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1): e1065 doi 10.22062/sdme.2021.196266.1065

Review

Move to the Fourth-Generation Universities: A Systematic Scoping Review of Educational and Management Strategies

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Received: 2021 June 13
Revised: 2021 November 02
Accepted: 2021 November 03
Published online: 2021 November 14

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Citation:
Salehi AM, Mohammadi HA, Ahmadian M, Khanlarzadeh E. Move to the fourth-generation universities: A systematic Scoping review of educational and management strategies. Strides Dev Med Educ. 2021 December; 18(1): e1065. doi: 10.22062/sdme.2021.196266.1065

Abstract

Background: Higher education is not uniform. There are significant differences between higher education systems among different countries and even among institutions in a similar education or system; therefore, identifying the various types of entrepreneurial activities helps the mission of fourth-generation universities.

Objectives: The purpose of this study was to introduce the most important educational strategies to move towards fourth-generation universities.

Methods: We systematically searched the international databases, including PubMed, Web of Science, Scopus, ISC, SID, and Google Scholar, until 2021 using some relevant keywords. Then, screening and selecting eligible articles according to inclusion criteria were done by two researchers independently.

Results: Soft skills training, sustainable development training, training business law, reviewing the continuous training of professors, promoting ideation and creativity to solve problems, development of interdisciplinary training, decentralization of government accelerators and deployment of private accelerators, privatization of higher education, and internationalization are the most important educational strategies to move towards fourth-generation universities. One of the critical aspects and perspectives of the fourth-generation university is the development of job skills, professions, and competencies and empowerment of students and professors in line with the process of national development and solving society's problems scientifically.

Conclusion: This research's analytical results help the universities design and implement their strategies to reach the fourth-generation universities according to the standard implementation models of the fourth-generation universities.

Keywords: Universities, Education, Policy, Fourth-Generation

Background

The university's evolution can be divided into four generations, medieval or first-generation universities, Humboldt or second-generation universities, and entrepreneur or third-generation universities. Recently, fourth-generation universities have been considered to have extraordinarily active interactions with the social and economic status of the university. Today, universities are changing and moving towards third- and fourth-generation universities (1). First-generation universities were universities with the main aim of not pursuing new knowledge and discoveries. These universities try to protect and maintain past knowledge and teach students complying with church principles and beliefs.

However, in addition to teaching, research was added to the scope of second-generation universities, and the traditional structures of first-generation universities changed by introducing research programs in second-generation universities. Although the second-generation universities were very successful as a major part of creating the modern vision and emerging, they had been under pressure for reasons, such as increasing demand for education, limited governmental funds, the emergence of multidisciplinary research, increasing the area of

university and administrative formalities, and increasing global need for entrepreneurs.

The idea of third-generation universities was presented to remove the pressure, which was noticed in second-generation universities. According to the Cambridge model, unlike second-generation universities to research to increase existing knowledge, a new goal was defined as utilizing knowledge in third-generation universities. Also, in these universities, unlike the second-generation universities, there is a lot of competition with the industrial sector to attract students, professors, and research contracts, and they are less dependent on principles and government laws and funds. Research in third-generation universities is broadly transdisciplinary or interdisciplinary. These universities welcome the idea of consilience [agreement among different academic subjects to achieve a subject or author] and creativity as a propellant. Appendix 1 summarizes the characteristics of the first-, second-, and third-generation universities.

The entrepreneurial university has extraordinarily active interactions with its social and economic status in its conventional sense. However, the objective of these relationships is still the university's internal growth. A more advanced model of a young university can be imagined that attempts to increase the speed of its growth and alter its environment through external activities. The university's interaction with this modified environment significantly affects the university itself. To distinguish this, the idea of a "fourth-generation university" is used, and constructing the institution's environment appears as a task in the mission statement of such a university. Second- and third-generation universities also shape their surroundings, but in this case, the university's primary goal is to influence environmental changes, even its total transformation, to meet the needs of the knowledge-based economy. The fourth-generation university is well-placed in the evolution of higher education. The most striking distinction is that these universities take a far more strategic approach to their environment and proactively influence it.

Several successful examples show that universities play a significant role in improving the competitiveness of some territories, and in many cases, they are actively involved in economic development efforts. Due to rising social and financial commitments, modern economic development requires universities to widen their traditional (education and research) operations. High-quality education is a crucial but insufficient factor in allowing universities to reach their full economic potential. High-quality research is also required to adopt research findings by the local economy. Therefore, the competitiveness of enterprises will be improved leading to the improvement of the region's competitiveness. Universities in developed economic zones are increasingly supplementing their conventional operations (education and research) with third-purpose elements as their influence in society and economy grows. Universities nowadays must meet the needs and demands of a knowledge-based society. Modern, internationally recognized universities are inextricably linked to the local economy; they maintain daily contact with local players (1).

Objectives

Considering the issues mentioned above and the importance of new educational and managerial strategies to achieve sustainable development goals in societies, this study was conducted to review educational-managerial strategies to move towards fourth-generation universities.

Methods

Search strategy: A comprehensive search was first conducted using PubMed, Web of Science, Scopus, ISC, SID, and Google Scholar databases until June 21, 2021, to detect the educational-managerial strategies to move towards fourth-generation universities. To this end, the following keywords, either alone or by conjunctions of ‘’and” or ‘’or’‘, were used to find relevant papers with the concerned keywords in the title, abstract, and keywords sections: "Upgrade","Generation","University","Fourth generation university","University generations", "Approach", "Components", “Educational”"Entrepreneur University","Smart University", and “21st Century University”.

Inclusion criteria were all full texts that explored educational strategies for moving to fourth-generation universities, and based on this index, a wide range of published journals and articles in English and Persian on educational strategies for moving to fourth-generation universities were selected. To select the articles and extract the data, initial screening was based on titles and abstracts. The papers were evaluated independently. The abstracts lacking data were revised for full-text assessment. Then, two researchers individually assessed the full text of the articles and determined their fitness (Figure 1).

Two authors (A.S. and E.K) extracted data from included articles. Using STATA software, the content of the selected studies in the previous stage was carefully examined, and information related to educational and managerial strategies to move toward fourth-generation universities was extracted. The obtained strategies were classified into related groups.

Results

After searching databases until June 21, 2021, 1986 research articles were identified. Of these, 58 duplicates were removed, and 1928 articles were independently examined by two researchers. Initially, 1648 articles were removed after screening their titles and abstracts. Subsequently, the full text of the remaining articles was examined, and 280 articles were excluded. Finally, 58 articles were deemed eligible, of which 14 dealt with soft skills training, 9 with sustainable development training, 8 with reviewing the continuous training of professors,10 with promoting ideation and creativity to solve problems, 6 with development of interdisciplinary training, 10 with decentralization of government accelerators and deployment of private accelerators in university,

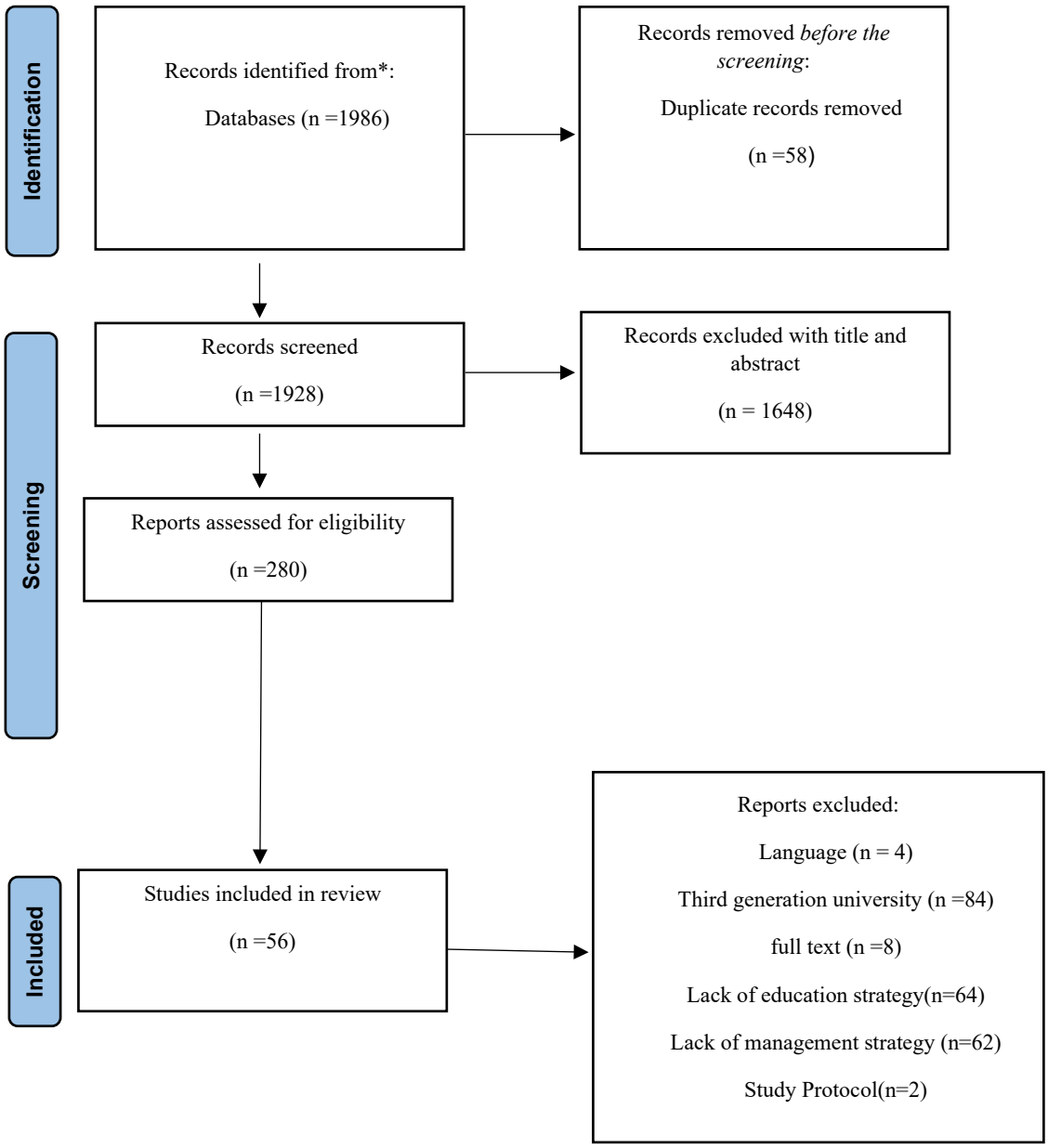

Figure 1. Flowchart of the selection process of the included studies

13 with the privatization of higher education, 7 with internationalization, and 15 with training business law in universities (Figure 1 and Table 1).

According to the article by Zuti et al., the fourth-generation university includes a model consisting of two pillars called "education-research and third mission"(1). The first pillar refers to the traditional activities of universities in the field of education and research, and the second pillar, called the "third mission of the university," deals with the economic development, entrepreneurship, and internationalization of the university. Combining the second pillar with the traditional activities in the first pillar increases the role of universities in improving the economy and society.

The fourth-generation university fits appropriately in the progress of university development. The most noticeable difference between them and other generations of universities is that they are highly strategic and planned because they can actively shape their environment. According to Table 1, each of the educational strategies extracted from the studied articles is a subset of one of the pillars of the proposed model by Zuti et al. for the fourth-generation universities, which each strategy is explained in detail below.

1- Soft skills training

By searching the workplace, we find that hardware skills are more important than soft skills, including problem-solving, creativity, efficiency, utilizing resources, teamwork, listening, and management. In most

Table 1. Evidence from educational-managerial strategies to move towards fourth-generation universities

Pillar	Education-Management Strategy	First Author (Reference)
Education-research	Soft skills training	L. Callagher et al (20), Y.-C. Chang et al (21), P. D' este and M. Perkmann (22), G. Dalmarco et al (23), M. Amaral et al (24), M. O. Arikewuyo and G. Ilusanya (25), L., D. Bienkowska et al (26), D. Di Berardino and C. Corsi (27), A. Adeniran et al (28), E. Amrina and F. Imansuri (29), L. P. Amaral et al (30), P. Sylvestre et al (31), R. K. Mavi (32)
	Sustainable development training	V. Bikse et al (33), N. Budyldina (34), N. Errasti et al (35), D. Farrington and D. Ismaili (36), M. Guerrero and D. Urbano (37), R. K. Mavi (32)
	Reviewing the continuous training of professors	G. Secundo et al (38), M. VAMPA (39), A. Disterheft et al (40)
	Promoting ideation and creativity to solve problems	V. Bikse et al (33), A. G. Bodunkova and I. P. Chernaya (41), J. Bronstein and M. Reihlen (42), N. Errasti et al (35), H. Etzkowitz (43-45), D. A. Kirby et al (46), R. Lombardi et al (47)
	Development of interdisciplinary training	H. Etzkowitz (44, 45), P. Savetpanuvong and P. Pankasem (48), D. Urbano and M. Guerrero (49),
Third mission	Decentralization of government accelerators and deployment of private accelerators in university	V. L. Albulescu et al (50), E. Berggren (51), M. O. Arikewuyo and G. Ilusanya (25), J. Bronstein and M. Reihlen (42), N. Budyldina (34), D. Di Berardino and C. Corsi (27), M. Guerrero et al (52), V. Bikse et al (33), D. Williams and A. Kluev (53), L. Markuerkiaga et al (54)
	Privatization of higher education	V. L. Albulescu et al (50), G. Dalmarco et al (23), E. Berggren (55), M. O. Arikewuyo and G. Ilusanya (25), T. Baaken et al (56), D. Bienkowska et al (26), V. Bikse et al (33), A. G. Bodunkova and I. P. Chernaya (41), N. Budyldina (34), N. Errasti et al (35), H. Etzkowitz and R. Viale (57)
	Internationalization	L. Markuerkiaga et al (54), T. Minola et al (58), V. Ratten (59), M. S. Reshetnikova (60), C. N. Reyes (61)
	Training business law in universities	V. L. Albulescuet al (50), E. Berggren et al (55), D. Bienkowska et al (26), N. Errasti et al (35), V. Bikse et al (33), G. Dalmarco et al (23), H. Etzkowitz (43, 44, 62), M. Guerrero et al (63-65)

universities, hard skills (laboratory, clinical, etc.) are taught well, but little attention is paid to these skills.

The basic need of a university graduate to achieve a job and accept specialized responsibilities of society is a skill; it means individuals in addition to having mental and physical abilities and educational level, need

behavioral characteristics, such as personality, type of attitude, motivation, and personal values that should be achieved by technical, human, and perceptional skills during the education period. Today, in all organizations and institutions, the model of individual and professional competence is used to identify these skills, and accordingly, required knowledge, skills, attitudes, and personality characteristics are determined to achieve every job (2); however, companies and businesses most of the time suffer from the lack of such skills in their workforce.

The existence of graduates who do not use their properties and are just waiting for investment injection to start their work is a serious danger to each country's economy.

The base of this wrong culture goes back to universities, where students do not use government resources properly, and there is much dissipation in these resources, and no one denounces the issue. As a result, that consumerism culture replaces the productive culture, and a graduate student of such a university will never be able to create wealth, and if he/she can, will suffer for a long time because he/she does not know how to manage the resources.

In recent years, these skills have become the pivot of many valid universities around the world. Therefore, it is necessary to plan the actions in this field and combine "being a student" with "skill training." Soft skills can be taught to students through volunteering and holding workshops (3). Volunteering is one of the best ways to teach soft skills because when students accept some of the job responsibilities, such as holding a conference, they gain experiences, such as crisis management, responsibility, public relations, funding, and attracting sponsorship before entering into the workplace (3).

2- Sustainable development training

The global document of countries' sustainable development consists of three parts, macroeconomics, society, and the environment, and pursues seventeen aims. Sustainable development training is one of the most important prerequisites for sustainable development in society. Domestic entrepreneurship will not be achieved unless having a major and hopeful vision for the country's future. Undoubtedly, students need to percept the whole puzzle to understand their place in the development puzzle. Training macroeconomics, sociology, and the environment help students understand the development concept and increase their entrepreneurial motivation for the country's development.

3- Training business law in universities

Entrepreneurship has grown significantly in the last decade, and new ways have been shown for newfound economics. With this development, entrepreneurship training has become essential. Since the focus of the fourth-generation university's activities is on the axes of innovation, technology, and entrepreneurship development, utilizing university growth centers' capacities is the main and unique solution of this approach. To achieve the issue, universities can design courses to teach entrepreneurship and wealth creation in the form of an academic course so that students do not face legal problems or even bankruptcy in their future jobs (4).

4- Reviewing the continuous training of professors

Adding technological training to the retraining of professors will update them. In addition to this training, it is necessary to remove and diminish the one-dimensional, article-based, and second-generation professors; the professors' promotion bylaw and its promotion ways should also be reformed and increased. If innovation and technology are accredited in the bylaw, professors and students will be propelled in this direction.

5- Promoting ideation and creativity to solve problems

Numerous techniques, named creative thinking tools, have been developed to generate innovative ideas. These strategies have originated from developing goods and supporting competition. Meanwhile, there are cases, such as brainstorm, holding ideation contests, and awarding special grants to creative students and professors that make students innovative (5, 6). Therefore, the university is responsible for informing students and creating new knowledge that can be useful for human beings' current challenges. Teaching these techniques to solve students' problems and use their solutions to solve the issues of university, industry, and the health system is considered a reasonable step in moving towards fourth-generation universities (5, 7).

6- Development of interdisciplinary training

Interdisciplinary refers to new knowledge areas that study more than one sheer field of knowledge. Interdisciplinary is not a specialty, and no one can consider himself as an expert in this field; rather, it is a method of producing knowledge to manage the complexities and explore fundamental facts. In other words, interdisciplinary is a process of answering, answering to a complex question, which cannot be addressed through a particular discipline or a profession. Over the past hundred years, higher education based on academic disciplines promoted the pivotal discipline model of specialization. But today, another approach must be added to this field, which is the interdisciplinary approach.

Interdisciplinary is beneficial in terms of being interdisciplinary and rescues scientists trapped in solitary cabins and exhibits the values of technological convergence for society's benefit (8). One of the top strategies for promoting interdisciplinary studies is paying attention to health-oriented disciplines and updating the curriculum of such fields in accordance with the interdisciplinary perspective because the main problem of current curriculums is that they are written with a focus on today's technologies and use the physician-patient relationship model at the moment; However, considering the acceleration of changes in the current curriculums, they cannot prepare students to change (9). In this regard, bioinformatics and social

medicine units can be added to the curriculum of bachelor and general doctorate courses (10).

7 - Decentralization of government accelerators and deployment of private accelerators in university

Entrepreneurship and accelerators have an effective role in this regard; because universities need educational and financial support to create leading entrepreneurship. On the other hand, the government cannot meet all the needs, and the acceleration in private knowledge-based companies is better than the governmental part. The reason is that the remote part always maintains a high level of service to survive the competition (11). Accelerators of private startups have been established to educate and facilitate startups and help universities' economic development. Therefore, the entrance of private accelerators in the field of entrepreneurship education causes the student to connect directly with the startup ecosystem, leading to the improvement of his/her abilities (12).

8- Privatization of higher education

Some researchers believe that the participation of other parts of society in financing higher education services has better results than the time the government is financing these services. While many investigations have emphasized the private part's involvement in higher education, the government is unable to afford the high costs of it. Insufficient government capacity to provide higher education services leads to education privatization (13, 14). It can also refer to the emergence of a knowledge-based economy and the change in university applicants' population composition, which has accelerated the move towards privatization in education (15).

Privatization is the process, by which the government transfers its duties and properties to the private part, which is one of the four principles of "structural reform" in economics. Privatization in medical education means that an organization presents education out of the governmental departments. Private educational institutions are funded in different ways and are under different levels of government control. It means that they can be totally independent or relatively independent or be profitable or non-profit and community-oriented (16).

Regarding the benefits of privatization in higher education, including improving the quality of education, independence of organization, supporting the laws and regulations governing these centers, the absence of high demands and ideals (political and ideological), the possibility of increasing the power of choice and managers' decision-making, better and more practical choice, and increasing competition can indicate the need to move towards fourth-generation universities.

However, apart from the benefits of higher education privatization in medical sciences, privatization in education causes deepening of class gaps and social inequality and changes the educational function, science production, publication, and implementation of academic research according to society's need for applications with the aim of profitability and material investment (17). Accordingly, to move towards fourth-generation universities, it is necessary to pay attention to the advantages and disadvantages of privatization and to carry out privatization properly in higher education.

9- Internationalization

Fourth-generation universities are institutions for strengthening scientific and educational exchanges between different nations and cultures (32). This role is due to two similar but distinct phenomena; globalization means unification, and internationalization means cooperation and partnership (33). Education in the international dimension is a relatively new phenomenon that has led to serious changes in education. In second-generation universities, internationalization was considered an individual activity, and the entire educational system was neglected. However, in fourth-generation internationalization does not focus only on the international transfer of students and professors (34), but all components and elements, including educational systems, areas of scientific transfer, curriculum and learning outcomes, borderless education, transnationalism, internationalization of research, and development of cooperation and capacity building are considered (35). A fourth-generation institution must accommodate student mobility as a result of internationalization (2).

Discussion

Today, fourth-generation universities, in addition to fulfilling the missions and duties of past generations, are responsible for meeting the needs and desires based on the knowledge society. However, the question always arises as to what conditions must be in place for universities to move towards local and global competition. The most important difference between fourth-generation universities is having a strategic approach that can actively shape their environment. Modern economics require new teachings and applications, as well as the participation of society and economics in theory and practice (18).

In this study, the educational-management strategies presented in the related articles were classified into none categories: soft skills training, sustainable development training, training business law in universities, reviewing the continuous training of professors, promoting ideation and creativity to solve problems, development of interdisciplinary training, decentralization of government accelerators and deployment of private accelerators in university, privatization of higher education, and internationalization.

According to the model proposed for the fourth-generation university components by Zuti_et al. (1), five strategies (55%) are related to the first pillar (education-research and third mission), and four strategies (45%) are related to the second pillar (third mission of the university).

Unlike the strategies related to the first pillar, the efficiency of the second pillar is related mainly to the factors within the university and can be easily achieved

with planning and proper and sufficient attention of the stakeholders. The fourth-generation universities are to some extent dependent on the level of the economy of the country and the region, in which the university is located, and these results are consistent with the model proposed by Zuti et al. for the fourth-generation university because the necessary infrastructure to implement the components of each one of the pillars is the level of the local economy (1).

According to the vision document (National Development Document) and the higher education sector in the country's fourth economic, cultural, social, and political development plan, Iran has envisioned the future primarily in economic, scientific, and technological level in Southwest Asia. The general policies and twelve themes of the Fourth Development Plan include issues, such as "laying the groundwork for rapid economic growth," "environmental protection," "spatial development," and "knowledge-based development," which are the strategies derived from this is review can be effective in achieving most of the provisions of the National Development Document (19). Also, regarding fourth-generation universities, such as Harvard and Cambridge universities, in the first step having a sustainable education system at all levels (students, faculty, and staff) and then using financial support from various companies, conducting research work in line with the needs, internationalization and internationalization and attraction of local and international students who have the necessary mobility, the creation of new business enterprises through the inventions of universities, and the transfer of knowledge to institutions and companies are very famous (18). The strategies extracted from the articles are suitable strategies for moving other universities towards fourth-generation universities.

According to the educational-managerial strategies expressed in this study, the following issues are suggested:
- Officials and policymakers in the field of higher education are recommended to facilitate the decision-making conditions of universities and give universities more authority to connect with the private sector and industry through the reform of the method governance.
- Specialists and planners in the field of higher education are recommended to include economic courses in each field in the design and development of the university curriculum.
- Universities are encouraged to develop interdisciplinary culture and values through student associations by increasing interdisciplinary activities.
- It is suggested that universities use student and university projects to solve problems and cultural, social, economic, and environmental issues.

Conclusion

The post-corona world will be an arena of dramatic change and accelerating dynamics. The changes will be so bizarre and rapid so that the lack of proper planning and the slightest carelessness can lead to strategic surprise costs in political, economic, social, and even cultural areas. The future environment will be full of change and uncertainty; the only approach and policy that is likely to be more successful are new perspectives on business issues, the emergence of fourth-generation universities, and the actual use of knowledge and expertise. Elite and the elimination of the traditional top-down view will be in the structure of government. The analytical results of this research help the universities of the country to design and implement their strategies to reach the fourth-generation universities following the standard implementation models of the fourth-generation universities.

Acknowledgments: The authors are grateful to the Student Research Center at Hamadan University of Medical Sciences.

Conflict of Interests: No potential conflicts of interest were reported by the authors.

Ethical Approvals: IR.UMSHA.REC.1400.774

Funding/Support: This study was financially supported by the Student Research Committee at Hamadan University of Medical Sciences

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Appendix 1. Some characteristics of first-, second-, and third-generation universities

Aspect	First-generation Universities	Second generation universities	Third generation Universities
Goal	Education	Education and research	Education, research, and utilization of knowledge
Role	Protection of truth	The cognition of nature	Creation of added value
Output	Professionals	Professionals and scientists	Professionals, scientists, and entrepreneurs
Language	Latin	National	English
Management	Chancellor	Part-time scientists	Professional management

Strides Dev Med Educ. 2021 December; 18(1):e1011 doi 10.22062/sdme.2021.192468.1011

Research Article

Effect of Integrated Teaching on Students' Learning

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Received: 2020 July 01
Revised: 2021 January 10
Accepted: 2021 January 25
Published online: 2021 March 08

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Citation:
Ebrahimzade A, Mohammad Reza Abedini MR, Ramazanzade K, Bijari B, Hamed Aramjoo H, Zare-Bidaki M.. Effect of Integrated Teaching on Students' Learning. Strides Dev Med Educ. 2021 December; 18(1):e1011. doi: 10.22062/sdme.2021.192468.1011

Abstract

Background: Currently medical education in Iran consists of basic sciences, physiopathology and clinical stages. Medical students learn them separately and often are confused that how basic sciences materials would be helpful for the patient's diagnosis and treatment. Integration of various related subjects during medical education is one the proposed strategy to overcome this problem.

Objectives: The present study was conducted to assess the effect of an integrated teaching approach on medical students' attitudes and knowledge about infection diseases.

Methods: This quasi-experimental study was conducted in the infectious disease ward of Valia-e-asr Hospital affiliated to Birjand University of Medical of Sciences, Birjand, Iran. A total of 60 medical students (stagers) were randomly selected and assigned to the control and intervention groups. The two groups were matched based on their grade point average (GPA), age, and gender. An integrated teaching approach was adopted in the intervention group by four epidemiology, microbiology, infectious diseases, and pharmacology professors. The students' knowledge was assessed by a written exam, and their attitude was evaluated using a questionnaire. Data was analyzed by SPSS version 16 and using paired and independent samples t-test.

Results: The analyses showed that 52% of the participants were male. The mean scores in the cognitive and emotional domains were not correlated with students' gender, and they were not significantly different before (p= 0.12) and after (p= 0.25) the intervention. The students' final learning scores were significantly higher in the intervention group than that of the control group (16.16±1.17 vs 14.12±1.73; p=0.001).

Conclusion: The integration of basic and clinical subjects helps students to better understand the physiopathology of diseases and enhances their satisfaction.

Keywords: Infectious Diseases, Integrated Teaching, Learning, Medical Students

Background

The medical education system in Iran consists of three separate major levels, including basic sciences, physiopathology, and clinical stages (1, 2). The basic sciences level is taught in the first part of the curriculum and takes about two to three years. Students learn basic sciences and the necessary skills before entering the clinical stage (2). The courses in the level of the basic sciences are related to the human body, such as Physiology, Epidemiology, Biochemistry, Microbiology, Immunology, etc. After completing the stage of the basic science, students enter the physiopathology level, which generally takes one year (3). At this level, they learn the signs, symptoms, diagnoses, and treatments of diseases and the factors influencing disorders. The Pharmacology course is also presented at this stage (3). The clinical-stage includes two parts, including the apprenticeship (stagership) and internship levels. In the stagership period, which takes two years, medical students gain a clinical and pathological understanding of diseases and acquire the necessary skills to treat patients under the supervision of clinical teachers. Students also learn practical skills, including

clinical examination, diagnostic techniques, and treatment methods. The clinical internship period usually takes 18 months and includes skills training and clinical decision-making independent from professors' supervision. At this level, students start disease diagnosis and treatment (3).

The teaching processes for medical courses are traditionally separate. Basic sciences are instructed in the first 2-3 years of the curriculum, whereas the clinical subjects are usually presented in the last part of the curriculum. Medical students are mostly confused in the early years of their studies. One of the most important and controversial questions they raise is that how much theoretical contents from basic sciences would be useful for disease diagnosis and treatment (2). Evidence shows that there is no logical relationship between the basic and clinical subjects, and the inappropriate method and time for teaching has made the problem even more complicated. The integration of basic and clinical courses is a strategy suggested by the Ministry of Health and Medical Education in Iran (3).

Special attention was paid to designing interdisciplinary curriculum programs, also called the integrated teaching/ learning approach, from 1930 to 1980, which was the golden time for curriculum development (4). The purpose of curriculum integration is to link and to mix the contents from different disciplines to meet the basic educational needs of learners and improve their level of thinking (5).

Integrated instruction is defined as a kind of teaching approach within which students at the same time analyze a variety of knowledge related to a certain scientific course but from different dimensions (6). Integration includes a set of programmed learning experiences that not only provide a collection of common information and knowledge for learners but also enables them to discover new relationships among different scientific disciplines for better learning of a subject as a whole (7). Integration in the teaching process occurs in different formats, such as single-threaded, multi-disciplinary, and inter-disciplinary approaches. In the single-threaded approach, learning in one field is simultaneously improved by learning another field. In multi-disciplinary integration, an educational subject is taught by teaching several related subjects. However, in interdisciplinary integration, the merging of the teaching process occurs by mixing two courses and establishment of a new educational course (8). The integrated teaching approach offers numerous advantages, including interdisciplinary relationship, a more efficient teaching/learning process, improvement of the level of education, translating from knowledge level to practice and problem-solving level, increasing students' motivation, and finally, enhancing the cooperation of professors in a multi-disciplinary academic environment (8, 9).

It is believed that the integration of basic and clinical sciences provides opportunities to improve physicians' competencies and prepare them to adapt to evolving technologies and patient expectations. The attitude and working habits of learners have been improved, and their team work attitude has substantially increased in the integrated method (1). This type of integration in medical education also enhances the application of basic sciences' principles to improve students' critical thinking, resulting in efficient clinical decision making (9).

Objectives

Considering the fact that several studies emphasize the superiority of the integrated teaching method and differences in learning and teaching cultures, the objective of the present study was to determine the effectiveness of integrated teaching method in the cognitive and emotional domains among the medical students attending the theoretical course of Infectious Diseases at Birjand University of Medical Sciences. We also sought to compare the impacts of integrated and traditional teaching methods on students' learning scores.

Methods

This semi-experimental study was carried out in a course on infectious diseases, including the infectious disorders caused by several bacteria, including *Mycobacterium tuberculosis*, *Homophiles influenza*, *Pseudomonas aeruginosa*, *Staphylococcus aurous*, and *Streptococcus pneumonia*. The course was offered in the infectious diseases ward at Vali-e-Asr Hospital affiliated to Birjand University of Medical Sciences, Birjand, Iran. All participants were randomly divided into control and intervention groups based on their age, gender, and the GPA score of basic sciences courses.

The participants were all medical students who were at the stager stage (fourth year) and had registered for participation in the Infectious Diseases course in the academic year 2017-18. Medical students who were not interested in participation in the study or were absent for more than one session were excluded. Finally, 60 medical students participated in the study.

Initially, a pre-test was taken to evaluate the primary knowledge of both control and intervention groups regarding infectious diseases. The possible marks ranged from 0 to 20. Using a researcher-made questionnaire, we also asked for the students' opinions regarding the cognitive and emotional effects of the integration of basic and clinical courses of infectious diseases as a new teaching method.

Then, the control group, including 30 medical students, attended an infectious diseases course on the above-mentioned subjects during four sessions (8 hours) by a professor who was a specialist in infectious diseases. At the end of the course, a summative evaluation (post-test) was performed as the final exam. Using a questionnaire, we also obtained the students' opinions regarding the effect of this method on their cognitive and emotional functions.

In the next semester, the other 30 medical students from the same level (experimental group) participated in an integrated teaching/ learning approach, including four sessions (8 hours) following a pre-test. Using a questionnaire, we also obtained students' opinions regarding the effect of this method on their cognitive and

emotional functions. A collection of faculty members from the Epidemiology, Microbiology, Infectious Diseases, and Pharmacology departments presented their teaching contents in an integrated method at the same time and the same location as the traditional teaching method.

Before the beginning of the course, the objectives for the integrated teaching method were explained to the students, and their informed consent to attend the study was obtained. The course syllabi were identical in both teaching methods. Therefore, other professors agreed to cover only the same materials which were formerly taught by the professor who was a specialist in infectious diseases. While all the professors were present during the class, the integrated method was performed as follows: The first 10 minutes of each session were devoted to evaluating the students' learning and drawing their attention to remarkable and more important points in each subject. Then, the microbiology professor explained for 15 minutes the structure of the microorganism, virulence factors, the organism characteristics in culture and microscopy, and the general method of pathological diagnosis. Then, for 15 minutes, the epidemiology professor presented a detailed epidemiology of the disease in the world, Iran and South Khorasan. After that, 10 minutes was devoted to questions and answering them as well as discussion related to these two parts. Afterward, the infectious diseases professor talked about the related diseases, symptoms of each disease, differential diagnoses, and pathological and radiographic diagnoses for 35 minutes. Finally, for 15 minutes, the pharmacology professor explained the treatment, selected antibiotics, and their application in the related infections, treatment challenges, interactions, and side effects. The last 10 minutes were assigned to asking questions, answering, and general discussion by the students in the presence of the four professors. At the end of the 4th session, using the same checklist, the students' points of view were recorded in two levels. Summative evaluation was also conducted by performing a post-test similar to the pre-test. Also, the students' points of view were obtained with the same questionnaire used for the control group.

Data was entered into SPSS (v.16), and learning outcomes were assessed in both groups by comparing their mean scores before and after the teaching procedure with each other using *t*-test. In the intervention group, the students' points of view were also analyzed in the cognitive and emotional domains using paired *t*-test. A *P*-value of less than 0.05 was considered significant.

The present study was designed and conducted as an educational scholarship project approved by the center for the development of medical education (EDC) at Birjand University of Medical Sciences, and the need for its ethics approval was waived by the Vice-Chancellor for Education in Birjand University of Medical Sciences (Certificate No. 1213119/12). Before starting the project, the study objectives were explained to all the participants. Those who agreed and signed the written informed consent were enrolled. The participants were informed that participation was voluntary and they could leave the study at any time.

Results

The mean age of the participants was 19.49±1.51 years, and 52% of them were male. There was no significant difference between the two groups regarding their demographic information. The mean scores of the students' points of views in the cognitive domain before and after the intervention were 24±1.38 and 25.8±1.36 out of 45, respectively. Although the students' mean score in the cognitive domain was higher after the teaching intervention, but this difference was not significant (P=0.12). The same trend in the emotional domain was observed. The mean scores of the emotional domain before and after the procedure were 23.2±1.42 and 24.6± 1.26 out of the total of 45, respectively (P=0.25).

Comparison of mean scores in cognitive and emotional domains in the two genders revealed no significant differences. Indeed, the mean score for the female and male students in the cognitive domain were 24.6±8.3 and 27.1±4.8 (P=0.36), respectively. In the emotional domain, these values were 22.9±7.7 for female and 26.5±3.8 for male students (P=0.16). Our findings also showed that the students' final marks (mean) in the intervention group was 16.16±0.23 out of 20, whereas this value for the control group was 14.12±0.35. Statistical analysis of the data revealed that the integrated multidisciplinary method was significantly more effective in promoting learning compared to the traditional teaching method (P<0.001; Table 1).

Discussion

This study examined the effect of integrated teaching on medical students' attitudes and knowledge about infectious diseases using a questionnaire. There was no significant difference between the two groups in terms of their attitudes towards the teaching methods. Although the mean scores for both cognitive and emotional domains increased after the intervention, the differences were not significant. This could be due to the small sample size, which is one of the limitations of our study and needs further investigation with larger sample sizes. Also, no association was found between gender and scores neither in cognitive nor in emotional domains. Although the mean score in the cognitive domain for male students was higher than the female students' mean score, this difference was not significant.

Table 1. Comparison of summative marks (mean) between the intervention and control groups

Procedure	N	Std. Deviation	SE	P
Integrated	30	1.17	0.23	0.001
Traditional	30	1.73	0.35	

Also, the mean score of male students in the emotional domain was higher than female students' mean score; however, this difference was not statistically significant. These findings were consistent with the results of other studies.

In a study by Rosse et al. on teaching of Anatomy course, the results showed that students showed better progress by the integrative approach in comparison to the traditional method not only in the cognitive dimension but also in the social and emotional domains (10). Another study conducted in three medical schools in Holland to compare the impact of different educational methods on preclinical (the second-fourth years) and clinical students (fifth-sixth years), it was shown that students who were taught by the integrated method had a higher accuracy in clinical diagnosis in comparison with other students who were instructed by two other methods, such as traditional and problem solving (11). In another study conducted by Marreez in 2013, two groups of junior medical students participated, and the effect of the integrated teaching method was assessed on their attitudes and performance. They reported that the mean score for students' attitudes significantly increased due to the integrative teaching method. Students' attitude scores toward importance factors like the first impression with patient, general information for diagnosis and treatment procedure, and disease diagnosis were all significantly higher after integrated teaching (12).

Our study presented that summative marks for students' knowledge in the integrated method were significantly higher than those in the traditional one. This finding signifies the fact that the implementation of the interdisciplinary, integrated method for teaching the Infectious Diseases course had a remarkable positive impact and improved students' learning. This finding is consistent with the results of other studies. In an interventional study in the form of pre- and post-test by Vyas in 2011, 45 sophomore medical students participated in a Gastrointestinal course in the first year of the medical program. It included early clinical exposure, problem-based learning, small group laboratory work, and lectures. The evaluation of the program was formative with PBL sessions and summative using Knowledge exam and PBL. Students reported that their attitude towards the quality and efficacy of medical training increased by 81% after the implementation of the program. A positive feedback was received from the students and faculty members on the benefits. The students suggested that integrated teaching is a necessity for their learning and could be applied for other courses in the curriculum, as well (13).

Brauer et al. conducted a study aimed at evaluating the integration of medical subjects, such as Physiology, Anatomy, and Biochemistry in a Gastrointestinal Diseases course. The period of integration was three weeks each year. Sixty students participated in the study in each year, and their total period of education was three years. The teaching method included lecture, group discussion, and patients' clinical examination. The students were divided into small groups consisting of six individuals. The professors were selected from Biochemistry, Physiology, and Anatomy departments. The procedure was carried out by a professor in each subject, and at the end of the three weeks, the students were assessed. The students believed that this approach could not only increase the cooperation between the basic and clinical departments but also it could motivate them to use their basic knowledge in the clinical stage. Eighty percent of the students reported that this teaching method could improve their scientific learning and skills in medicine (14).

In a survey of physicians and undergraduate students regarding the simultaneous teaching of basic and clinical sciences, they reported that this approach helped them to better understand their responsibilities as a physician in the society. They also emphasized the importance of cooperation among health systems in the treatment of patients. Regarding the cognition domain, the students reported that they better understood the diseases, and it also provided a powerful clinical information network in their minds and resulted in better disease diagnosis. In the behavioral domain, this integrated teaching method provided them an atmosphere to feel that they belong to the society and changed their attitudes and behaviors to have a better judgment about diseases. This method also helped them to achieve the skills needed for better communication and their improved social relationship with patients (15).

To improve the quality of teaching in modern medical education, various strategies have been taken into consideration as the basis for the integration of basic and clinical sciences in the curriculum of medicine. The SPECES teaching strategy proposed by Harden (16) is the major strategy, which consists of six items, as shown in Table 2.

The integrative approach is an important teaching method that aims to establish a relationship among academic subjects. One of the integration types is the vertical integration for the basic and clinical subjects. Recently, there has been a global desire for early clinical exposure (ECE) in the initial years of educational programs in medical training systems. The advantages of the vertical integration and ECE include students becoming more motivated to learn deeply, better understand the basic and clinical sciences, and more appropriately apply their knowledge for better clinical reasoning (17).

Kalpana reported that the integrated teaching method in medical education promoted learning by 61.5%, enhanced treatment performance by 70%, and improved students' attitude towards this teaching method by 67%. However, these figures for the traditional teaching method for the basic sciences and clinical stages were only 27%, 37% and 20%, respectively. The average of their marks was also increased significantly in the integrated method when compared with the other methods (18).

In a study conducted by Brumpton in 2013 to evaluate the opinions of medical students regarding an integrative teaching program, 125 fifth-semester students were

selected. Ninety percent of the students believed that the integrated teaching method helped them to improve their knowledge, skills, and scientific reasoning. Eighty-two percent of them also believed that the integrated teaching approach enhanced their abilities in clinical examination. Fifty-two percent of the students preferred horizontal integration to vertical integration. Medical education is constantly evolving and more than half of the schools in the United States change their curriculum annually through vertical and horizontal ways of integration (19). A study conducted by Zolfaghari et al. to develop a concept mapping strategy for integrating the basic and clinical sciences for Nursing and Midwifery students showed an increase in students' learning and participation. This study can be expanded to integrate clinical and basic training in other medical education programs (20).

Strengths and limitations

We engaged with a main limitation in this study and introduced a teaching method. To apply this method, it was necessary to coordinate the presence of several professors in the classroom. Also, with the presence of several professors, many questions and discussions were raised that extended beyond the class time. However, these discussions and challenges, especially with the presence of professors of basic medical sciences and clinicians, were a strength of the class both for the students and for the professors.

Conclusion

In general, the integration of the basic and clinical subjects helps students to better understand the physiopathology of diseases, improves their abilities, grows their personal talents, and prepares them to have an excellent level of mastery and expertise for their future profession.

Suggestions for future studies

It is suggested that this teaching method be used not only in the Infectious Disease course but also in other clinical courses. Moreover, this method should be offered at least in a few sessions for each course. In this way, students can gain a more accurate understanding of the relationship between basic and clinical sciences and will be able to apply their knowledge of basic medical sciences in disease diagnosis and treatment.

Acknowledgments: The authors would like to thank all the students who participated in this study.

Conflict of interests: None declared.

Ethical approval

The present study was designed and conducted as an educational scholarship project approved by the center for the development of medical education (EDC) at Birjand University of Medical Sciences, and the need for its ethics approval was waived by the Vice Chancellor for Education in Birjand University of Medical Sciences (Certificate No. 1213119/12).

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e1026 doi 10.22062/sdme.2021.195075.1026

Research Article

A Student-as-Teacher Program: A Pathway to the Accountability of Medical Education Systems

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Received: 2020 September 29
Revised: 2021 January 30
Accepted: 2021 February 06
Published online: 2021 March 08

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Citation:
Keshmiri F. A Student-as-Teacher Program: A Pathway to the Accountability of Medical Education Systems. Strides Dev Med Educ. 2021 December; 18(1):e1026. doi: 10.22062/sdme.2021.195075.1026

Abstract

Background: Teaching is identified as a necessary role and responsibility for junior faculty members in their future careers.

Objectives: The present study aimed to test the hypothesis that a student-as-teacher (SaT) program can effectively prepare the students for their future roles as teachers and educators.

Methods: In this quasi-experimental study, the participants included 143 postgraduate students of 12 doctorate and master's degree programs at Shahid Sadoughi University of Medical Sciences, who were selected by census method . Nine learning objectives were classified in four competency domains: (1) adult learning principles; (2) instructional design; (3) teaching and learning processes; and (4) learner's assessment. The educational methods were based on an active learning approac.

Results: The mean score of learners in the practical assessment was 12.5±3.6 out of 15, and their mean score in the modified essay test was 8.5±1.5 out of 10 after the educational intervention. The results showed that the scores of the learners' attitude about cooperative learning were significantly different before (2.38±0.31) and after (4.15±0.65) the intervention (P=0.0001). Also, the scores of learners' capabilities in teaching were significantly different before (2.5±0.61) and after (3.80±0.34) the intervention (P=0.0001). The learners considered their teaching capabilities to be at the level of "familiarity without mastery" and "implementation mastery" before and after the intervention, respectively (P=0.0001).

Conclusion: It is recommended to develop and implement SaT programs to improve the teaching capabilities of students using innovative teaching methods and prepare them for their future roles as instructors and teachers.

Keywords: Teaching, Competency, Educational Capability, Postgraduate Program

Background

Over the past decades, the preparation of learners for fulfilling multiple roles in their future careers has become a major responsibility of educational systems. Teaching has been described as a role of junior faculty members in professional health programs (1). These faculty members should be able to educate their colleagues, learners of other disciplines, and recipients of services. The student-as-teacher (SaT) and resident-as-teacher (RaT) programs in clinical disciplines have been introduced as important components of professional health education (2-4).

Recently, the preparation of learners as teachers for fulfilling different roles, especially at postgraduate levels, has been emphasized (1, 5, 6). In postgraduate programs, such as doctorate and master of sciences (MSc) degrees, the development of research skills and evidence-based practice has been highlighted, besides the development of teaching capabilities. The implementation of teaching and learning methods, such as problem-based learning, small group learning, active learning methods, and self-directed learning skills, has also been underlined in various studies (1, 5, 7-9). Besides, the ability to facilitate the learning process in different environments, use role models and apply practice-based learning skills, and communicate with learners has been introduced as an essential skill of students (10, 11).

In postgraduate programs, the learners' use of teaching skills for different audiences in a variety of environments has been described as a major competency. Postgraduate and graduate programs generally define the main context for preparing the students to play a teaching role. Different roles and skills have been described for a teacher in medical education systems (12). The National Framework for Professional Standards for Teaching in the United Kingdom reported that the competencies of an efficient teacher include acquisition of basic knowledge and commitment to professional values and doing activities (12). Besides, in the Three-Circle Model, three components are defined as the competencies of an excellent teacher: "Doing the right thing" (planning, facilitating, learning, and evaluating), "doing the thing right" (mental/emotional intelligence and analytical/creative intelligence), and "the right person doing it" (professionalism) (12, 13).

Molenaar et al. described a framework of teaching competencies across the medical education continuum. This framework defined teaching at a micro level and divided it into development, organization, coaching, and evaluation domains (14). Overall, it is important to provide educational opportunities for learners to achieve these competencies. In this regard, a systematic review of peer teaching programs among healthcare professionals showed that the implemented programs included the foundations of education theories, teaching methods and techniques, and feedback. In a previous study, the needs of healthcare providers, including students, graduates, and experienced workers, were highlighted to improve the teaching skills of future teachers. However, future studies are needed to evaluate the objective methods of evaluation in the programs (15).

Furthermore, Mann et al. and Freret et al. suggested twelve instructions to develop RaT or SaT programs (6, 7). Freret et al. divided the instructions into three domains, including pre-implementation, implementation, and post-implementation (6). Another study reported that the SaT curriculum consisted of feedback, teaching and clinical perceptions, small-group teaching, case-based teaching, and professionalism (5). Besides, the results of a study by Muir et al. revealed that providing teaching situations for several months led to the participants' preparedness for their teaching responsibilities in their working life (16).

One of the main goals of postgraduate programs in health sciences is to enable the learner to participate in the teaching process (1). Despite the significant teaching role of graduate and postgraduate learners, many of them receive no formal education on how to teach effectively (17). Doctoral and master's degree graduates are hired by universities as teachers, without any formal training about teaching skills. In previous studies, the need assessment of doctoral students at the schools of medicine and public health showed that these students assessed their capabilities to be at the level of "familiarity without mastery". The lowest level of capabilities was determined in the assessment domain, and the most important educational need was related to the methods of increasing motivation among learners (18, 19).

Generally, the development of the postgraduate students' ability to play teaching roles is one of the most important requirements of healthcare systems (7). The SaT program is incorporated in the curriculum of postgraduate programs at the Public Health school of Shahid Sadoughi University of Medical Sciences. It seems that by developing SaT programs, we can improve the learners' teaching competency (18, 19).

Objectives

The present study aimed to test the hypothesis that SaT programs can effectively prepare the students for their future roles as teachers and educators.

Methods

This quasi-experimental single-group study was conducted in two phases. In the first phase, an educational program, based on an active learning approach, was developed to improve the teaching skills of postgraduate students. In the second phase, the educational program was implemented for the postgraduate students at the Public Health School of Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Twenty-four faculty members of the Health Education and Medical Education Departments participated in the program development process. In the second phase, the postgraduate students of MSc and doctorate programs at the public health school were recruited by census method. Finally, 143 postgraduate students of 12 different PhD and MSc programs participated in the SaT program. First, the educational program was developed. A Delphi technique was used to collect the expert opinions about the main teaching roles of an assistance teacher in the SaT program. In the first round, an open question was asked to gather the opinions of the participants by email. This process was conducted in three rounds, and 77 competencies and skills were extracted. Next, the SaT program was developed by an expert panel, including eight PhD graduates of health education. Nine learning objectives were classified in four competency domains: (1) adult learning principles; (2) instructional design; (3) teaching and learning processes; and (4) learner's assessment.

The educational content of the program included the teacher's role in the medical education system, the design of the program plan and its components, principles of small group learning, active learning methods, and feedback or reflection as an educational tool and assessment method. Small-group learning (snowball groups, group discussion, and buzz groups), role-play, review of videotaped sessions, and case-based learning were determined as the educational methods based on the active learning approach. First, the learners were familiarized with the adult learning principles. Second, they were exposed to the active learning methods in the classroom; this step allowed the person to play different roles, such as facilitator and group member in interactive learning activities. Third, the learners designed and

implemented a classroom as a teacher, based on the active learning approach (real situations in practical teaching). The interventions were implemented in eight sessions (16 hours) over six semesters.

A 16-item self-assessment questionnaire was used to examine the students' educational capabilities and needs. The questionnaire was developed by Farhadian (20) and validated among postgraduate students in a previous study (Cronbach's alpha of educational capabilities, 0.86; Cronbach's alpha of educational needs, 0.95) (18). The scores for each capability ranged from 1 to 4 (1= "non-familiarity" and 4= "mastery"), and the scores of educational needs ranged from 1 to 5 (1= "very low" and 5= "very high"). The questionnaire was completed by the learners before and eight weeks after the educational sessions.

Moreover, the learners' attitude toward the use of cooperative learning was assessed using a 12-item questionnaire, developed by Farzaneh and Nejadansari (21). The validity of this questionnaire and its internal consistency were approved (Cronbach's alpha=0.82) in the present study. Besides, the learners answered tem modified essay questions after six weeks of the educational sessions. The modified essay questions were short scenarios, followed by questions that assessed cognitive skills, such as organization of knowledge, reasoning, and problem-solving (22).

To assess the learners' teaching performance, each learner designed and delivered an educational session based on the active learning approach in a classroom situation. The teaching performance of the learners was assessed using a 13-item checklist by observing their performance after four weeks of the SaT program. The modified essay questions and the observational checklist were developed by the expert panel and validated by medical education experts (n=10). The frequency and percentage were measured for describing the sample characteristics. Mean, and standard deviation (SD) were also calculated for all instrument scores. The self-assessment results were compared using the student's t-test and ANOVA in SPSS version 16.

Results

Postgraduate students from 12 MSc and doctoral programs, including 74 women (51.74%) and 69 men (48.25%), participated in the SaT program (n=143).

Table 1. The students' attitude toward cooperative learning

Items	Pretest Mean (SD)	Posttest Mean (SD)	P
1) I willingly participate in cooperative learning activities.	2.45(0.30)	4.4(0.40)	0.001
2) When I work with other students, I achieve more than when I work alone.	3.0(0.18)	4.3(0.32)	0.001
3) Cooperative learning can improve my attitude toward work.	2.1(0.42)	4.8(0.9)	0.001
4) Cooperative learning helps me to socialize more.	2.0(0.52)	4.6(0.82)	0.0001
5) Cooperative learning enhances good working relationships among students.	2.5(0.28)	4.3(0.99)	0.0001
6) Cooperative learning enhances class participation.	2.3(0.32)	4.9(0.85)	0.0001
7) Creativity is facilitated in the group setting.	1.79(0.17)	3.7(0.70)	0.01
8) Group activities make the learning experience easier.	2.5(0.57)	3.4(0.53)	0.001
9) I learn to work with students who are different from me.	2.8(0.21)	3.6(0.48)	0.001
10) I enjoy the material more when I work with other students.	1.47(0.40)	4.3(0.69)	0.0001
11) My work is better organized when I am in a group.	2.0(0.38)	3.3(0.73)	0.001
12) I prefer that my teachers use more group activities/assignments.	2.57(0.27)	4.1(0.50)	0.01
Total	**2.38(0.31)**	**4.15(0.65)**	**0.0001**

Table 2. Comparison of the level of learners' capabilities before and after the educational intervention

Items	Pretest Mean (SD)	Posttest Mean (SD)	P
1. Understanding the general concepts of learning, teaching, and assessment	2.60(0.72)	4.0(0.33)	0.0001
2. Developing a lesson/course plan	2.30(0.82)	4.0(0.14)	0.0001
3. Delivering lessons based on a logical structure	2.60(0.84)	4.0(0.59)	0.0001
4. Methods of improving motivation among learners	2.48(0.88)	3.6(0.39)	0.001
5. Improving critical thinking among learners	2.29(0.87)	3.6(0.63)	0.001
6. Methods of managing difficult situations in lectures	2.52(0.85)	4.0(0.29)	0.0001
7. Methods of managing difficult situations in the classroom	2.76(0.78)	4.0(0.38)	0.0001
8. Using a variety of teaching materials	2.65(0.88)	3.9(0.49)	0.0001
9. Giving lectures	2.48(0.81)	3.8(0.50)	0.0001
10. Conducting a variety of teaching methods in the classroom setting	2.61(0.79)	4.0(0.31)	0.0001
11. Having effective presentation skills in community or scientific settings	2.61(0.83)	3.8(0.29)	0.0001
12. Implementing the learner's assessment methods	2.54(0.78)	3.9(0.40)	0.0001
13. Designing multiple-choice questions	2.44(0.87)	3.4(0.34)	0.001
14. Interpreting and analyzing the results of learner's assessment	2.16(0.88)	3.5(0.71)	0.001
15. Applying evaluation results	2.20(0.94)	3.8(0.12)	0.001
16. Finding academic information resources	2.20(0.87)	3.6(0.70)	0.001
Total	**2.53(0.61)**	**3.80(0.34)**	**0.001**

The mean age of the participants was 31.4±6 years. Forty-three students (30%) had a teaching experience. The obtained data were tested for normality using the Kolmogorov-Smirnov test (P=0.08). The results showed that the scores of the learners' attitude were significantly different before (2.38±0.31) and after (4.15±0.65) the intervention (P=0.0001) (Table 1). On the other hand, the results revealed no significant difference in the learners' scores according to their age (P=0.08) or gender (P=0.1).

The mean score of the learners in the practical assessment was 12.5±3.6 out of 15, and the mean score of the modified essay test was 8.5±1.5 out of 10 after the educational intervention. The results revealed that there was no significant difference in the learners' scores according to age (P=0.2) or gender (P=0.4). The students reported that their skills before the intervention were at the level of "familiarity without mastery" (2.53±0.61). However, after the intervention, the mean score of the learners was 3.80±0.34, which is in the category of "implementation mastery".

Moreover, the results showed that the learners' self-perception about their capabilities was significantly different before and after the intervention (P<0.05) (Table 2). Besides, there was a significant difference in the scores of male (3.74±0.41) and female (3.87±0.25) students (P=0.02). Although the scores of both groups increased, the scores of women was reported to be higher than men. Nevertheless, the results revealed no significant association between the learners' score and age group (P=0.09).

Discussion

Postgraduate programs in health education mainly contribute to the development of teaching skills of learners, who will become junior faculty members in their future careers. The results of the present study showed that the SaT program improved the teaching capabilities of learners. In other words, the attitude, self-perception, and performance of the learners improved after attending the SaT program.

Generally, the SaT approach is integrated in graduate and postgraduate programs to prepare the learners for their various future roles, such as teaching (1). Six roles have been identified for a teacher in the medical education system, which include the planner, information provider, facilitator, resource developer, evaluator, and role model. This framework of teacher roles can be helpful in clarifying the expected roles, identifying the necessary skills for teaching at universities, and recognizing the recruitment needs of faculty members (23). It seems that this framework can be applied to the SaT programs.

In the present study, the main competencies of the defined teaching roles in the classroom were considered. The capabilities were associated with roles, such as the planner, information provider, facilitator, evaluator, and role model. The essential skills of an excellent teacher are defined as having small-group teaching skills, providing feedback, understanding the learners' needs, and assessing the learners (3, 10, 23, 24), which were also considered in the SaT program of the present study. Besides, it is important for the participants to learn to establish an interactive relationship with the learners (reciprocal and non-judgmental interaction) and support them in the teaching-learning process (10, 13, 25). These skills are defined as the curricular priorities of SaT programs (5), similar to our program.

Generally, the goal of SaT programs is to consider the learner's preparation for applying an active learning approach in the future and changing his/her attitude. In the present study, the learners were involved in an active learning process that led to the acquisition of teaching skills and promoted a positive attitude toward the active learning approach. Similarly, a systematic review of RaT programs showed positive changes in the participants' attitudes toward teaching. Also, the participants' knowledge about the educational principles increased, which is in line with the present results (26). The results of different studies support our findings regarding the positive effects of SaT on the teaching skills, and attitude about student-centeredness (27, 28).

The establishment of student-centeredness and active learning approaches, which focus on acquiring knowledge through thinking, discussion, and participation in group activities (29), is needed to change various components of the educational system, such as human resources and infrastructure. Also, the preparation of postgraduate students, who will be junior faculty members in the future, can expand these approaches at universities. Besides, it is recommended to apply teaching methods, such as large and small group discussions, role-play, and videotaped vignettes in the SaT curricula, to expanded the attitude and preparedness of future teachers (17).

According to the present results, the learners assessed their skills to be at the level of "familiarity without mastery" before the intervention, which is consistent with the results of previous studies (18, 19). The learners stated that "understanding the general concepts of learning, teaching, and assessment", "delivering the lesson plan based on a logical structure", and "improving critical thinking among learners" were the most needed aspects of education; this result is in line with the findings of previous studies among postgraduate students (19). Moreover, the present results showed that after the intervention, the learners' capabilities improved to a higher level, which confirms the effectiveness of SaT interventions in improving the teaching skills of learners.

The learners evaluated their abilities to be at the level of "implementation mastery" and their practical and cognitive skills to be at an "optimal level". The results showed that the learners assessed their skills in understanding the adult learning principles, instructional design, and implementation of teaching method domains to be higher than the assessment domain. In line with the present findings, a review study of the SaT curricula showed that the teaching behaviors and confidence of learners improved after attending the program (17). According to the results of a study by Donovan, the program directors

believed that improvement of teaching skills helped the residents to become better healthcare providers. It was concluded that the SaT program prepared the learners to play effective teaching roles, which helped them become professionals (30).

In line with the present study, the results of a study by Hosein Nejad et al. showed that the residents' attitude toward teaching abilities improved significantly after the intervention; however, there was no significant difference in the teaching performance of the residents from the viewpoint of interns (31). These results may be attributed to the educational methods that were used in their study. In the present study, the learners engaged in active learning methods that can improve the performance of learners. Also, the discrepancy between the findings may be due to differences between the evaluators in these studies. Besides, in the study by Hosein Nejad et al., the learners' performance was assessed from the viewpoint of consumers, which is different from our study. Other limitations of the present study include its single-group design and lack of a control group. Also, assessment of the learners' practical skills was performed only after the intervention, which is another limitation of the present study. It is recommended that future longitudinal studies assess the impact of SaT interventions on the participants' teaching behaviors.

Conclusion

The results of the present study indicated the improvement of the teaching abilities of learners who attended the SaT program. Overall, the use of an interactive learning approach in SaT programs can improve the students' skills and attitude as future teachers. It is recommended that SaT programs be developed as elective courses to improve the teaching skills of learners who want to become university instructors in the future.

Acknowledgement: Athor wish to thank various participants for their contribution to this project.

Conflict of Interest: The author declared there was not conflict of interest.

Ethical Approvals: This study was approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences (ID: IR.SSU.REC.1398.049).

Funding/Support: This project was funded by the National Agency for Strategic Research in Medical Education, Tehran, Iran (Grant No.: 981642).

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Strides Dev Med Educ. 2021 December; 18(1):e1036 doi 10.22062/sdme.2021.195312.1036

Research Article

A Comparative Study of Doctoral Nursing Education Programs in Iran and Japan

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Received: 2020 November 20
Revised: 2021 February 07
Accepted: 2021 February 13
Published online: 2021 March 08

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Citation:
Sajadi SA, Mokhtari J, Rajai N. A Comparative Study of Doctoral Nursing Education Programs in Iran and Japan. Strides Dev Med Educ. 2021 December; 18(1): e1036. doi: 10.22062/sdme.2021.195312.1036

Abstract

Background: The quality assurance of doctoral nursing education programs is one of the priorities of educational systems, with significant effects on the development and improvement of educational programs. Therefore, identifying the strengths and weaknesses of these programs through comparison can be useful.

Objectives: This study aimed to compare the doctoral nursing education programs in Iran and Japan.

Methods: In this descriptive and comparative study, which was based on the model proposed by Beredy, the Iranian doctoral program in nursing education was compared with that of Japan in four stages of description, interpretation, juxtaposition, and comparison.

Results: The doctoral nursing education program in Japan was older than its Iranian counterpart, based on historical records. The challenges of nursing education in Iran included the student admission system, inflexibility of the program, and emphasis on theoretical education. The strict rules regarding article publication in International Scientific Indexing (ISI) journals and the higher number of credits in the Iranian program, compared to its Japanese counterpart, were among the strengths of Iran's program, increasing the level of students' knowledge and preparation for research activities.

Conclusion: Comparison of the educational systems of Iran and Japan indicated the need for a more flexible and community-based curriculum in Iran.

Keywords: Nursing, Education, Curriculum, Iran, Japan

Background

Universities, as executors of educational systems, need to adapt to major changes occurring around them. These organizations can have productive global competitions for the purpose of assessment and quality assurance (1). Medical education is part of the higher education system, dealing with human life. The health of the community depends on the quality of education at universities. Nursing is one of the complex domains of medical sciences. If appropriate and high-quality educational programs are not designed for the students, it can cause irreparable damage to the health of the community and compromise the scientific reputation of the university and its graduates (2). Therefore, nursing schools, as part of medical universities, need to consider quality assurance, continuous evaluation, and promotion (3).

Organizations, such as the World Health Organization (WHO), have called for the improvement of standards for newly graduated nurses. The changing needs of life in today's fast-paced world emphasize the need for educational developments and innovations, especially in universities and higher education institutions; the nursing curriculum is no exception (4). Currently, the main concern in the quantitative assessment of nursing PhD students is ensuring the quality of doctoral nursing programs (5). If a doctoral program is not systematically

reviewed, the nursing science and profession will not progress (6). As the evaluation of doctoral programs in nursing education requires continuous assessment and review, similar to any other training course, the use of a comparative method is helpful (7). Therefore, recognizing the strengths and weaknesses of educational programs and developing high-quality ones through review and modification can be useful.

Comparative studies are one of the research tools for the review and modification of educational programs and development of rational strategies to make use of others' experiences (8). Investigation of the evolutionary history of educational systems shows that most developed countries have benefitted from comparative research (9). Japan is one of the most developed and prominent countries in terms of higher education. Initially, nursing knowledge and skills were imported from developed Western countries, but through time, researchers and scholars were able to apply and modify this information in their educational system. Also, the customs and culture of the country were considered in the development of programs (10).

Doctoral nursing education programs

The doctoral nursing education program was first developed at Columbia University in the United States in 1924. Later, a doctoral nursing program (11) with two areas of interest, including education and management, was established at New York University in 1934 (12). Besides, the doctoral nursing program was developed at Case Western Reserve University in Ohio, USA, in 1979 (13). Today, there are about 273 doctoral programs in more than 31 countries across the world (14). Currently, the doctoral nursing program includes two areas of study, that is, research-based PhD and doctor of nursing practice (DNP) (13). Generally, the nursing PhD program can be applied, based on two European and American models. In the European model, students complete the research projects individually or with the help of supervisors. On the other hand, in the American model, students must first meet some credit requirements for their doctoral dissertation and then complete their thesis guided by their supervising professors (15).

Challenges of doctoral nursing education programs

Although implementation of nursing PhD programs has led to the promotion of nursing profession and health systems, there are several challenges in this area. The quality assurance of doctoral programs for nursing education is one of the priorities of educational systems, with significant impacts on the development and improvement of educational programs (16). In this regard, some Iranian studies reported the quality of nursing PhD programs to be at a moderate level (17). Also, in some studies, the graduates' incompetence to encounter the healthcare system challenges was highlighted (18). Similarly, the results of another investigation in Iran revealed that doctoral nursing programs could not meet the needs of clinical centers and that the graduates were not in the right job position at the hospital (19).

In other studies, challenges, such as inflexibility of the program content, overlaps with other programs (16), and problems in the implementation of nursing education programs in Iran were described (20). Accordingly, the WHO called for the development of standards for newly graduated nurses (21). It seems that the experiences of advanced countries, pioneering in different educational domains, can help us deal with the existing problems in higher education systems while considering the cultural, political, economic, and social contexts (16).

Objectives

Since Japan is recognized as a developed Asian country in terms of higher education (4), the present study aimed to compare the doctoral nursing education programs of Iran and Japan to find solutions to the existing problems.

Methods

This descriptive, comparative study was conducted based on a well-known model proposed by Beredy. This model includes four stages of description, interpretation, juxtaposition, and comparison. In the description stage, systematic collection of data was performed. The curriculum data were collected by searching relevant articles, websites of universities, and the ministry of health websites. Next, the information collected in the first stage was analyzed in the interpretation stage (22). In the juxtaposition stage, the information was categorized and juxtaposed, and the research problem was investigated and compared with attention to detail to discover the similarities and differences of these systems and address the research questions in the comparison stage (23).

To collect the data required for this study, an extensive search was conducted in Persian and English articles, published between 2007 and 2020, using keywords, such as "nursing", "education", "curriculum", "Japan", "Iran", and "descriptive-comparative studies". The scientific databases and official websites included CINAHL, Science Direct, PubMed, Google Scholar, Iran Medex, SID, MagIran, and Noormags, as well as the websites of Iran's Ministry of Health and Medical Education, Ministry of Science Research and Technology, Japanese Nursing Association, and several universities in Japan (including Chiba and Oita universities). Finally, the data were collected, categorized, and compared. To verify the search process, the articles were reviewed by the three authors of this study (an assistant professor, an instructor, and an associate professor), who were faculty members of the school of nursing.

Results

In the present study, the doctoral nursing education programs of Iran and Japan were compared regarding their history, objectives, areas of interest, admission to doctoral education, curriculum, employment during study, funds, graduation requirements, and professional perspectives (Table 1).

Table 1. Comparison of doctoral nursing education programs in Iran and Japan

History	
Iran	For the first time, the school of nursing and midwifery, affiliated to Tabriz University of Medical Sciences, admitted three students through a national entrance exam in 1995 (24).
Japan	The first doctoral program in nursing education began at the University of Tokyo in Japan in 1966, based on health sciences. In 1988, a PhD program was established at St. Luke's School of Nursing in Tokyo, with an emphasis on nursing expertise (25).
Objectives	
Admission to doctoral programs	
Iran	Students are admitted through a national entrance exam or free admission. The conditions for participation in the exam include enrollment in higher education programs, that is, having a master's degree (MA), a professional doctorate degree, or higher degrees in line with the program (24). For free admissions, universities are allowed to admit 20% of the national entrance exam capacity (at maximum) among candidate graduates from MA programs under specific conditions. Admission of the students is also dependent on the confirmation of the educational council of the university. Changes in the field or place of study are not allowed for the admitted students (15). Upon admission, the candidates must attend an oral test in the form of an interview by the nursing board. The share of the written test and the interview score is equal to 50% of the total score (24).
Japan	Only graduate students can enroll in a doctoral program (26). In Japan, each university has established an independent set of admission criteria, based on which students are interviewed and admitted (27). The participants are often divided into two groups: young researchers aiming to learn research (in the second decade of life) and university coaches seeking a doctoral degree to promote their profession (in the fourth decade of life) (28).
Credits	
Iran	The program lasts four years and a half. The credits are fixed and the same throughout Iran. There are 45 credits within this program, including 19 specialized credits (core), six specialized elective credits (non-core), and 20 credits for dissertation (with a focus on qualitative research). Of 19 specialized credits required, 16 credits are presented in a practical format, and three credits are presented theoretically. Also, of six elective credits, three credits are presented in a practical format, and three credits are presented theoretically (24).
Japan	The program lasts three years (28). The credits are not fixed and vary from one university to another. For example, at the University of Tsukuba, 22 credits are required, while 21 credits are elective (29). On the other hand, 12 credits are required at Chiba University. The number of credits is low, and on average, about 13.6 credits (range: 6-23) are required; presentation of seminars and dissertations is emphasized in this program (25).
Content of lessons	
Iran	The credits are mainly theoretical and involve research, education, and theories of nursing; the practical aspects are limited (18). The specialized credits include the nursing science philosophy, nursing theories, management and leadership in nursing education, methodology and critique of qualitative and quantitative research, nursing management and leadership, nursing education systems, advanced inferential statistics, and special topics in nursing. The elective credits also emphasize on different areas of nursing, such as oncology, pediatrics, rehabilitation, school health, family and community health, and emergency care. The students are allowed to select six of these credits, according to their master's thesis or guidance of their supervising professors (24).
Japan	The curriculum is divided into two parts, including basic science courses and specialized courses. The basic science courses emphasize on improving the students' qualifications for research, including the application of sciences in nursing, research methodology, nursing education, clinical research, and advanced nursing education seminars. On the other hand, specialized courses focus on the development of nursing skills to improve the status of community health systems by resolving problems and implementing nursing interventions, especially for the physical and mental health problems of children at school age. These credits include specialized credits in nursing science, seminars in nursing, science ethics, and professional seminars on evidence-based nursing and advanced practical nursing (29).
Employment while studying	
Iran	The doctoral nursing education program is full-time; therefore, the employment of students is prohibited (30).
Japan	Education is provided in two forms: full-time and part-time. According to a study in Japan, 38.4% of PhD students are employed and work part-time (31).
Graduation requirements	
Iran	The graduation requirements are as follows: passing a comprehensive exam after completing the program (twice a year) (5); defending a dissertation; and publishing articles in well-known scientific databases, including the Information Sciences Institute (ISI) (18).
Japan	The graduation requirements are as follows: passing the final exam, defending a dissertation, and publishing an article extracted from the dissertation in an academic journal (28).
Professional perspectives	
Iran	Although in the curriculum of nursing PhD program, employment of Nursing PhD graduates is defined in universities, hospitals, health centers, rehabilitation and welfare centers, research centers, headquarters and nursing planning centers, private centers, and growth and knowledge-based companies (24), most graduates tend to work at universities (15). Besides, the job positions and tasks have not been defined in hospitals for students holding a PhD degree in nursing (32).
Japan	Most students tend to work in academic environments (25). However, the available academic positions are not adequate for the high number of graduates (26).

Discussion

The admission systems of Iran and Japan were found to be different. In Japan, each university can admit students independently through interviews, based on their policies. The universities' autonomy in student admission helps

them achieve their goals and increases the competitiveness of universities in attracting students, which in turn enhances the quality of education. On the other hand, PhD students in Iran are selected in two stages, that is, a written entrance exam, followed by an interview, regardless of the individual's average score at the MA level and clinical experience. It should be noted that student admission through a national exam may attract less motivated students (33), whose only purpose for participation in such exams is to escape clinical practice (34) and work at universities to earn higher salaries.

Moreover, some researchers stated that enrollment of inexperienced and unmotivated individuals in the nursing profession is not suitable at higher levels of education, research, management, and planning and cannot lead to improvements in the quality and development of nursing services. Accordingly, work experience in nursing and motivation must be considered as the essential criteria for the admission of PhD students (19). According to a study by Tazakori et al., at least two years of work experience in clinical practice can help us have a better understanding of clinical difficulties (20).

In the nursing doctoral curricula of Iran and Japan, the credits showed significant differences. Unlike Iran, the credits were not fixed in the nursing PhD curriculum of Japan and varied from one university to another. It should be noted that centralized PhD programs can provide opportunities or pose threats to an educational system. Indeed, the coherence and consistency of credits in a country can provide the students with similar education programs without any discrimination. However, students in Iran cannot choose some credits, which is considered a drawback of the educational system. On the other hand, students in other countries can choose half of the credits in the program, based on their interests and requirements of their dissertations. This issue can increase the students' motivation and effectiveness of the program and also help meet the needs of the community.

Besides, attention to the students' interests is an important issue that should be considered in the selection of credits (20). In Japan, the duration of training is shorter, and the number of credits offered for doctoral nursing is lower than Iran. Considering the low number of credits, PhD students are not prepared to conduct research independently or increase the available nursing knowledge (28).

Iran and Japan are significantly different in terms of the curriculum of nursing doctoral programs. One of the strengths of the nursing doctoral curriculum in Japan is the presentation of advanced clinical seminars in particular domains (29). However, in the PhD program of Iran, most credits are theoretical and related to topics other than clinical problems; also, there are only six elective credits related to specialized clinical issues (30). Therefore, the inclusion of practical credits in the curriculum can help reduce the existing gap between education and clinical practice (18).

Moreover, some credits in Iran's nursing doctoral program overlapped with some credits of master's degree programs. It is obvious that repeated topics and contents can reduce the learning motivation and efficiency of students (15). One of the responsibilities of PhD students in nursing is educational planning and involvement in specialized and professional planning. However, students do not often acquire the required skills in this domain, because credits, such as educational management, are not presented practically. The credit, entitled "nursing theories", mainly involves criticism and review, while students in other countries can conceptualize, develop, test, and validate different models (20).

The issue of research in PhD programs is of utmost importance in both countries. A researcher cannot distance him/herself from research to become a prominent scholar or conduct applied research for health promotion of the community (33). It should be also noted that the primary goal of PhD programs in Iran is to prepare the students for research. Nevertheless, writing articles can rarely educate effective teachers; this issue is of particular importance in educating students who want to become faculty members in the future (1).

The DNP program has not yet been established in Iran and Japan. In Iran, considering the content of the nursing education curriculum, which is not clinically oriented, the need to establish DNP programs is strongly felt. It seems that the implementation of DNP programs can play a significant role in eliminating the gap between education and clinical practice and promoting performance-based care (19). However, there are some criticisms about these programs, such as confusion about the titles and roles (35), lack of job descriptions for bedside care, absence of thesis or research projects in the curriculum, and risk of marginalizing doctoral nursing graduates (13). Therefore, it is recommended to establish these programs with more accurate planning to meet the requirements in the coming years (12).

Employment is considered as one of the challenges of PhD graduates. Job opportunities after graduation seem to be similar in Iran and Japan. Therefore, the majority of graduates are inclined to work in academic settings rather than hospitals due to unclear descriptions of tasks and responsibilities, vague organizational roles and positions, low salary and benefits, and the gap between theory and practice in the PhD program. Also, the course curriculum focuses on education, research, and management at a strategic level. On the other hand, graduates often feel that they have insignificant impacts on improving the healthcare system. Generally, graduates cannot be expected to deliver direct professional nursing care as a practitioner in specific clinical contexts. Therefore, it is advisable to employ these graduates in their areas of expertise at higher levels of education, management, research, and nursing planning (19).

Although simultaneous education and employment can lead to role duality, physical stress, fatigue, irritability (36), absenteeism, reduced use of library resources (37), and reduced academic performance (38), part-time education

in Japan gives the students an opportunity to work while studying. This consideration enhances the graduates' functional and experiential skills, while providing the living costs, and may also improve post-graduation employment (37).

Conclusion

Since comparison of different educational systems can improve the quality of education (39), this study compared the educational systems of Iran and Japan. Several differences and similarities were addressed in this study. Based on the comparison of nursing PhD programs, it seems that Japan's system has better outcomes, associated with the universities' independence in student admission; design of curriculum credits that lead to a constructive competition among universities and their progress; optional credits selected by the students based on their interests and needs; clinically oriented course content; and variety of programs, including part-time education programs for the employees.

It is recommended that Iranian educational planners, as well as the educational authorities of countries with shortcomings in doctoral nursing programs, use the findings of this study to review their doctoral nursing education programs.

Acknowledgements

The authors appreciate the management staff and personnel of the libraries and websites of Tehran University of Medical Sciences and Baqiyatallah University of Medical Sciences in Iran.

Conflict of Interest: The authors declare no conflicts of interest.

Ethical Approvals: Not applicable.

Funding/Support: This study was supported by Aja University of Medical Sciences.

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Strides Dev Med Educ. 2021 December; 18(1):e1020 doi 10.22062/sdme.2021.193967.1020

Research Article

Improving Medical Students' Essay Writing through Direct Focused Corrective Feedback, Revising Errors, and Group Discussions

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Received: 2020 August 18
Revised: 2021 February 13
Accepted: 2021 February 24
Published online: 2021 May 24

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Citation:
Tazik Kh. Improving Medical Students' Essay Writing through Direct Focused Corrective Feedback, Revising Errors, and Group Discussions. Strides Dev Med Educ. 2021 December; 18(1):e1020. doi: 10.22062/sdme.2021.193967.1020

Abstract

Background: Writing in English has always been emphasized in educational programs.

Objectives: This study aimed at investigating the effects of direct focused written feedback followed by amendments and group discussions on improving students' English writing in different fields of medical sciences.

Methods: The present research employed a quasi-experimental design. The participants were 168 Iranian undergraduate students from seven entire classes (taught by the main researcher), studying at Ahvaz Jundishapur University of medical sciences in 2019-2020. The writing tasks were the topics suggested at the end of each unit of the Inside Reading ("Intro" and "One") series. The length required for each topic was a paragraph with a hundred words at most. After writing each essay, the researcher spotted grammatical errors, recorded their types and frequencies, and gave direct feedback. The students received the corrected essays, and through group discussions and based on extra explanations provided by the researcher, the students became totally informed of their errors and were asked to apply this knowledge on their succeeding works.

Results: Wrong tenses (30.47%), incorrect articles (23.48%), word order (17.48%), singular/plural nouns (11.59%), prepositions (10.90%), and subject-verb agreement (6.08%) were found to be the most common errors, respectively.

Conclusion: Comparing the number of errors in the first essay with the errors spotted in the second and third essays showed that the corrective feedback was effective in improving the medical students' essay writing.

Keywords: Writing, Feedback, Medical Education

Background

Writing in English has always been emphasized in educational programs; however, it has not been given due attention by educational planners in medical education. That is why medical students always make similar errors and refer to English teachers to translate their written reports or ask their instructors to correct their reports, which is a tedious and time-consuming job. In the educational contexts of some countries such as Thailand, the writing skill is regarded as a compulsory course to make students prepared for writing their assignments and passing their exams (1). Beside writing proficiency, students will learn how to write argumentative and persuasive essays, in both of which, students struggle to write grammatically accurate sentences in order to deliver clear messages. It is evident that a poor-written piece of report or research lacks communicative value. To deal with this problem, identifying common errors and giving corrective feedback and practicing them in an organized manner can help students avoid the recurrence of such errors.

During any communicational interaction, either oral or written, students need feedback from the reader or listener. In written forms, students mostly receive feedback on their production errors or communicative gaps from their teachers. The major purpose of giving feedback is to provide a positive atmosphere for writing development and a chance for teachers to help students find their writing problems. Through the process of interactional feedback, students will learn how to compose linguistically correct and communicatively effective pieces of writing (2).

Corrective feedback is delivered into the two oral and written modes. In the oral mode, students receive direct or indirect feedback through explicit corrections, metalinguistic clues, recasting, and repetition (3). In fact, they are provided

with a typology for different forms of corrections applicable over different contexts. The typology includes explicit corrections, recasting, elicitation, metalinguistic clues, clarification requests, and repetition. These different types of feedback have been practiced in English classes, resulting in different findings. For instance, a study (4) reported that learners understood better when they received direct corrective feedback from their teachers. Similarly, it was noted that students favor explicit corrective feedback rather than implicit ones (5). In another research, (6), it was found that students preferred to receive objective comments and guidelines through which they could realize their incorrect uses of language and correct themselves. In one study (7) on timing, it was reported that immediate and delayed feedback are helpful in constructing explicit knowledge in adults.

Along with advancements in different areas of science, it is supposed that students should be equipped with English linguistic knowledge in order to facilitate their international relations. However, in general, medical science students in Iran do not adequately study and use English language, especially for speaking and writing, in their classes at least compared to the students studying medical fields in international universities. As a consequence, most Iranian students are not able to write in English or confident in communicating in English. Actually, in Iran, as any other English as a Foreign Language (EFL) country, academic communications are in mother language while academic sources are in English. Moreover, publishing a paper in an international journal is an academic requirement for students, especially for attaining postgraduate degrees. This contradiction in academic tradition in Iran is challenged by university students and instructors. Students pass different courses and attend different classes without sufficient knowledge to communicate their ideas with the international community. Though university organizers believe that students and teachers should equip themselves with the required knowledge in English in order to be involved in international discussions, the problem of academic communications has yet remained unresolved. In fact, there is a gap between academic expectations and the real level of education in Iran's universities. In such a situation, EFL teachers in medical universities need to make some revolutionary changes in their teaching methods and focus comprehensively on the academic writing skill. Also, curriculum developers need to sweep the writing skill into the medical educational system and provide equipment for training students.

Significance of Writing in English in Medical Education

According to university syllabuses in Iran, medical science students are required to enroll in educational courses for pre-university English, general English, and English for specific purposes (ESP), each of them focusing on different issues. During the pre-university English class, students are required to review high-school materials with a little attention given to other related skills. During general English courses, students are required to work on their reading skills and learn some new academic vocabularies. Finally, the ESP course, as the final part of this syllabus, varies based on different fields of study. However, the course mostly focuses on specific content aiming at boosting students' comprehension and translation abilities. Although these English courses aim at improving students' performance in different skills, the byproduct of the syllabus indicates that students are not satisfied with the courses and do not attain systematic and high-level knowledge in English.

Based on the given explanations on the importance of paying attention to English writing, especially essay writing, in medical science education, this study intended to use written direct corrective feedback to improve medical students' essay writing skills. Among different techniques used for giving feedback, direct and indirect feedback is the most well-known strategy. Generally, direct feedback refers to the designation and provision of correct linguistic forms while indirect feedback only focuses on identifying errors, but students themselves have to look for correct forms (8). In addition to the direct and indirect forms of corrective feedback, focused and unfocused modes are also discussed in the literature. Unfocused feedback deals with all kinds of errors in a text while the focused approach involves designating specific kinds of errors in advance while ignoring other types of errors (9).

Objectives

Essay writing is an important part of every medical schedule as medical students need to strengthen their critical judgments and present their ideas and information. Therefore, this study aimed at investigating the effects of direct focused written feedback followed by amendments and group discussions on improving students' English writing in different fields of medical sciences.

Methods

The present research employed a quasi-experimental design. The participants of this study were 168 Iranian EFL undergraduate students from seven entire classes, studying at Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, in 2019-2020. The students of these seven classes were selected because the main researcher (a faculty member who holds Ph.D. in Teaching English) taught them both the pre-university English and general English courses. The students themselves also showed keen interest in improving their writing skills and grammar accuracy. All the students participating in the study had already studied English for six years (three years in junior and three years in senior high school). They were first-year undergraduates and were expected to be familiar with the grammatical points presented to them in the high school curriculum. Although the students participating in language teaching institutes were supposed to show a higher accuracy in writing; none of them had advanced writing skills to be excluded from the study. All the students were informed about research aims. The researcher himself taught all these classes and provided feedback to the students on their essays. Also, an experienced colleague was requested to randomly rate the essays, and in case of any discrepancy, a group discussion was held to reach a consistent decision.

Table 1. Time Schedule for Writing Tasks and Returning Corrected Drafts

Time	Writing Task	Suggested Topics
Month 1st	Writing Task 1	Topic 1: Functional magnetic resonance imaging (fMRI). Topic 2: Describe ideas for new studies on the human brain. What would you like scientists to study? Topic 3: What are some other simple tools or complex equipment that doctors use to learn more about what is inside a human body?
	Corrected draft 1	
	Treatment 1	
Month 2nd	Writing Task 2	Topic 1: Imagine that you are a teacher. Children in your classroom often come to school with colds. What might you tell them about staying healthy? Topic 2: Today we have many effective ways to prevent illnesses. Yet, in our modern world, illnesses can spread worldwide in a short time. Why do illnesses spread so easily in our modern world? Topic 3: Describe a time when you were ill. How did you feel? What did you do to feel better?
	Corrected draft 2	
	Treatment 2	
Month 3rd	Writing Task 3	Topic 1: The reading you have studied described the life cycle of malaria: from mosquito to entering a person's body and returning back to the mosquito status. Describe another cycle of malaria: How malaria identifies poverty, and how poverty intensifies malaria? Topic 2: What are some things that people can do to keep themselves healthy? What are some things that people can do to feel better if they get sick?
	Corrected draft 3	
	Treatment 3	

The effectiveness of written corrective feedback inboosting grammatical accuracy in medical students' English essays was evaluated. Nine topics from the Inside Reading (Intro and One) series were given to the students, and they were required to select three topics and write an essay for each. The process of receiving the essays and returning their corrected drafts took five months to be completed. During this period, the researcher identified the students' grammatical errors, corrected them, and informed the students through written corrective feedback. The students were required to compare the original and the corrected drafts and work on their errors. After reviewing the essays, the researcher held two sessions to answer possible questions regarding the errors and clarify grammatical rules. In every remedial session, all errors were classified, and along with their corrected forms, extra explanations were illustrated to the students. In this way, all the students became aware of the rules, and it was possible for them to use correct forms in their future essays. This process continued till the end of the educational midterm.

The study was conducted to assess the effectiveness of error correction, corrective feedback, boosting students' basic knowledge, written corrective feedback, and using a combination of educational method in improving English writing grammatical accuracy of Iranian EFL medical students and helping them extend their knowledge, better comprehend grammatical rules, and reach higher levels of writing proficiency.

This research was conducted during a six-month period (from September 2019 to February 2020, over the first and second educational semesters), including Iranian undergraduate students studying in different medical sciences' subfields. The students worked on the topics specified at the end of each unit of the Inside Reading (Intro and One) series and submitted their essays via email. After the submission of the essays, the teacher read them meticulously and identified their grammatical errors. Then detailed feedback comments were given to each essay. The students were required to carefully study the given comments and apply them in their upcoming essays. The writing tasks that the students were required to write about were the topics suggested at the end of each unit of the Inside Reading Intro series. The required length for each topic was a paragraph of a hundred words at most. Table 1 shows the time scheduled for the writing tasks and returning corrected drafts.

The students were free to select one topic from the three suggested ones; two sessions after the ending of each unit were given to the students to write and submit their essays. The students were free to use any reference in their essays. Primary audiences were university students, and the teacher was the expert to check the essays. To avoid attention deviance, the teacher did not reveal assessment and scoring strategies in advance to tackle the students' attempts for matching themselves with the teacher's expectations and employing avoidance strategies. Consequently, the students felt free and flexible in their writings. There were no pre-test and post-test procedures in this study. In fact, the study was conducted in a longitudinal process where the writing products were compared over time to mark the differences and possible improvements. Also, it is worth noting that indirect feedback was not used.

To analyze the data, IBM SPSS Statistics 21 software was used. The statistical techniques used to present and analyze the data were descriptive statistics (frequency

Table 2. Demographic Characteristics of the Students

	Faculties			
Student demographics	**Health N (%)**	**Rehabilitation N (%)**	**Paramedical Sciences N (%)**	**Total N (%)**
Gender				
Male	12 (12.24)	30 (55.55)	4 (25.0)	46 (27.38)
Female	86 (87.76)	24 (44.45)	12 (75.0)	123 (72.62)
Age rang (year)	18-20	18-22	18-21	
Course and level				
Pre-university English/1st semester	98 (58.34)	54 (32.14)	16 (9.52)	168 (100)

and percentage) and the Chi-square test (to determine the statistical significance or insignificance of frequency differences).

This research was approved by the Institutional Research Ethics Committee [IR.AJUMS.REC.1399.333] of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Results

The participants of this study were 168 Iranian EFL undergraduate students from seven entire classes, studying in Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. The students of these seven classes were selected because the main researcher (a faculty member who holds Ph.D. in Teaching English) taught them both the pre-university English and general English courses. The students themselves also showed keen interest in improving their writing skills and grammar accuracy. All the students participating in the study had already studied English for six years (three years in junior and three years in senior high school).

The participants were 168 first-year undergraduates with the age range of 18 to 22 years (Table 2).

According to Table 3, wrong *tenses* [n=802, 30.47%] were the most frequent errors in the written essays. Incorrect articles [n=618, 23.48%], wrong word order [n=460, 17.48%], wrong use of singular/plural nouns [n=305, 11.59%], inappropriate prepositions [n=287, 10.90%], and subject-verb disagreement [n=160, 6.08%] were found to be the most commonly spotted errors,

Table 3. Frequency and Type of English Language Errors in Students' Essays

	Essays			
Error Types	**Essay 1 N (%)**	**Essay 2 N (%)**	**Essay 3 N (%)**	**Total N (%)**
Wrong tenses	472 (29.35)	234 (33.52)	96 (29.45)	802 (30.47)
Incorrect articles	384 (23.88)	146 (20.91)	88 (26.99)	618 (23.48)
Word order problem	280 (17.41)	111 (15.90)	69 (21.16)	460 (17.48)
Incorrect singular/plural nouns	188 (11.69)	84 (12.03)	33 (10.12)	305 (11.59)
Inappropriate prepositions	188 (11.69)	76 (10.89)	23 (7.05)	287 (10.90)
Subject-verb disagreement	96 (5.97)	47 (6.73)	17 (5.21)	160 (6.08)
Total	1608 (100)	698 (100)	326 (100)	2632 (100)

respectively.

As shown in Table 3, the number of errors reduced drastically from the first to the third essay. For instance, errors of tenses occurred a total of 472 times in the first essay which reduced to 96 in the third essay.

This reduction could be related to direct focused corrective feedback, follow-up amendments by the teacher, student-teacher group discussions, and students' engagement in discussions.

The Chi-square test was used to assess the effects of the focused directive corrective feedback provided and the teacher's follow-ups on the immediate and distant retention of grammatical rules and to compare thefrequency of errors between topics (Table 4). It should be noted that the main focus of the study was the students' errors rather than their scores. Therefore, the data was presented as the cumulative frequency of total errors. The findings indicated that corrective feedback was effective in improving both the immediate and distant retention and practice of grammatical accuracy, indicating that the actual acts of corrective feedback and follow-up, but not the assigned time, were the major factors contributing to the improvement of the students' writing skills.

Table 4. Chi-Square Test Results for the Significance of Error Differences

Error Types	Essays					
	Essay 1- Essay 2		Essay 1- Essay 3		Essay 2 - Essay 3	
	X^2	P	X^2	P	X^2	P
Wrong tenses	80.23	<0.001	248.90	<0.001	57.70	<0.001
Incorrect articles	106.87	<0.001	185.62	<0.001	14.37	<0.001
Word order problem	73.04	<0.001	127.56	<0.001	9.80	<0.001
Incorrect singular/plural nouns	39.76	<0.001	108.71	<0.001	22.23	<0.001
Inappropriate prepositions	47.51	<0.001	129.02	<0.001	28.37	<0.001
Subject-verb disagreement	16.79	<0.001	55.23	<0.001	14.06	<0.001
Total	359.10	<0.001	849.80	<0.001	135.14	<0.001

Discussion

As our results showed, writing is an important but difficult skill for EFL students to master (10). Though educational curricula emphasize on learning four languages, especially English, the time devoted to English courses is not enough. Some researchers (11, 12) have suggested that preparation sessions for essay writing should range from 1 to 30 hours regardless of the major courses during the semester, which was shown to significantly improve students' essay writing capabilities. According to our findings as well, it is advisable to reform the curricula of Iran's universities, devoting more time to English courses and incorporating essay writing as the major part of language learning.

Essay writing is a process in which the primary purpose is to focus on an idea and develop it in an organized way. When the essay is ready to be presented, teachers assess the product from different perspectives based on either mechanical, functional, or instrumental criteria. Since the Iranian EFL students enrolled in this study participated in university classes without any preparation sessions, the focus of this study was on the mechanical aspect and to determine if the teacher's feedback could help the students improve their writing skills.

In addition to the mechanical and grammatical aspects of essay writing, students are required to be aware of the discipline-specific conventions of academic discourse. Our findings in this study suggest English teachers of medical universities to inform their students of these conventions.

One of the important issues revealed in this study was that medical education in Iran needed to change the curriculum regarding English language courses and adapt itself to students' actual requirements. Curriculum change is one of the essential elements of contemporary medical education and is undertaken by many universities throughout the world. These changes should be in line with new developments in different areas of language learning and research and consider all academic, social, economic, and even historical contexts of Iranian students. University students also need to pass preparation courses in essay writing before entering postgraduate periods. The review of academic requirements shows that postgraduate students need to write their own papers, reports, and reflections in English. So, the lack of writing preparation courses can cause many problems for students, leading them to plagiarize, copy their works in templates, paraphrase previously submitted works, and ask others to translate their written works. To solve such problems, a curriculum reform is essential to incorporate writing courses into medical syllabuses.

In countries with EFL contexts, like Iran, wherein English language is taught formally in state and private schools, medical university students, as the findings of this study showed, still commit various grammatical errors that make their writings incomprehensible. The first step in dealing with this problem is to consider compulsory writing courses in medical education. During these courses, students can learn most of the issues related to writing. Of course, some departments offer scientific paper writing as a complementary course during special English language courses. However, the major problem is the students' lack of structural knowledge. When students are knowledgeable enough about English language rules, then universities can think of further advanced writing courses. Reinforcing students' writing skills can also help achieve reflective writing expectations.

University educators frequently ask their students to think critically and write reflective pieces of writing. Without language knowledge; however, these expectations will never be fulfilled. Therefore, the first step to help medical students attain mastery over essay writing is to boost their writing knowledge by holding appropriate preparation courses.

According to a study (13), educational goals and expectations should be explicitly declared to all students. This clarity helps students acknowledge the final destination and plan to reach it by setting reasonable goals (14). In fact, writing is a central skill for medical educators (13); however, little attention is paid to wiring skills in medical education, and students are not usually instructed on how to write precisely and clearly. Moreover, medical students come from different linguistic backgrounds and express variable levels of preliminary education; therefore, educators should be informed about the ways to instruct and guide them in accordance with the defined curriculum.

Medical community, as a globalized community, expects medical undergraduates to write critical and evidence-based letters, papers, and essays (15). This expectation cannot be satisfied without acquiring appropriate writing skills. Therefore, before adding evidence-based writing to the medical curriculum, students should take writing classes and work on their writing proficiency. The findings

of this study indicated that the lack of writing knowledge, at least in the grammar section, crippled EFL medical students in Iran, highlighting the need for providing them with grammatical and mechanical instructions before holding any other related course. This is in accordance with a previous report (16) suggesting that such teaching courses can improve critical appraisal and writing skills of medical undergraduates.

Conclusion

This study revealed beneficial findings used for medical writing instruction and the application of corrective feedback principles in the Iranian medical university contexts. Frequent use of group discussions, a session after writing and receiving feedback, could help students raise their awareness and improve their accuracy in using tenses, articles, word order, nouns, prepositions, and subject-verb agreement.

Acknowledgements

The author is thankful to all the students who participated in this study. This research was approved by the Institutional Research Ethics Committee [IR.AJUMS.REC.1399.333] of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Conflict of Interest: There is no conflict of interest.

Ethical Approvals: This research was approved by the Institutional Research Ethics Committee [IR.AJUMS.REC.1399.333] of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e1029 doi 10.22062/sdme.2021.195134.1029

Research Article

The Costs of Training Medical Parasitology and Mycology Students at Kerman University of Medical Sciences

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Received: 2020 October 10
Revised: 2021 February 22
Accepted: 2021 February 28
Published online: 2021 May 24

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Citation:
Goudarzi R, Fasihi Harandi M, Tasavon Gholamhoseini M, Ebrahimipour M. The Costs of Training Medical Parasitology and Mycology Students at Kerman University of Medical Sciences. Strides Dev Med Educ. 2021 December; 18(1):e1029. doi: 10.22062/sdme.2021.195134.1029

Abstract

Background: Training of expert human resources is one of the main and basic objectives of developed countries. One of the important challenges for attainment of this objective is shortage in funding and financial resources. This is while medical branches, due to being specialized and requiring vast practical courses, need spending considerable financial costs for training competent students.

Objectives: The present study aimed to estimate the costs of training medical parasitology and mycology students at Kerman University of Medical Sciences.

Methods: This was a descriptive research. The data collection tool was a form designed by researchers using various resources. Educational and non-educational costs of the academic year of 2017-2018, with a top-down approach, were analysed to estimate the costs of training and educating post-graduate students. Analyses were made using Microsoft Excel 2013 software.

Results: The costs of educating master students in parasitology, Ph.D. students in parasitology, and master students in mycology in the academic year of 2017-2018 were 11,144, 18,365, and 7,821 USD, respectively. Forty-five percent of the total of educational costs was allocated to training Ph.D. students in parasitology alone, and a major share (81%) of these costs had been paid to human resources.

Conclusion: Our findings indicated that the financial costs of training and educating students in the parasitology and mycology fields are high, needing the prompt attention of the policymakers of the national medical education system.

Keywords: Cost, Parasitology, Mycology, Kerman University of Medical Sciences, Ph.D. program, MSc. program

Background

Universities and higher education institutes are important and influential parts in each country because they are responsible for training specialized human resources. In fact, the progress and development of countries depend on the competency of its universities and higher education institutes (1, 2), and investments by governments in training specialized human resources can result in the country's economic growth in the long-term. Evidence shows that, particularly in countries with high incomes, investment in education has a positive impact on productivity and economic growth partly because educated forces can learn skills and new tasks easier and use a widespread range of new technologies, which consequently result in economic growth and prosperity (3).

However, one of the most important challenges of governments is difficulty in funding the development of higher education because of insufficient financial resources (4). Funding higher education throughout the world has

dramatically changed, especially during the 21st century (5). An increase in demand for educated and skilled workforce necessitates paying more attention to the financial costs associated with this mission (6).

On the one hand, a cost management system capable of precise identification of expenses and calculation of the cost of services can result in better management of costs and appropriate planning for allocating resources. The structure and design of the cost management system should be based on organizational needs to be capable of fulfilling them (7). In the past, traditional cost management methods (for example dividing total costs by the number of students) had been applied, which are not currently used due to their numerous deficiencies and challenges. Nowadays, applying modern cost calculation methods, we can expand scientific fields by appropriately allocating and optimizing the utilization of available financial resources throughout society.

For training students in medicine and related fields, the issue of costs is particularly important for a variety of reasons, such as increasing costs and their direct impacts on the quality of medical education, as well as the quality of training specialized resources (8).

Several researchers such as Esmaeili *et al.* in the northeast of Iran in 2018 (9), Ghasempour *et al.* in central Iran in 2016 (1), Haghdoost *et al.* in the southeast of Iran in 2014 (10), Foo in Australia in 2017 (6), and Maelah in Malaysia in 2011 (11) have conducted investigations on the costs of training students in various fields and grades.

Objectives

Therefore, considering the transformation and innovation packages in medical education in Iran and the emphasis of this policy on the realization of the costs of higher education services, as well as the lack of studies on the costs of training students in medical colleges, this study aimed to estimate the costs of educational services for training parasitology and mycology students in Kerman University of Medical Sciences.

Methods

This descriptive study enrolled post-graduate (masters and Ph.D. of parasitology and masters of mycology) students in Kerman University of Medical Sciences in the academic year of 2017-2018. The study was conducted in 2019, and required data was collected using a researcher-made form and extracted from the financial statements of the Faculty of Medicine and the data of Accrual Accounting software, Comprehensive Education Management System (i.e., the academic automation known as the Sama system), and other documents. Data was analysed using Microsoft Excel 2013 software. All costs were converted into US dollars based on the latest exchange rate reported by the Central Bank of Iran (1 USD = 42000 Rials) (12).

To calculate the costs of education in the mentioned fields and performing accounting operations, the top-down cost calculation approach via the direct allocation method was performed in four steps as follows:

First step: Identification and definition of educational and non-educational activities: The objective of this step was to familiarize ourselves with organizational structures and separate educational from non-educational activities. Educational activities include those that are directly related to the education and training of students (such as teaching of courses by professors).

Non-educational activities are those that are not directly related to student education (such as administrative activities, installations, library staff, etc.).

Second step: Identification and determination of the resources spent for education: In this step, all the costs of the resources related to student education and training, both direct and indirect, were identified and calculated. The resources studied included human resources (faculty members and staff), medical and non-medical supplies, logistic services, deputies, the depreciation of equipment, assets, and buildings, energy expenditure, and other resources (Table 1).

Table 1. Description of the Types of Costs and the Formula Used for Their Calculation

Item	Type of cost	Details of costs	Allocation basis	Method of calculation
1	Human resources	Salary and fringe benefits, overtime working, teaching fee, the fee of deprivation from having an office, new year bonus and allowance	No. of credits and No. of students	$\text{Salary of the faculty member} \times \frac{\text{No. of taught credits in the parasitology group}}{\text{Total of taught credits}} \times \frac{1}{\text{No of students}}$
2	Consumables	Administrative, Student and Laboratory Consumables	No. of students and volume of utilization	$\text{Total cost of consumables} \times \frac{1}{\text{Amount of utilization}} \times \frac{1}{\text{No.of students}}$
3	Logistic services	Repair, maintenance, installations, publication contracts	Area in Sq. meters	$\text{Total costs of logistic services of the medical college} \times \frac{\text{Area of the parasitology department in sq. meters}}{\text{Area of the medical college in sq. meters}}$
4	Deputies	Per capita student from Student, R&D deputies	No. of students	$\text{Total costs of deputies} \times \frac{1}{No.\ of\ students}$
5	Depreciation of equipment, assets, and buildings	Accumulated depreciation of administrative and laboratory equipment and accumulated depreciation of the building	No. of students	$\frac{\text{Costs of assets} - \text{salvage value}}{\text{Useful life}} \times \frac{1}{\text{No.of students}}$
6	Energy	Cost of utilities: water, power, gas, telephone	Area in Sq. meters	$\text{Total energy costs of the medical college} \times \frac{\text{Area of the parasitology department in sq. meters}}{\text{Area of the medical college in sq. meters}}$
7	Other costs	Miscellaneous costs and costs of purchase of new books during the studied years	No. of students	$\text{Other costs} \times \frac{1}{\text{No. of students}}$

Third step: Allocation of resources' costs to activities: The objective of this step was to allocate costs to related activities using the allocation basis method to determine the amount of the work spent on a particular activity. In this study, the allocation basis for faculty members (professors of parasitology and mycology, as well as visiting professors) was the number of their course credits. It is remarkable that in other educational groups, the teaching fee was deducted from the total allocated cost. For example, to calculate the salary share of faculty members of the parasitology group, our calculations were as follows:

First, the ratio of the number of course credits taught by a professor in the parasitology group (for example, for parasitology master students) to the total number of course credits taught by him/her (for all the parasitology and other groups) was determined. His/her salary was then multiplied by that ratio and finally divided by the total number of students (in this example, parasitology MSc. students). Other allocation bases included the number of students, area in sq. meters, and the duration of the activity.

Fourth step: Calculation of Cost of Education of Student: In this step, all the costs of educational and non-educational activities were calculated and summed up, and finally, based on the number of students at each program and the field of study, the cost was estimated.

Results

In this study, the number of students studying parasitology and mycology was 31. Nine of them were students in the master program in parasitology; nine others were in the Ph.D. course of parasitology, and finally 13 students were studying in the master program in mycology. The total number of the professors working in this educational group was 19, of whom 10 were resident faculty members, and nine were visiting professors (Table 2).

Table 2. Description of the parameters used in this study for calculating the costs of parasitology and mycology educational groups

Description	Parasitology		Mycology
	Master's degree	Ph.D.	Master's degree
No. of students	9	9	13
No. of credits	42	56	35
No. of academic staff	8	8	2
No. of visiting professors	5	6	5
Total number of students of the medical college	1825		
The total area of the medical college in square meters	18000		
Area of the parasitology and mycology departments in square meters	530		

Table 3. Description of the studied costs by the program and field of study in the parasitology and mycology departments (Costs in USD)

Item	Costs' topics	Costs' items	Parasitology				Mycology		Total
			Masters	Proportion of each costly item (%)	Ph.D.	Proportion of each costly item (%)	Master	Proportion of each costly item (%)	
1	Human Resources	Academic staff	39,843	39.73	53,125	32.14	37,261	36.65	130,229
2		Visiting professors	38,925	38.81	44,004	26.62	33,520	32.97	116,450
3		Administrative staff	341	0.34	1,389	0.84	493	0.48	2,223
4		Laboratory staff	801	0.80	801	0.48	1,157	1.14	2,760
5		Library staff	111	0.11	454	0.27	161	0.16	726
6		Ph.D. candidates' awards	0	0.00	44,777	27.09	0	0.00	44,777
7	Consumables	Administrative and student consumables	86	0.09	86	0.05	125	0.12	298
8		Laboratory consumables	667	0.67	1,124	0.68	763	0.75	2,554
9	Logistic Services	Installations	183	0.18	183	0.11	265	0.26	631
10		Repair & maintenance	8	0.01	8	0.00	11	0.01	27
11		Publications	24	0.02	24	0.01	35	0.03	83
12	Deputies	Vice chancellor's office in student and cultural affairs	6,773	6.75	6,773	4.10	9,783	9.62	23,328
13		Vice chancellor of research	9,643	9.61	9,643	5.83	13,929	13.70	33,214
14		Vice chancellor of administration and resources development affairs	213	0.21	213	0.13	308	0.30	733
15		Vice chancellor of academic affairs	89	0.09	89	0.05	129	0.13	307
16	Depreciation	Equipment & assets	2,257	2.25	2,257	1.37	3,260	3.21	7,774
17		Building & rental	61	0.06	61	0.04	87	0.09	208
18	Energy	Water, power, gas, telephone	270	0.27	270	0.16	390	0.38	930
Total			**100,296**	**100**	**165,281**	**100**	**101,676**	**100**	**367,253**
Cost per Student			**11,144**		**18,365**		**7,821**		

Table 4. The share of each educational program from the costs (Percentage)

Topics of costs	Master in Parasitology	Ph.D. in Parasitology	Master in Mycology	Total
Human resources	21.79	39.36	19.77	80.92
Consumables	0.21	0.33	0.24	0.78
Logistic Services	0.06	0.06	0.08	0.20
Deputies	4.53	4.53	6.54	15.6
Depreciation	0.63	0.63	0.91	2.17
Energy	0.07	0.07	0.11	0.25
Others	0.02	0.02	0.04	0.08
Total	27.32	45.01	27.69	100

Our findings showed that the total financial cost of the parasitology and mycology groups of Kerman University of Medical Sciences during one academic year was 367,253 US dollars (USD). The highest share of this was related to the Ph.D. course in parasitology. Moreover, the costs of the master and Ph.D. programs in parasitology, as well as the master program in parasitology during one academic year were 11,144, 18,365, and 7,821 USD, respectively (Table 3).

As it has been shown in Table 4, the largest share (81%) of the total cost was related to human resources, and the least (0.08%) was related to other costs (purchasing books, etc.). Also, 45 percent of the total cost was related to the Ph.D. program of the parasitology group.

Discussion

This study assessed the costs related to the educational and non-educational activities of the parasitology and mycology groups of the Medical College of Kerman University of Medical Sciences in the academic year of 2017-2018. Numerous studies have reviewed the cost of training students in different educational programs and fields of study in medical universities (1, 2, 9, 10, 13-19). However, no study has focused on the financial costs of the parasitology and mycology groups in Iran and other countries.

Our findings showed that the annual costs of educating students in the master and Ph.D. programs of parasitology and the master program of mycology at Kerman University of Medical Sciences were 11,144, 18,365, and 7,821 USD, respectively. The annual cost of training a Ph.D. student in clinical and laboratory fields is estimated to be 1.5 to 2.4 times of the cost spending for students in master's educational programs of the same fields. In the study of Ghasempour *et al.*, it was shown that this ratio was 2.2 (i.e., the cost ratio of training Ph.D. to master's students) in the laboratory hematology and blood banking field, which is in compliance with the findings of the present study (1). However, in the study of Ebadifard Azar *et al.*, the ratio of the annual costs of the Ph.D. and master's educational programs in non-clinical fields was 1.1 (20), reflecting the lesser practical credits and courses in non-clinical and non-laboratory fields, in which there is a little difference between the educational costs of the Ph.D. and master programs. In general, the costs of training students in medical colleges is high due to numerous laboratory-based courses and practical credits, as well as expensive consumables and equipment, resulting in higher costs of training students in medical vs. non-medical colleges. In Maelah's study, it was shown that the cost of educating students in medicine was about two times that of other study fields (engineering, economics, law, etc.) (11). Moreover, Razavi *et al.* in their study mentioned that parasitology and mycology are relatively costly fields (21).

A review of studies showed that the highest share of educational costs was related to direct costs (9, 10, 18, 22). In the present study, the largest share of these costs was related to human resources (81%), and in particular, professors' salaries (68%), which was in compliance with the findings of similar studies. This implies that the most costly educational activity is related to the salaries of professors, to which some studies have referred (23, 24). It is notable, the higher the professor's scientific grade is, the higher the costs of educating courses are (25). However, any endeavor to decrease professors' salaries can have a direct impact on the quality of training (24).

Based on the data of the present study, professors of parasitology and mycology spent about 60 percent of their time for the training and teaching of the course credits of other educational groups, and in this study, such costs were deducted and excluded from the costs of educating parasitology and mycology students.

Some discrepancies in the costs reported in this study and those mentioned in previous studies may be related to the fact that we reviewed post-graduate programs while the other studies mainly investigated professional doctorate periods. As another reason for the differences in the costs of various educational programs, one can refer to the difference in the number of course credits, which is the most important allocation basis. In other words, course credits in each semester are lower in post-graduate programs, increasing the costs of these educational programs. Furthermore, the allocation of different coefficients to educational programs, including bachelor, master, and Ph.D., causes numerous and significant changes in the costs of educating students. In Rajabi's study (15), the reasons for higher costs of post-graduate programs were noted to be a lower number of students and more facilities and equipment used in these programs, which increased the cost of educating these students compared to other groups.

This study has a number of strengths and limitations.

One of the strengths of this study was the adjustment of different costs by the importance of activities in each of the master and Ph.D. programs in the cost calculation process, which has been largely neglected in other studies. Moreover, we can refer to a number of limitations, like not considering what semester each student was studying in, as well as ignoring the costs of university offices and directing offices, as well as overhead costs like those related to facilities and maintenance.

Finally, we should argue that it is not appropriate to consider the number of students as a basis for paying per capita awards to faculties or universities. Likewise, Kojouri *et al.* (17) indicated in their study that differences among universities, their equipment and research capabilities, the scientific grades of professors, etc. could be among the factors resulting in a difference in the cost of a student for universities. Therefore, this basis is not an appropriate criterion for allocating financial resources to different educational groups and universities.

Conclusion

One of the most important objectives of cost analysis studies is to disclose the real costs of services, which is also among the policies of the packages of transformation and innovation in medical education. In the present study, the costs of educating and training students in parasitology and mycology were assessed in Kerman University of Medical Sciences in the academic year of 2017-2018. Parasitology and mycology are among the costliest medical fields due to having numerous practical and laboratory credits. Monitoring the costs of an education service leads to an optimal allocation of educational resources and budget to different parts (i.e., human resources, equipment, and educational requirements) and may, in long run, help purchase required advanced educational and research equipment. It may also serve as a basis for determining the costs of internationalization of education and attracting international students. So, this research can be an appropriate guide to policymakers for decision-making in order to improve the national educational system and optimally utilize financial resources.

Acknowledgments

We thank all the administrative staff of the Faculty of Medicine of Kerman University of Medical Sciences for their cooperation and assistance in collecting data.

Conflict ofInterest: The authors declare that they have no competing interests.

Ethics Approval: The Ethics Committee of Kerman University of Medical Sciences approved the study (IR.KMU.REC.1398.280).

Funding/Support: The research was not funded by any organization.

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Strides Dev Med Educ. 2021 December; 18(1):e1034 doi 10.22062/sdme.2021.195297.1034

Research Article

Actual Costs of Residency Training in Teaching Hospitals: A Case of Iran

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Received: 2020 November 18
Revised: 2021 May 30
Accepted: 2021 June 08
Published online: 2021 June 15

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Citation:
Meshkani Z, Alebouyeh MR, Rezapour A, Alipour V, Mazdaki AR, Markazi Moghaddam N, Yousefzadeh N, Hakimi N. Actual Costs of Residency Training in Teaching Hospitals: A Case of Iran. Strides Dev Med Educ. 2021 December; 18(1):e1034. doi: 10.22062/sdme.2021.195297.1034

Abstract

Background: There was a challenge for teaching hospitals to accept residents for educational goals due to their training costs.

Objectives: The present study aimed to estimate the actual costs of residency training in hospitals for policymaking, budgetary impact, and negotiation.

Methods: This retrospective study was performed in eight teaching hospitals affiliated with the Iran University of Medical Sciences, Tehran, Iran, in 2018. Two scenarios were designed to estimate the costs of education per resident. All of the resources used by residents in the hospitals were identified. Cost items attributed to the training goals were allocated to the internal medicine and surgical fields; however, for cost items that were used for treatment and education, such as disposables and consumables and equipment, the cost drivers were used. Therefore, the difference between the scenarios was related to the cost drivers.

Results: Overall, the selected hospitals had spent $ 586,720.35 and $ 572,358.10 based on scenarios 1 and 2, respectively. The residency training per surgical resident in the hospitals was about 1.2 times higher than an internal medicine resident. Surgery, neurology, urology, and anesthesiology were the fields with the highest costs in the hospitals.

Conclusion: Although residency training accounts for a large proportion of hospital costs, employing residents reduces the costs of human resources. Monitoring and controlling costs, as well as resource quotas for resident training, can be a way to reduce educational course costs in hospitals. Universities can cover some parts of the educational costs to motivate hospitals to make an appropriate setting for residents.

Keywords: Cost Analyses, Academic Medical Centers, Internship and Residency

Background

Health care funding is the most controversial issue that encourages policymakers worldwide to think about it and provide cost control strategies. Aging, chronic diseases, expensive treatments, and education are some factors that raise the costs of health sectors (1). In the 1700s, Adam Smith who was one of the earliest references for medical education costs pointed out the expense of medical education costs (2). Although education increases the costs of hospitals, it can provide the required specialized human resources in hospitals (1).

Training in the health sector is one of the human resources information system dimension that if carried out correctly and comprehensively, it can economically avoid expenses for the health sector in the one hand and increase the quality of life of the population on the other

hand (3, 4); furthermore, this will be more evident in the training of medical students, especially residents. Due to diversity and challenging populations, general practice skills do not meet the needs; then, it seems that specialized clinical knowledge has more value for the health economy than generalist medical expertise (5).

A portion of medical education that leads to experience and skill is the residency training program that takes 4 to 7 years based on the field (6). Much of this course is spent in hospitals. Residents require spending long hours in hospitals and clinics to gain training and experiments and need some facilities, such as food, during the period of training bearing costs for hospitals (7, 8). However, the question is that how much does it cost to train residents in teaching hospitals, and how should the costs be financed? What portion of the costs of residents training is borne by the government, universities, or teaching hospitals?

Several studies addressed the costs of education in teaching hospitals (9-12) that have been estimated more than 80 billion euros per year globally for education and training in 2015 (13). The total costs of education were $US 9,042,400. Moreover, the total costs of per resident and per fellow were $US 35,164 and $US 31,363 for the School of Medicine, University of Pittsburgh, United States, in 2003, respectively. The cost items were included as administrative office expens, fellowship and residency training expense, program leaders, Residency Review Committee (RRC) subspecialty coordinators, and Additional teaching cost. (14). The hidden costs of medical education were estimated at the Sydney Medical School, Australia, about $US 56,250 per student in 2010, also including the infrastructure costs. The total costs paid by the university were about $US 56,000, and the costs that were not paid by the university were annually about $US 34,000 per student (15). Although there were no published papers on the costs of residency training in Iran, several studies addressed the costs of university student educational services (16, 17).

The education costs of nursing, health education, and environmental health were $US 4662, $US 3305, and $US 3906 in MSc per student in 2017, respectively. The education costs of laboratory sciences were $US 2373 (17). The education costs of PhD, MSc, and BSc students were $US 3380, $US 2191, and $US 1208 in 2013, respectively (16).

Iran Ministry of Health and Medical Education is also in charge of educating medical students and residents. The residents do not have any payment for their training course, and all of the costs were paid by medical universities and hospitals, although the cost portion of hospitals is lower than the universities. Due to the imposition of costs on hospitals and the financial priorities, there was a challenge for teaching hospitals to accept residents for educational goals. Although admissions are compulsory, the challenge will be solved by sharing the costs between the university and the hospitals and receiving more financial supports from the university for hospitals due to education; nevertheless, how much of the costs should be covered by the university and paid to the hospitals?

Objectives

The present study aimed to estimate the financial burden of residents' training in teaching hospitals affiliated with Iran University of Medical Sciences, Tehran, Iran, for policymaking, budgetary impact, and negotiation.

Methods

It was a mixed-method study. A retrospective evaluation and analysis of training cost per medical resident at all teaching hospitals affiliated to the Iran University of Medical Science were performed to address the challenges in cost management between the university and teaching hospitals and negotiation as well. Iran University of Medical Sciences is one of the major medical centers in Iran that supports nine colleges, 18 teaching hospitals, and 27 research centers and residency fields.

This study aimed to estimate the instructional and program-specific administrative actual costs of residency training in internal medicine and surgical fields in all the teaching hospitals affiliated with the Iran University of Medical. The total costs of residency training for an academic year per field, the costs of residency training per resident on average, and the percentage of educational costs from the full costs of hospitals were the outputs of the present study.

All of the teaching hospitals that support residency courses were considered in this study. Accordingly, eight teaching hospitals were included in the present study. The hospitals were marked in English letters from A to H to maintain confidentiality. No sampling was required, and all the members of the hospitals that provided residency courses were considered. The residency rotation and failed residents were considered separate samples in each hospital because the resources used by them were different in each one.

The costs of all the resources were taken from the accounting, staffing, and medical equipment departments. All units had their information systems and made the information available on the required items. All the data were entered in a researcher-made form.

Costing Perspective

The costs were estimated by "hospital perspective". Accordingly, all of the cost items in the hospitals as direct costs and overhead costs that attributed to the education were considered. Accordingly, the cost items that were paid by the university were not considered. Unlike other medical students who have two semesters a year, residents spend one academic year on educational courses in hospitals and the university. Therefore, the time duration of the present study was an academic year. Costs items were considered for the fiscal year 2018.

For the estimation of residency training costs, qualitative and quantitative phases were defined as follows:

First, the resources used by residents in the hospitals were identified; accordingly, a 14-item survey was designed based on process mapping. The research team tried to visualize connections and feedback loops to

provide a baseline understanding of the costs of the overall process of training a resident in the hospitals. Then, a questionnaire was designed by considering all the resources used by residents, such as disposables and consumables, equipment and instruments, payments for residents, number of nutrition packs, number of professors and residents in any field, and overhead of training programs. The questionnaire also contained the amount of consumption and the duration of equipment utilization by the residents. This was the qualitative part of the study.

The estimation of the costs of education per resident was the quantitative part of the study. For estimating the costs of residency training in hospitals, there was no conclusive methodology; therefore, two scenarios were designed for analysis by an expert panel.

The qualitative phase was in common for the scenarios, and all of the resources used for residency training were identified in both scenarios. Cost items that entirely attributed to the training were allocated to the internal and surgical fields; nevertheless, for cost items that were used for treatment and education, such as disposables and consumables and equipment, the cost drivers were used. Therefore, the difference between the scenarios was related to the cost drivers explained as follow:

- In the first scenario, a technical advisory panel consisting of health economics, medical sciences professors in all fields, and the managers of the hospitals was used. The expert panel defined the portion of residents of hospital resources. Based on the identified cost headings from the panel of experts, the residents' use of all resources was visually traced.
- Considering the residents as employees of the hospitals due to their continued presence was the second scenario. Then, the clinical staff-to-resident ratio was calculated, and the costs of residency training were estimated based on the ratio.

Accordingly, by estimating the portion of residency training from the cost items of hospitals and the costs items that attributed to the education, the total costs of any fields and the average costs of education per resident in any fields were estimated. The average overhead costs were also considered. The formula for the calculation of the residency training costs by the scenarios was as follows:

$$\text{Average cost of training for residents} = \frac{\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + u}{R}$$

where indicates the cost of resources used by residents like as disposables and consumables depreciation of equipment and instruments, payments for residents, overhead of training programs. indicates the overhead costs was different based on the scenarios. As previously mentioned, for the first scenario, was calculated by observing the activities and consumption of resources, and the ratio of residents to the entire clinical staff (i.e., nurses and physicians) was obtained for the second one as follow:

$$\beta = \frac{R}{\mathrm{R} + \mathrm{N} + \mathrm{P}}$$

where R, N, and P are the numbers of residents, nurses, and physicians in each hospital at the study time, respectively. X is the cost items as disposables and consumables and equipment depreciation. U stands for the overhead costs.

All types of costs were converted into US dollars ($US) using the 2018 exchange rate (1 $US = 42000 Rial) that was reported by the central bank of Iran (18). Excel software (version 2010) was used for analyzing the costs.

Because the present study was a costly investigation, the sensitivity analysis was not performed, although two scenarios were defined to assess the robustness of the results. This study was approved by the Health Management and Economics Research Center, Iran University of Medical Sciences (no.: IR.IUMS.REC.1397.925).

Results

A total of 736 residents were spending their educational practices in the hospitals affiliated with the Iran University of Medical Sciences in 2018. There were a total of 22 courses in the selected hospitals. The surgery residents were considered 35% of the total population.

Based on the panel results, the salaries and payments of professors and residents, the costs of depreciation of the hospital building, the costs of depreciation and repairing the equipment and instruments, the costs of disposables and consumables, the overhead costs of training programs, and the costs of nutrition packs were defined as costs items. The costs of the salaries of professors and residents and depreciation of the buildings were excluded because the costs items were not paid by the hospitals. The cost components are defined as follow:

- Resident's payments: Although the resident's salary was paid by the university, monthly payments made by the hospitals to the residents were considered.
- Disposables and consumable costs: All the consumables used by residents for educational measures, such as disposable clothing and gloves, sterile gloves, syringes, and all kinds of kits, were included because they were provided by the hospitals. The portion of education and treatment was not defined in financial documents; therefore, it was estimated by defining two cost drivers as two scenarios. Based on the panel results, the residents used about 35% of disposables and consumables in the hospitals; therefore, 35% of the total costs of consumables in the hospitals were evaluated for the first scenario. The ratio of residents to clinical employees was calculated for consumption for the second scenario.
- Costs of depreciation and repairing the equipment and instruments: The depreciation and repairing costs of any equipment used by residents were included. The equipment was analyzed using an estimated useful life of 15 years. Based on the panel results, the time of equipment used by residents was two times higher than the professors

considered for the first scenario. The ratio of residents to clinical employees was calculated for the depreciation of the equipment for the second scenario. The repair of equipment was considered only for the second scenario because, according to the panel results, the residents did not damage the equipment.

- Overhead costs of training programs: Any costs for consumables and spaces, such as papers, video projectors, resorts, classes, conference rooms, and nutrition pack costs, in the hospitals were considered. Nutrition pack costs were calculated by the number of meals used by residents multiplied by unit costs.

Based on the results, payments for residents and costs of disposables and consumables had the highest portion of training costs in the hospitals for residents, respectively. The cost category of the residents' practical courses in hospitals is provided in Table 1.

The total costs of the hospitals for training residents were $US 586,720.35 and $US 572,358.10 based on scenarios 1 and 2, respectively. Based on scenario 1, the average costs of a surgical resident and an internal medicine resident were $US 10710.13 and $US 9204.88, respectively. With a slight difference, the average costs of a surgical resident and an internal medicine resident were $US 10284.32 and $US 9048.11 based on the second scenario, respectively (Figure 1). About 65% of the total costs were spent on the internal medicine residents. The costs of education per surgical resident in the hospitals were about 1.2 times higher than an internal medicine resident.

The percentage of educational costs of residents from the whole costs of the hospitals was also estimated that was less than 10 for H, F, D, B, A, and G hospitals; however, the aforementioned percentage was 26 and 31 for C and E hospitals, respectively. Table 2 shows the mean and total costs of residency training in every hospital. Based on both scenarios, the residents used the highest resources in hospital B, and the lowest costs were related to hospital H.

The mean costs per internal medicine resident in hospital F were the maximum ($US 10135.69); nonetheless, the mean costs per internal medicine resident

Table 1. Cost ($US) Category of Residents' Education in Hospitals

Cost category		Cost ($US)	%
Scenario 1	Disposables and consumables	77,329.74	13.18
	Depreciation of equipment and instruments	32,856.34	5.6
	Payments for residents	295,120.34	50.3
	Overhead of training programs	181,413.93	30.92
	Total	586,720.35	100
Scenario 2	Disposables and consumables	58,609.47	10.24
	Depreciation of equipment and instruments	19,689.12	3.44
	Repair of equipment	6,295.94	1.1
	Payments for residents	301,003.13	52.59
	Overhead of training programs	186,703.21	32.62
	Total	572,358.10	100

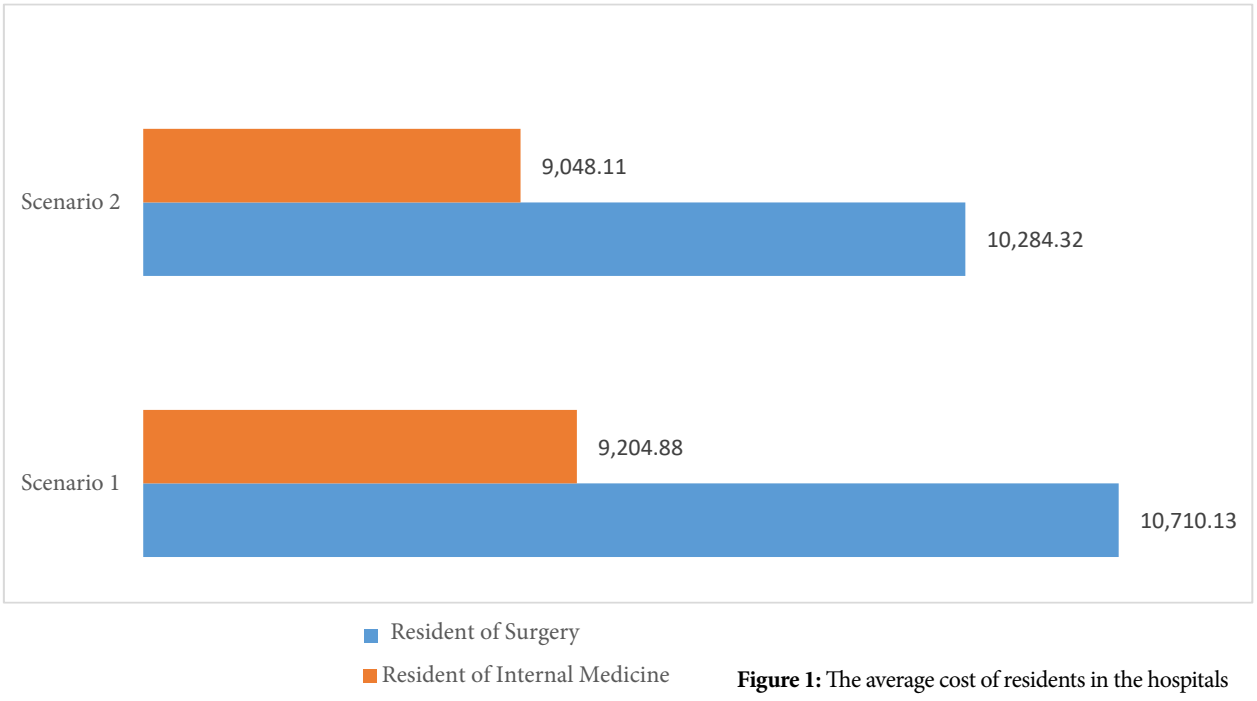

Figure 1: The average cost of residents in the hospitals

Table 2. Costs ($US) of Residents' Education per Hospital

Hospitals	Mean cost ($US) per resident		Total cost ($US)
	Scenario 1		
	Surgery resident	Internal resident	
A	9,849.63	9,276.00	142,581.78
B	10,167.02	8,812.00	212,161.09
C	10,558.13	9,484.73	96,994.12
D	10,713.82	9,497.78	20,211.60
E	-	8,455.41	48,859.83
F	18,452.74	10,135.69	32,469.40
G	11,471.37	9,526.67	25,366.24
H	-	8,076.30	8,076.30
	Scenario 2		
A	9,821.89	8,979.03	139,742.64
B	9,782.90	8,684.69	207,435.34
C	10,368.69	9,426.20	96,146.96
D	10,190.45	9,204.39	19,394.84
E	-	8,350.48	45,949.59
F	15,964.85	9,994.91	30,560.98
G	10,548.94	9,463.10	25,051.45
H	-	8,076.30	8,076.30

were the minimum ($US 8076.30) in hospital H based on scenario 1. The results were similar for the second scenario. The highest and lowest mean costs for surgical residents were related to hospital F ($US 18452.74) and A ($US 9849.63) based on scenario 1, respectively; however, based on scenario 2, hospital F ($US 15964.85) and B ($US 9782.90) had the highest and lowest mean costs for surgical residents, respectively. There were no surgical residents in hospitals E and H.

The costs of residents per field were also calculated in this study, shown in Table 3. Surgery, neurology, urology, and anesthesiology were the fields with the highest costs in the hospitals based on both scenarios; nevertheless, psychiatry, occupational medicine, and geriatrics and gerontology had the lowest costs.

Factors that increase the hospitals' costs and the training costs accordingly in the hospitals were identified by the panel experts. The first important element was the lack of independence in equipment production and importing the equipment that takes time and costs.

Table 3. Costs ($US) of Residents' Education per Field

	Scenario 1		Scenario 2	
Specialty	Total	Mean	Total	Mean
Orthopedics	30,791.12	10,263.71	29,618.39	9,872.80
Pediatrics	58,483.67	9,747.28	55,504.11	9,250.68
Emergency medicine	48,178.26	9,635.65	47,887.47	9,577.49
Urology	11,351.99	11,351.99	11,104.98	11,104.98
Immunology	8,515.62	8,515.62	8,394.17	8,394.17
Nephrology	13,199.97	13,199.97	12,700.73	12,700.73
Anesthesiology	43,832.06	10,958.02	41,427.39	10,356.85
Forensic science	24,402.58	8,134.19	26,044.92	8,681.64
Dermatology	17,171.00	8,585.50	17,047.95	8,523.98
Surgery	39,065.68	13,021.89	36,172.18	12,057.39
Neurosurgery	9,415.76	9,415.76	9,497.65	9,497.65
Oncology	28,574.62	9,524.87	28,579.25	9,526.42
Psychiatry	30,182.59	6,036.52	37,983.22	7,596.64
Internist	84,579.44	9,397.72	81,882.53	9,098.06
Obstetrics and Gynecology	30,620.69	10,206.90	29,792.48	9,930.83
Geriatrics and Gerontology	7,872.99	7,872.99	7,872.99	7,872.99
Occupational medicine	7,403.15	7,403.15	7,403.15	7,403.15
Infectious diseases	18,681.03	9,340.52	17,975.38	8,987.69
Cardiology	19,173.10	9,586.55	18,646.02	9,323.01
Ear, Nose and Throat	19,242.06	9,621.03	19,143.07	9,571.53
Nephrology	18,652.48	9,326.24	18,536.29	9,268.15
Neurology	9,254.21	9,254.21	9,143.79	9,143.79

Dependency on the international exchange rate due to importing some disposable and consumable equipment and instruments, economic shocks, and inflation were other important factors for increasing the costs. In addition to raising the costs of education, economic shocks have delayed providing training requirements and finally increased the opportunity costs of training. Other factors were hospital size, referral hospitals in some fields, number of beds and patients, training time, and program size.

Discussion

This investigation was conducted to gain insight into the actual costs of residency training in hospitals affiliated with Iran University of Medical Sciences for an academic year. Based on the results, the total costs of the hospitals for training residents were $US 586,720.35 and $US 572,358.10 based on scenarios 1 and 2, respectively. About 65% of the total costs of residency training were spent on internal residents, although the costs of education per internal resident were about 1.2 times lower than a surgical resident in the hospitals. Surgery, neurology, urology, and anesthesiology were the fields with the highest costs in the hospitals; however, psychiatry, occupational medicine, and geriatrics and gerontology had the lowest costs based on both scenarios.

Based on the results, the costs of education were not related to the number of beds, the size of the hospitals, and the number of residents; however, they depend on the number of trials and errors and activities in each field. Higher education courses have lower costs than others. If the costs of training were related to the size of the hospitals or the number of beds, the costs should be reduced by increasing these variables; nevertheless, the results of the present study did not confirm this issue.

The costs of resources used by residents were not documented in the hospitals, and the calculation of the exact costs was impossible. Then, the authors tried to define a method to estimate the costs and defined two scenarios to extract the education costs from the whole. Nearly, similar results were obtained; then, the ratio of the residents to clinical employees was the best choice because it did not waste time and was more accurate. Several studies have extended this to calculate the costs related to medical students in different ways. Although comparing the studies is difficult due to the difference between cost items and calculation methods, it was tried to investigate some of them in this study.

Verma et al. compared the costs of medical education by traditional and time-driven activity-based costing (TDABC) methods in India. Based on the results, 172.20 and 98.80 lacs were estimated for medical students' education by traditional and TDABC methods, respectively. The authors suggested that TDABC is a more accurate method of costs calculation than the traditional one because the second method allocates all resource costs irrespective of consumption (19). Due to the costing perspective, the TDABC method was not used in the present study. The costs by residents were traced, and if all resources in the hospital were considered, we would face overestimating the costs of education.

Franzini et al. calculated the costs per undergraduate medical student at the University of Texas-Houston Medical School, United States, in 1994-95. They used a cost-construction model for the calculation of the costs. In the model, the costs of the entire program, such as instructional costs, educational costs, and milieu costs, were considered. Student contact hours, enrollment, required full-time-equivalent faculty and residents, professional-activity profiles, faculty and resident salaries, and supporting resource costs were considered cost drivers. Based on their results, the costs of 4-year education for the undergraduate medical program were about $US 82,692,280 at the university, and the costs per student were annually about $US 192,023 (20). The present study estimated the costs of education for an academic year. The hours of using the equipment for calculating the costs of equipment in the first scenario and the number of clinical individuals in the wards for calculating the costs of all topics except the overhead costs were considered in the present study; nevertheless, the difference between the studies is due to the costing perspective.

Koenig et al. estimated the mission-related costs of teaching hospitals that were about $US 27 billion for all teaching hospitals in 2002. The aforementioned study did not calculate the costs per medical student (21). In the present study, the costs of teaching in all hospitals were estimated at about $US 586,000, and the costs of teaching were about $US 10,000 per resident, which were higher than those of the aforementioned study.

Ben-Ari et al. estimated the costs of internal residents in the United States in 2013. The average costs were estimated within the range of $US 183,188 to $US 199,486. They identified the fixed and variable costs. All the items dependent on the program size of education were considered variable costs (22). Two scenarios were considered in the current study, and the study performed by Ben-Ari et al. was more similar to the first scenario; nevertheless, they defined another category of costs for education. The costs of disposables and consumables and the costs of depreciation and repairing the equipment and instruments were different in the present study that increased by the program size. A large part of the costs included fixed costs, such as a resident's salary, which was 50% of the total costs for education.

For the estimation of the educational costs, some studies compared the teaching and non-teaching hospital costs (23, 24). However, there is a high gap roughly in estimating the actual costs of education. Due to lower tariffs in teaching hospitals, the burden of admissions is higher than in non-teaching hospitals. Then, if the researchers decided to estimate a medical student's educational costs, they would face overestimating the costs. Therefore, this method was not chosen for the current study.

Additionally, the present study investigated that training time, especially for equipment and instruments,

was a factor that affected and increased the education costs; nonetheless, the results are in contrast with the results of a study by Babineau et al. They calculated the costs of operative training for surgical residents. Based on the results of the aforementioned study, although the operation time increased due to education, it was not an effective factor in increasing the financial burden on hospitals. Babineau et al. argued that because lots of training costs were categorized as fixed costs, they did not impose a financial burden on hospitals (25).

Time is one of the factors leading to the depreciation of equipment and capital assets. Accordingly, time can increase cost items, such as repairing the equipment, and shorten their useful life. Therefore, time imposes the need to buy new equipment in the hospital earlier than usual.

Training is an opportunity for hospitals to provide human resources; however, they can negotiate with the university to allocate more funding for residency training.. Policymakers should consider the educational needs and the need to provide new equipment for forecasting the budgets of education in hospitals.

Limitations

The estimated costs of education per field per resident for the first time were the strength of the present study in Iran; nevertheless, it was not possible to calculate all the components of resident's costs in the hospitals, such as administrative costs in the university, due to the costing perspective. Another limitation was that it was not possible to measure the effect of education on third-party payer costs. Finally, the results cannot be generalized to all of the hospitals in Iran due to different cost management strategies.

Conclusion

The financial burden of medical students was high in teaching hospitals in Iran University of Medical Sciences; nonetheless, because they are low-wage professionals and generate revenue for hospitals, not accepting them would lead to an opportunity cost. The costs of education were not related to the number of beds, the size of the hospitals, and the number of residents, but related to the number of trials and errors, activities, and years of study in each field. The important factors that increased the costs of hospital resources and educational costs accordingly were economic shocks and inflation.

The overarching part of the study was the methodology that is generalized for estimating the costs of educations in hospitals for any setting. It was not possible to find a gold standard for calculating the costs of medical education; nevertheless, it is better to identify the costs of perspective for the first step and calculate the costs per resident for the second one. The results showed that for estimating the costs of medical education in teaching hospitals, the ratio of residents to clinical employees is the best choice. Monitoring and controlling costs, as well as resource quotas for resident training, can be a way to reduce training costs in hospitals. Universities can cover some parts of the educational costs of residents to motivate hospitals to make an appropriate setting for residents.

Acknowledgments

The authors would like to express their gratitude to the Health Management and Economics Research Center, Iran University of Medical Sciences, for financial support and the management of the selected hospitals for providing the data.

Conflicts of Interest: The authors declare that there is no competing interest.

Ethical Approval: This study did not involve any human subjects.

Funding/Support: This study was approved by the Health Management and Economics Research Center, Iran University of Medical Sciences (no.: IR.IUMS.REC.1397.925).

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Strides Dev Med Educ. 2021 December; 18(1):e1015 doi 10.22062/sdme.2020.193866.1015

Research Article

Relationship between Self-efficacy and Attitudes towards Interprofessional Collaboration and Communication in Learners of Different Disciplines of Medical Sciences

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Received: 2020 July 27
Revised: 2020 December 3
Accepted: 2020 December 12
Published online: 2021 October 26

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Citation:
Keshmiri F. Relationship between Self-efficacy and Attitudes towards Interprofessional collaboration and Communication in Learners of Different disciplines of Medical Sciences. Strides Dev Med Educ. 2021 December; 18(1):e1015. doi: 10.22062/sdme.2020.193866.1015

Abstract

Background: Interprofessional collaboration is defined as a key component of a successful team in healthcare system. Interprofessional collaboration facilitates healthcare team members to provide the effective and safe healthcare services.

Objectives: This study aimed at investigating the relationship between self-efficacy and attitudes toward interprofessional communication and collaboration in learners of different disciplines.

Methods: This cross-sectional study carried out in Shahid Sadoughi University of Medical Sciences in 2020. In the first phase, the psychometrics properties of the scales; attitudes toward healthcare teams and self-efficacy in interprofessional collaboration and communication were evaluated. In the second phase, the survey were conducted among 178 residents, medical interns, and nursing students.

Results: The validity and reliability of the instruments were confirmed. According to exploratory factor analysis, the items of the self-efficacy in interprofessional collaboration and communication scale were classified into four areas; effective communication with the patient, patient involvement, interprofessional teamwork, and interprofessional interaction. The Cronbach's alpha coefficient was 0.74 and 0.95, and interclass correlation coefficient was 0.76 and 0.90 for attitudes toward healthcare teams and self-efficacy in interprofessional collaboration and communication scales, respectively. The mean scores of self-efficacies (2.10±0.41) and attitudes toward health care teams (2.17 ±0.43) were at a weak level, and a significant relationship was observed between them (P= 0.001, r = 0.80).

Conclusion: Regards the confirmation of validation of the tools, the validated instruments can be utilized for formative evaluation of learners in different fields in order to provide the necessary platform for the promotion of interprofessional collaboration behavior in clinical teams.

Keywords: Interprofessional, Collaboration, Attitude, Team, Self-efficacy, Interprofessional Communication

Background

Patient safety is considered the main indicator in healthcare delivery systems, and health system personnel are expected to acquire the core capabilities to provide safe and high-quality services (1). In this regard, the World Health Organization, scientific communities, and educational accreditations agencies in worldwide to develop frameworks to explain the capabilities needed to achieve the goals of providing safe and high-quality services in healthcare systems (1-4). Likewise, interprofessional collaboration in educational programs of universities and institutes continuously receives special attention (4-6). Hence, interprofessional collaboration and teamwork are defined as core competencies in the curricula (5, 6). Various areas are defined in the literature for interprofessional collaboration, including professional values, recognizing roles and responsibilities, teamwork, interprofessional communication, leadership, and conflict management (4-7). Teamwork and interprofessional communication, as the basis for

interprofessional collaboration, can play an effective role in healthcare teams (7-9). The results of a review study on interprofessional training and cooperation indicated the need for further research to determine the factors affecting interprofessional cooperation in healthcare teams (10-11). Therefore, recognizing factors predicting and influencing behavior change, such as attitude and self-efficacy, among healthcare team members and planning based on it can provide a solution for the promotion of interprofessional collaboration behavior in educational interventions.

Self-efficacy and attitudes toward the desired behavior are considered important in choosing and performing it. Self-efficacy is the key determinant in Bandura's theory, introduced as an important and main precondition for behavior change. According to this theory, behavior is the result of interactions among environmental factors, behavior, and the individual (12-13). Self-efficacy is defined as one's understanding of his ability to organize and practice the pathways required to manage future situations (12, 13). Self-efficacy beliefs guide thinking, feeling, motivation, and ultimately, functioning. In Bandura's theory, self-efficacy refers to the sense of competence, adequacy, and ability to cope with life situations and the extent of one's perception of the degree of control over different situations. Self-efficacy is a personal factor influencing the choice and conduct of a particular behavior (12-15). It shows that how people think, feel, and behave (13, 16). Perceived self-efficacy determines the type of one's selective behavior, perseverance, and quality of performance (17). Self-efficacy, in the early stages, does not develop with "self-persuasion" and beliefs in "I think" and "I can", but is formed by the consistent support and pursuit of realistic plans, concepts that should be considered in organizations (18).

In clinical practice, self-efficacy is considered a key component of independent behavior (17) that helps learners to feel competent in different situations and accept their roles (19, 20). The results of a study by Mohammadi et al. showed that higher self-efficacy leads to better adaptation and, in turn, better functioning in the desired behavior (21). Robb stated in a study that the facilitation of self-efficacy converses learning into practice, leading to the decrease of the gap between theory and performance (22). It increases the motivation, self-confidence, and clinical performance of learners in complex and difficult situations (17).

Interprofessional collaboration is a complex concept whose realizing requires the knowledge of personal, cultural, and systemic factors in the desired community. The personal factors are recognized as the most important factors in interprofessional collaboration, among which knowledge expansion, decision-making, and teamwork skills are of great importance. In addition, attitudes and beliefs in the usefulness and perceived competence of personal abilities play an effective role in involvement in interprofessional collaboration (17). Attitude is another factor that plays a role in decision-making in behavior choice (23) and is introduced as an effective factor in the development of knowledge and skills required for interprofessional collaboration (10). Therefore, it can be said that attitude and self-efficacy are among the factors affecting interprofessional cooperation and communication (24, 25). In other words, effective performance depends on individual skills, attitudes, and beliefs in self-efficacy, and those who believe in their abilities can take steps toward success (17). Therefore, it is necessary to properly analyze the current situation through studies to provide a basis for effective interventions. Given that in the present study setting, educational programs were mainly designed and implemented as a disciplinary based approach, the promotion of interprofessional cooperation skills is not included in the curricula. Hence, the evaluation of learners' attitudes and self-efficacy in interprofessional communication, in terms of person-behavior interaction, could be a starting point for planning the promotion of interprofessional cooperation among learners of different professions.

Objectives: The present study aimed to investigate the relationship between self-efficacy in interprofessional cooperation and attitudes toward the team among nursing students, as well as medical interns and residents at Shahid Sadoughi University of Medical Sciences.

Method

The current descriptive-analytical cross-sectional study was conducted in two phases at Shahid Sadoughi University of Medical Sciences, in 2020. In the first phase, the psychometric properties of the attitudes toward healthcare teams scale and self-efficacy in interprofessional team collaboration scale were examined. In the second phase, a survey of the learners of clinical education courses (including nurses as well as medical students at internship, and medical residents) was performed at Shahid Sadoughi University of Medical Sciences, who were selected by the census method.

The Communication Skill Self-Efficacy Beliefs scale was first developed by Hagemeier et al. in 2014 to assess the self-efficacy in interprofessional collaboration and communication (26). Items are scored based on a Likert scale from strongly disagree (score 1) to strongly agree (score 5). The total score of the scale is calculated from the average score of all 33 items. Therefore, the score of each item ranges from 1 to 5, and the total scores are classified as very weak (1-2), weak (2.1-3), moderate (3.1-4), and strong (4.1-5).

The attitudes toward healthcare teams scale was first developed by Heinemann et al., and its reliability was confirmed by Cronbach's alpha coefficient (alpha = 0.83) (27). This 19-item scale has two subscales, including "quality of health services" (n=14) and "physician-centered" (n=5). The items are scored based on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The total score is obtained from the average scores of all 19 items. Thus, the score of each item ranges from 1 to 5, and the total scores are classified as very weak (1-2), weak (2.1-3), moderate (3.1-4), and strong (4.1-5)(27).

In the first phase of the study, the psychometric properties of the instruments were assessed. The translation-retranslation process was performed by two experts fluent in Persian and English languages. The translated versions were compared to provide the initial Persian version. It was reviewed by medical education and nursing education experts, as well as clinical specialists (n=4), and accordingly, the final version was developed. Next, the Persian version was retranslated into the original language. After making sure that the re-translated version coincided with the original one, the expert's comments were made by a specialized team. Finally, the Persian version of the questionnaires was approved.

The content and face validity of the Persian version of the questionnaires were assessed by the Delphi technique. It was performed in four rounds with the participation of medical education faculty members and clinical specialists (n=15). First, the Persian version was reviewed by experts, and their comments on the content validity of the scale were qualitatively examined. After two weeks of each round, experts' comments were collected, and the second round was performed after making amendments. This technique was performed for four rounds until no new code was presented. Then, the content validity of the Persian version of the scale was qualitatively analyzed. The Content Validity Ratio (CVR) and Content Validity Index (CVI) were used. For this purpose, the experts were asked to rate each item on a three-point scale (i.e., necessary, useful but not necessary, and not necessary). Based on the Lawshe table, the minimum CVR value was determined (15). For CVI, the validity of each item was assessed based on a four-point scale (very high = 4, high = 3, low = 2, very low = 1) (16).

Next, the exploratory factor analysis of the Communication Skill Self-Efficacy Beliefs scale was conducted for the first time in the present study. This was done because of the importance of explaining the components of self-efficacy in interprofessional communication and the complexity of this concept. For this purpose, 350 learners in different disciplines o medical sciences (195 nursing students and 155 medical students) were included in the study. The inclusion criteria were studying in nursing or different disciplines of medicine and spending at least three months in clinical training at teaching hospitals affiliated with Shahid Sadoughi University of Medical Sciences. All eligible subjects were included in the study. In the exploratory factor analysis, the sampling adequacy was assessed by the Kaiser-Meyer-Olkin (KMO) test. In addition, the Bartlett test was performed to examine the suitability of the data. Varimax orthogonal rotations and principal component analysis were also used to identify the scale dimensions. The reliability of the instruments was assessed using internal consistency and reproducibility. The internal consistency was assessed using Cronbach's alpha coefficient and the internal consistency using the test-retest method.

In the second phase of the study, a survey was conducted to investigate the attitudes and self-efficacy in interprofessional collaboration and communication among the study participants. The inclusion criteria were studying in nursing students or medical students at internship, and medical residents as well as, spending at least six months in clinical training at the hospital. The study samples were included by the census method. The questionnaires were distributed to the participants in the hospitals, and explanations were also given regarding the study objectives. The self-administered questionnaires were completed by nursing students, as well as medical students at internship, and medical residents.

Also, the scores of attitudes and self-efficacy in interprofessional communication were analyzed using descriptive (mean and standard deviation) and analytical (ANOVA and t-test) tests. Pearson correlation coefficient was performed to determine the relationship between the scores of self-efficacies in interprofessional communication and attitudes toward healthcare teams. Finally, the data were analyzed in SPSS version 24 (IBM Corporation, Armonk, NY). Significant level was considered as 0.05.

Questionnaires were completed anonymously, and a code was assigned to each participant in order to maintain confidentiality.

Results

In the first phase, a total of 15 medical education faculty members and clinical specialists participated, of whom eight were males (53.33%) and seven females (46.66%), with a mean age of 46±6 years. In addition, a total of 415 students of nursing and medical internes and residents participated in the validation phase that include exploratory factor analysis (n=350), internal consistency (n= 35), and reproducibility (n=30) of the scales. In the second phase, 178 subjects including 53 nursing students (29.8%), 90 interns (50.6%), and 35 specialty residents (19.7%) participated (response rate = 76%).

The face and content validity of both instruments were confirmed by the experts participating in the first phase of the study. According to the Lawshe table, all items of both scales obtained values greater than 0.49, using the CVR results. The items of both scales got CVI values greater than 0.79 and were retained in the questionnaire. Finally, both qualitative and quantitative validities of the 33-item self-efficacy in interprofessional communication scale and the 19-item attitudes toward the healthcare teams scale were confirmed.

For the self-efficacy in interprofessional collaboration and communication scale, the adequacy of sampling, based on the KMO index (0.90), confirmed, and the Bartlett test results showed the suitability of data (P = 0.001). The present study results indicated a relationship between the variables examined in factor analysis. Based on the exploratory factor analysis, the measured scales included items with significant factor loading. As reported, the components of the self-efficacy in interprofessional communication scale included the following factors: effective communication with the patient, patient involvement, interprofessional teamwork, and interprofessional interaction.

Table 1. Factor Loads of the Items of Self-efficacy in Interprofessional Communication Scale

Item	Factor Load
Effective communication with the patient	
1- I have the necessary skills to effectively communicate with the patient.	0.56
2. I have the necessary skills to effectively communicate with the healthcare team members.	0.54
3- I clearly communicate with the patient.	0.66
4. I actively listen to patients to fully understand their views on the disease.	0.76
5. I make a good communication with my patient.	0.75
6- When I meet with patients, I consider the patient-centered communication principles.	0.73
7- I manage the information received from the patient in a way to ensure that I fully understand his needs and concerns.	0.61
8- I effectively consider the patient's feelings when interacting with him.	0.71
9- I communicate with the patient by building the trust.	0.74
10- I end the discussion with the patient while the information received by him is facilitated.	0.71
11. When a dispute arises over a treatment plan, I use patient participation strategies to gain a common perspective.	0.72
Patient Involvement	
12- I clearly communicate with the patient.	0.61
13- I professionally express my opinions to the patient.	0.62
14- I effectively explain the roles and responsibilities of team members to the patient.	0.71
15- I can effectively involve the patient in the treatment plan if he wishes.	0.63
16- I effectively provide information for illiterate patients.	0.50
17- I clearly state my role and responsibility to the patient.	0.50
18- I patiently communicate with the patient.	0.51
19. I effectively talk to the patient about my knowledge and skill limitations.	0.60
Interprofessional Teamwork	
20- I transparently transfer my knowledge to the healthcare team members.	0.70
21- I professionally respond to team members' feedback.	0.70
22- I effectively overcome barriers limiting communication with healthcare team members.	0.62
23- I respectfully give feedback to healthcare team members.	0.50
24- I encourage the healthcare team members to freely express their opinions.	0.61
25- I professionally respond to interprofessional conflicts.	0.55
26- I establish a positive, supportive relationship with healthcare team members.	0.56
27- I perfectly know the hierarchy of authority among healthcare team members.	0.66
28- I have a correct understanding of my role as a healthcare team member.	0.68
29- I have a good understanding of the role of team members.	0.78
Interprofessional Interaction	
30- I respectfully share my views with team members.	0.65
31- I actively listen to team members.	0.75
32. I respect the expertise of team members.	0.74
33. I trust team members.	0.69

Table 2. The comparison of the scores of the self-efficacy in interprofessional communication and collaboration and attitude toward health care team based on field of the study

Area	Discipline			P	F
	Interns	Residents	Nursing students		
	Mean (SD)	Mean (SD)	Mean (SD)		
Self-efficacy in inter-professional communication					
Effective communication with the patient	10.51(2.0)	2.04(0.51)	1.94(0.61)	0.46	0.62
Patient involvement	27.55(2.0)	2.45(0.56)	2.29(0.78)	1.94	0.14
Interprofessional teamwork	10.49(2.0)	2.19(0.46)	2.03(0.52)	1.51	0.22
Interprofessional interaction	72.48(1.0)	1.85(0.49)	1.70(0.49)	0.46	0.18
Total score	5.40(2.0)	2.15(0.40)	2.02(0.47)	1.72	0.18
Attitudes toward healthcare team					
Quality of health care services	2.15(0.38)	2.14(0.38)	2.15(0.43)	0.82	0.44
Physician-centered	2.14(0.38)	2.15(0.38)	2.13(0.38)	0.58	0.56
Total score	2.15(0.4)	2.14(0.38)	2.15(0.36)	0.82	0.43

Table 1 shows the factor loading of each item.

For attitudes toward healthcare teams scale, the Cronbach's alpha coefficient and interclass correlation coefficient (ICC) were 0.74 and 0.95, respectively. The Cronbach's alpha coefficient and interclass correlation coefficient (ICC) were 0.76 and 0.90, respectively for self-efficacy in interprofessional team collaboration scales, respectively.

In the second phase of the study, 178 nursing students, as well as medical students at internship, and medical

residents, participated, of whom 82 were males (43.4%) and 96 females (53.9%). Totally, 90(50.6%) interns, 35 (19.7%) residents, and 53(29.8%) nursing students participated in the study, with a mean age of 28.80±5.88 years. As reported, self-efficacy in interprofessional communication, with a mean score of 2.10±0.41, was reported in a weak level. The mean score of females (2.16 ± 0.38) was significantly higher than that of males (2.02±0.42) in self-efficacy (P = 0.02). There was no significant relationship between the mean score of self-efficacies and the age of participants (P = 0.90, r = 0.20).

The attitude towards healthcare teams was reported in a weak level among the participants, with a mean score of 2.17 ±0.43. The obtained scores ranged from 1.00 to 3.37. The mean score of participants in attitudes toward healthcare teams showed a weak level in the assessed domains (Table 2). The mean score of attitudes in men and women were 2.06 (0.14) and 2.28 (0.14), respectively, which showed that this score was significantly higher in female students (P = 0.001). There was no significant relationship between the mean score of attitudes and the age of participants (P = 0.720, r = 0.10).

The results showed a significant positive relationship between the mean scores of attitudes towards team and self-efficacy towards interprofessional collaboration and communication (P = 0.001, r = 0.80). The scores of participants related to self-efficacy and attitudes among participants by different disciplines are presented in Table 2. There was no significant difference between the mean scores of attitudes toward healthcare teams and self-efficacy in interprofessional collaboration and communication among the participants based on the study field and degree (P >0.05).

Discussion

Interprofessional cooperation among healthcare team members is considered a way to achieve the provision of safe services (28). Therefore, it is necessary to promote the attitude, self-efficacy, and performance of interprofessional collaboration among healthcare team members (28, 29). The results of the present study showed that the validation of instruments used to measure attitudes toward healthcare teams and self-efficacy in the self-efficacy in interprofessional collaboration and communication were confirmed. The results of the second phase showed a significant positive relationship between the attitude and self-efficacy in interprofessional cooperation; however, the scores of nursing students, as well as medical students and residents, were low in both attitude and self-efficacy variables.

the present results showed the significant positive correlation between attitudes toward healthcare teams and self-efficacy in interprofessional collaboration. In line of our results, the findings of Khademian study indicated that students' interpersonal communication skills had a direct and significant relationship with their attitudes towards teamwork (30). A positive attitude leads to higher self-efficacy in interprofessional cooperation and communication, and a belief in teamwork capability also helps to have a positive attitude. In the present results showed the alignment of the two attitude and self-efficacy variables indicated a negative attitude towards the interprofessional team collaboration led to low self-efficacy in teamwork, and also, low self-efficacy led to a negative attitude towards the interprofessional team collaboration among the participants, which is consistent with person-behavior in the Bandura (12) and Bandura and Adams (13) theories. This can be due to the neglect of training communication skills and interprofessional collaboration in both formal and informal curricula. In the present study, learners mainly spend the main courses in clinical ward by a uni-professional approach. They had less opportunity to practice and experience interprofessional collaboration in training situations. It seems that this issue, in addition to building a person-centered attitude, also affected the lack of self-efficacy in their teamwork.

Based on the results of the present study, the mean scores of attitudes and self-efficacy in interprofessional collaboration and communication were reported low among nursing students, as well as general practitioner and specialty assistants, which contradicted the results of a study by Williams et al. (30). In their study, the level of self-efficacy in interprofessional learning and collaboration was estimated at a moderate level (31). Differences in results can be due to the different disciplines of the participants, as well as the community culture in the two studies.

The results of a study by Mahfoozpour and Mozhdehkar showed that about 50% of physicians, nurses, and paramedics working in Labbafinejad Hospital, Tehran, believed that they had any teamwork (31). Therefore, it seems that the promotion of teamwork skills should be considered in healthcare personnel. In a study by Shaghayeghfard et al., the attitude of personnel in different rehabilitation disciplines, such as physiotherapy, occupational therapy, speech therapy, rehabilitation medicine, and artificial limbs, was reported desirable (32). The difference between their findings and the present results can be due to the working environment, the nature of rehabilitation activities, and a better understanding of the need for interprofessional teamwork to provide rehabilitation services among assistants and involved staff. In a study by Shaghayeghfard et al., inappropriate intra-group communication, a misconception of asking for help, and lack of knowledge of teamwork were reported as the challenges of teamwork (32). In their research, Nørgaard et al. reported that the participants' self-efficacy in interpersonal communication was moderate before the intervention, and inter-professional training had a significant effect on the promotion of self-efficacy in collaboration and communication (33, 34). It seems that the lack of experience in interprofessional training could have affected the attitudes and self-efficacy of participants in the present study.

The results of the present study showed that the score of participants in attitudes toward teamwork was low. In a

study by Khademian and Tehrani, the attitudes of nursing students towards teamwork were moderate to high, and interpersonal communication skills were at a moderate to desirable level (29), which was inconsistent with the present results; this could be due to different educational processes, especially in clinical training. Given that in Shiraz University of Medical Sciences, the membership of learners in medical teams during clinical education gains special attention, it seems that students can have more positive attitudes and skills in interprofessional collaboration and communication (29).

Based on the results of the present study, the score of participants in attitudes toward both high-quality and physician-centered healthcare services was low. One of the challenges to promote interprofessional teamwork is the belief in providing high-quality services through interprofessional collaboration. When team members do not have a positive attitude towards the team and teamwork, it is difficult to promote skills and change their behavior even if they have technical knowledge and skills. Another important point is the physician-centered approach that needs to be controlled in healthcare teams and shifted to an interprofessional one through the promotion of team members' capabilities. In this regard, Vafadar et al. considered the physician-centered approach as a key barrier to the promotion of interprofessional cooperation in medical education system at Iran (35). The findings of a study by Ardalan and Eskandari showed the significant positive effect of action-oriented team leadership components on team skills and synergy (36), which is consistent with the results of the present study. In the present study, the physician-centered approach (individualism) contributed to a weak attitude toward teamwork and perception of self-efficacy in interprofessional collaboration. The results of various studies introduced interprofessional education as a way to promote self-efficacy and attitudes toward interprofessional collaboration (35, 24). Interprofessional education helps to accept the role as a team member and understand related responsibilities, which can develop a team-oriented attitude among team members and affect team members' performance (24).

Based on the results of the present study, there was a significant difference in the scores of self-efficacy and attitudes toward interprofessional collaboration and communication between different degrees and disciplines. This highlights the need for all learners in the disciplines to be involved in healthcare services to promote their interpersonal communication capabilities. The present study participants consisted of nursing students, as well as medical interns and residents, who played role of healthcare teams members. Medical students may lead future healthcare teams whose skills and attitudes toward interprofessional collaboration can also effectively guide other team members. In the study by Costa et al., strong leadership was introduced as an essential component of establishing the culture of collaboration among professionals at the team and hospital levels. Collaborative leadership motivates team members to perform well; it also supports organizational aspirations and plays a critical role in promoting interprofessional collaboration (37).

In research by van Schaik et al., team leadership is described as an essential competency for interprofessional collaboration. In their study, the ability to communicate, active listening, facilitating, problem-solving, and participatory decision-making were among the essential leadership skills based on the interdisciplinary approach (38). When a team leader has neither of an understanding of inter-professional collaboration nor adequate skills in leadership, he/she cannot be expected to implement a team-based treatment plan and guide the team as the most important strategy to provide safe and patient-centered healthcare services (39, 2, 1). On the other hand, team members need to know their individual and team responsibilities and believe that being a team member, they need to be responsible and accountable. The predominance of a uni-professional approach and the negligence of responsibilities towards other team members can lead to medical errors and inter-professional challenges (36). Therefore, building an interprofessional attitude, finding it useful to provide team-oriented services, growing the belief in teamwork, and cooperating with others need to be considered among the learners of various medical disciplines. This is consistent with the social cognitive theory and can be interpreted in the individual-behavior dimension. The personal attitude and perceived self-efficacy directly affect each other and shape one's behavior (12, 13). Therefore, the promotion of self-efficacy and positive attitudes towards interprofessional collaboration can be effective in increasing interprofessional collaboration among healthcare team members.

The results of the present study showed that participants got lower scores in interprofessional interaction and effective communication with the patient domains. This can be due to a lack of attention to training interpersonal and interprofessional collaboration and communication skills. Effective communication and active listening are among the core competencies of interprofessional collaboration (9) that need to be given special attention to promoting this capability among learners. The results of a study by Watters et al. showed that interprofessional training in a simulated environment increased learners' perceived ability in communication skills, teamwork, leadership, and management in clinical scenarios (40). Therefore, it is necessary to plan for the promotion of learners' commitment to patient-centered and team-based care in the education systems.

The use of self-administered questionnaires, small sample size, and limited disciplines were among the study limitations, which reduced the generalizability of the findings. Since the present study was conducted in a medical sciences university, the results can be influenced by environmental culture and personal and systemic features. In addition, self-reporting may result in exaggeration or underreporting. Therefore, it is recommended to conduct multicenter studies on people involved in different

disciplines of healthcare and rehabilitation services, as well as theory-based interventions, to develop factors affecting self-efficacy and attitudes toward interprofessional collaboration and communication.

Conclusion

Based on the results of the present study, the validity of the scales for self-efficacy in interprofessional collaboration and communication and attitudes toward healthcare teams was confirmed in the present study. Given the significant positive relationship between self-efficacy and attitudes toward interprofessional collaboration and communication and the weakness of participants in the two variables tested, it is suggested that in addition to providing training programs for the promotion of knowledge and skills, supportive opportunities and strengthening of a positive attitude toward interprofessional teamwork be considered by educational administrators. According to the psychometric approval of the mentioned tools, they can be used for formative assessment of learners in different fields to provide the necessary situations for the development of interprofessional collaboration in healthcare teams through continuous evaluation, feedback, and development planning.

Supplementary material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

We would like to express our sincere thanks to learners who participated in the study.

Conflict of Interests: Conflict of interests: The author(s) declare that they have no conflict of interests.

Ethical Approvals: The present study protocol was approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences (ethical code IR.SSU.REC.1399.147).

Funding/Support: The present study was conducted with the financial support of the Vice-Chancellor for Research and Technology of Shahid Sadoughi University of Medical Sciences, Yazd, Iran. (ID code: 8511).

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Strides Dev Med Educ. 2021 December; 18(1):e1035 doi 10.22062/sdme.2021.195301.1035

Research Article

Professional Ethics in Teaching from the Perspectives of Professors and Graduate Students of Mazandaran University of Medical Sciences: A Comparative Study

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Received: 2020 November 20
Revised: 2021 April 18
Accepted: 2021 April 20
Published online: 2021 October 30

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Citation:
Sadeghimahalli F, Valipour Khajehghyasi R, Akbari Farmad S. Professional Ethics in Teaching from the Perspectives of Professors and Graduate Students of Mazandaran University of Medical Sciences: A Comparative Study. Strides Dev Med Educ. 2021 December; 18(1):e1035. doi: 10.22062/sdme.2021.195301.1035

Abstract

Background: Teaching and training require ethical considerations.

Objectives: The present study aimed at evaluating teaching ethics from the perspectives of professors and postgraduate students of Mazandaran University of Medical Sciences based on a comparative approach.

Methods: A cross-sectional study was performed on all postgraduate students and their professors in the academic year of 2019-2020. A total of 284 postgraduate students and 42 professors were selected using a stratified random sampling method, according to the size of each stratum. The data collection instrument was the standard teacher's professional ethics scale including six subscales and 48 items, scored based on a five-point Likert scale from 1 to 5. Data were analyzed by SPSS version 21 using descriptive statistics, independent samples t-test, and one-way analysis of variance.

Results: The total mean score of professional ethics for professors was 3.67±0.63 and 4.29 ± 0.59 from the students' and professors' perspectives, respectively. There was a significant difference between the students' and professors' perspectives in each of the subscales (P <0.0001). There was a significant difference among schools in the teaching techniques mastery and observation of rules subscales.

Conclusion: From the perspective of students, the status of teaching ethics is still far from the standard, and it needs more educational plans to improve.

Keywords: Professional Ethics, Teaching, Professors, Students

Background

Teaching and training are important parts of the higher education system; hence, it requires special ethical considerations (1). Ethics and teaching are two intertwined components (2). The main mission of the university is to train specialized and experienced human resources based on society's needs (3). National and international experiences in improving the quality of higher education show that the performance of faculty members, especially in education affairs, is of great importance, as they are the main determinants of students' performance (4). An effective trainer can facilitate the teaching process and even compensate for textbook deficiencies and lack of educational facilities or, conversely, turn the best situation and subject into inefficient teaching due to inefficiency (5).

Besides being responsible for the transfer of knowledge, lecturers and professors are a model of professional ethics in the academic environment for the students (6). Teachers, because of their teaching profession, have moral responsibilities called professional ethics in teaching or training. Professional ethics can be summarized in two main components of ethical duties in teaching and upbringing; therefore, adherence to the principles and values of professional ethics is very important both in terms of developing ethical organizational culture and transmitting humanity to students and, thus, disseminating it to society (7, 8).

Regardless of having adequate skills in their specialty, professors must also be skillful in teaching and familiar with its professional principles. The training provided by education systems can specifically affect morally criticizable behaviors of the community. For example,

the teaching technique can provide effective learning opportunities for the student; the educational references and content can strengthen or weaken thinking in a certain manner, which has a positive or negative impact on society; and the professor's behavior can also have a positive or negative effect on students' characters and behaviors (9). Observation of teaching ethics guarantees the health of the teaching-learning process. It helps the moral rules and values of teaching to ensure students' rights in benefitting from the best education, as well as the dignity of learning, science, and studying (10).

The success of any university depends on teaching ethics status and its distance from educational standards. Therefore, a special place is given to research performed on this issue because such studies, from the perspective of students, as the important elements of education that all efforts are made to train them as professional workforce, can help university administrators and educational planners to make appropriate decisions to reduce the gap between the current and optimal situation and achieve educational standards (11). From the perspective of Morris and Wood, the components of teaching professional ethics include personal traits, teaching techniques, problem-based and interactive teaching, and communication skills (12). Rutgans and Schmidt indicated the criteria of professional ethics as social congruence, subject-matter expertise, and cognitive congruence (13). From the perspective of students in Birjand, Iran, the most important components of professional ethics were personal traits, teaching skills, personal communication skills, evaluation skills, and observance of educational rules and regulations (14). From the viewpoint of the students of Shahid Sadoughi University, Yazd, Iran, the most important criteria of professional ethics teaching include personal traits, human relations, teaching skills, and evaluation skills (15). Sobhani-Nejad et al. stated the personal traits of the teacher, mastery of content, mastery of teaching methods, knowledge of the learner, standard evaluations, and observation of educational rules as the components of professional ethics teaching from the perspective of medical students in Qom, Iran (11).

It can be said that evaluating the views of postgraduate students, who have a much closer relationship with professors and can more appropriately evaluate teaching ethics, as well as examining the professors' views and the gap between the two views, can solve dilemmas existing in teaching and promote the quality of teaching in order to achieve educational standards. Objectives: Given the importance of professional ethics teaching in achieving academic goals, the present study aimed at investigating the status of teaching professional ethics from the perspective of professors and postgraduate students of basic sciences at Mazandaran University of Medical Sciences.

Objectives

The present study aimed at evaluating teaching ethics from the perspectives of professors and postgraduate students of Mazandaran University of Medical Sciences based on a comparative approach.

Methods

The present descriptive-analytical study was performed on all professors, as well as MSc. and Ph.D. students in basic sciences including medicine, pharmacy, paramedical, health, nursing-midwifery, and advanced technologies in various medical sciences schools. A general assessment was performed, and the students' views on those professors who had a course with them were examined. Inclusion criteria were studying at the university and a willingness to participate in the study. The exclusion criterion was an incompletely filled questionnaire (<30% of the items). A stratified random sampling method was used to determine the sample size based on the size of each stratum, i.e., the numbers of students and their professors in each school. The samples size was determined using Morgan's table based on the proportion of each school, which was 284 for students and 42 for professors.

The teacher's professional ethics scale was utilized as the data collection tool. It was designed by Sobhani-Nejad et al. in six components based on the theoretical foundations of ethics and effective teaching, as well as related research (16-22). The face and content validity of the tool were also confirmed. The reliability of the scale was also assessed using Cronbach's alpha coefficient (alpha = 0.92) (10). The questionnaire consisted of 48 items in six components that examined teaching ethics in professors. The components included: 1. personality traits consisting 21 items including attention to appearance, good human relations, practical commitment to religious values, patience in receiving feedback, responsibility to students, avoiding nasty jokes, avoiding reprimand and blame, motivity for teaching, criticizability, lack of discrimination in dealing with students, not questioning the performance of counterparts, welcoming group decision-making, commitment to confidentiality about students' information, adequate insight into students' behavior, not assigning students to personal affairs, safekeeping of teaching aids, good manners in teaching, good self-esteem, accessibility in non-school hours, use of research evidence to explain theoretical orientation, and teaching without personal bias. 2. content mastery consisting 6 items including making a proper horizontal connection among different subjects, making a proper vertical connection among different subjects, good command of analytical methods and content choice, coincidence of most content chosen with students' needs, sufficient expertise in the subject and content, and using a variety of teaching techniques. 3. teaching techniques mastery consisting 4 items including consistent and meaningful presentation of content, paying attention to the teaching process and student participation, organizing subjects as a semester plan, and using a variety of teaching techniques consistent with the objectives and content. 4. recognizing learners' dimensions consisting 6 items including considering students' personal differences in the teaching process, good knowledge of students' needs, recognition of students' previous experiences and

learnings, skillfulness in creating motivation, balanced approach to strengthen students' cognitive, emotional, and functional areas, and paying attention to students' feedback. 5. standard evaluation consisting 5 items including consistency of evaluation with educational objectives, justice in evaluation, predetermining the evaluation method, establishing an appropriate incentive system to manage students' behavior, and applying developmental evaluation to the teaching process. 6. Observation of educational rules and regulations consisting 6 items including giving importance to attendance, assigning time for checking exam papers and handling complains, timely attendance at class, observation of class time, compliance of assigned tasks with academic objectives, and commitment to university regulations. The items were scored based on a five-point Likert scale from 1 (very low) to 5 (very high). The mean score of 1-2.33 is considered undesirable, 2.34-3.67 relatively desirable, and 3.68-5 desirable. A maximum score of 5 is considered the standard (optimal) status. In terms of ethical considerations, the participation was completely voluntary and subjects were provided with necessary explanations about the project, data extraction and expression, confidentiality of personal information, and anonymity of questionnaires. The completion and return of questionnaires were considered a sign of willingness to participate in the study. The questionnaire was collected after completion. Data were entered into SPSS version 21, reported as descriptive statistics (frequency, mean, and standard deviation), analyzed using independent t-test, and one-way analysis of variance (one-way ANOVA).

Results

Out of 284 questionnaires distributed to the students, 235 were completed and returned (response rate = 82.7%). Of them, 160 (68.1%) were completed by female students and 75 (31.9%) by male students. The numbers of MSc and Ph.D. students participating in the study were 172 (73.2%) and 63 (26.8%), respectively. All 42 questionnaires distributed to the professors were returned completely (response rate = 100%), of which 16 (38.1%) were completed by females and 26 (61.9%) by males. The number of students was 77 (32.8%) in the school of medicine, 64 (27.2%) in nursing-midwifery, 53 (22.6%) in health, 20 (8.5%) in pharmacy, 12 (5.1%) in paramedical, and 9 (3.8%) in advanced technologies in medicine.

The comparison of professors' and students' attitudes toward the professional ethics of faculty members showed that professors had a more positive attitude towards the observation of professional ethics by teachers. The mean scores of professional ethics of faculty members from view point of professors and students were at desirable and relatively desirable levels, respectively. Also, the comparison of teaching ethics components showed that the observation of the rules attained the highest (desirable) and learner cognition the lowest (relatively desirable) mean scores from the perspective of both professors and students. Data shown in Table 1 indicate a significant difference between the perspectives of professors and students in the teaching ethics scale and its components P <0.0001) (Table 1).

Table 2 shows the mean scores of teachers' professional ethics from students' perspectives based on gender. Data indicated no significant difference between the scores obtained by male and female students in the teaching ethics scale and its components (independent samples t-test P = 0.71).

Table 3 shows the mean scores of teachers' professional ethics from the students' perspectives based on degree. Data indicated a significant difference between the PhD and MSc student views in the teaching ethics scale and its components (P = 0.02).

Table 1. Comparison of the mean scores of faculty members and students on the teacher's professional ethics scale

The component of teachers' professional ethics	Students Mean (SD)	Faculty members Mean (SD)	P	t
Personality traits	3.80 (0.64)	4.33 (0.7)	0.0001	-4.831
Mastery of content	3.72 (0.73)	4.26 (0.63)	0.0001	-4.519
Mastery of teaching techniques	3.75 (0.75)	3.47 (0.74)	0.0001	-4.687
Learner cognition	3.56 (0.80)	4.00 (0.79)	0.0001	-3.862
Standard evaluation	3.64 (0.79)	4.36 (0.65)	0.0001	-5.348
Observation of rules	3.64 (0.79)	4.36 (0.65)	0.0001	-4.493
Total score	3.67 (0.63)	4.29 (0.59)	0.0001	-5.252

Table 2. Comparison of the mean scores of students by gender on the teachers' professional ethics scale

The component of teachers' professional ethics	Mean (SD)		P	t
	Female, n=160	Male, n=75		
Personality traits	3.82 (0.64)	3.75 (0.65)	0.450	0.762
Mastery of content	3.74 (0.74)	3.67 (0.71)	0.353	0.613
Mastery of teaching techniques	3.77 (0.77)	3.70 (0.71)	0.508	0.643
Learner cognition	3.55 (0.79)	3.59 (0.84)	0.751	-0.326
Standard evaluation	3.66 (0.82)	3.67 (0.74)	0.872	-0.155
Observation of rules	3.87 (0.81)	3.80 (0.71)	0.461	0.704
Total score	3.68 (0.63)	3.65 (0.62)	0.717	0.362

Table 3. Comparison of the mean scores of students by degree on the teachers' professional ethics scale

The component of teachers' professional ethics	Mean (SD)		P	t
	MSc, n= 172	Doctoral degree, n= 63		
Personality traits	3.84 (0.64)	3.70 (0.63)	0.143	1.441
Mastery of content	3.78 (0.73)	3.54 (0.69)	0.025	2.224
Mastery of teaching techniques	3.85 (0.73)	3.47 (0.74)	0.001	3.520
Learner cognition	3.62 (0.82)	3.41 (0.70)	0.057	1.765
Standard evaluation	3.74 (0.79)	3.46 (0.78)	0.017	2.409
Observation of rules	3.92 (0.73)	3.64 (0.88)	0.027	2.450
Total score	3.73 (0.63)	3.52 (0.60)	0.022	2.279

Table 4. Comparison of the mean score of students by school on the teachers' professional ethics scale

The component of teachers' professional ethics	Mean (SD) score by school							P	T
	Medicine	Nursing	Healthcare	Pharmacy	Paramedics	Advanced Technologies in Medicine	Total score		
Personality traits	3.74 (0.69)	3.91 (0.68)	3.76 (0.59)	3.69 (0.46)	3.92 (0.51)	3.84 (0.63)	3.80 (0.64)	0.593	0.742
Mastery of content	3.54 (0.70)	3.92 (0.83)	3.77 (0.69)	3.65 (0.64)	3.66 (0.46)	3.62 (0.51)	3.72 (0.73)	0.068	2.085
Mastery of teaching techniques	3.53 (0.77)	4.06 (0.73)	3.77 (0.74)	3.75 (0.59)	3.79 (0.66)	3.61 (0.66)	3.72 (0.73)	0.002	4.036
Learner cognition	3.51 (0.74)	3.77 (0.86)	3.53 (0.86)	3.23 (0.73)	3.72 (0.54)	3.25 (0.82)	3.75 (0.73)	0.077	2.017
Standard evaluation	3.61 (0.77)	3.58 (0.83)	3.64 (0.81)	3.29 (0.70)	3.80 (0.60)	3.44 (0.88)	3.56 (0.80)	0.088	1.942
Observation of rules	3.58 (0.87)	4.14 (0.67)	3.91 (0.69)	3.85 (0.73)	3.75 (0.58)	3.81 (0.84)	3.66 (0.79)	0.002	3.969
Total score	3.57 (0.65)	3.58 (0.66)	3.67 (0.62)	3.52 (0.48)	3.73 (0.47)	3.60 (0.63)	3.67 (0.63)	0.139	1.687

The difference was mostly observed in content mastery (P = 0.02), teaching techniques mastery (P = 0.001), standard evaluation (P = 0.01), and observance of rules (P = 0.02) components. There was no difference between the two grades in the personality traits component (P = 0.14); there was also a slight difference in the learner cognition component (P = 0.05).

Table 4 shows the mean score of professors teaching ethics from the perspectives of students based on the school. Data indicated no significant difference among the perspectives of students of different schools in the teaching ethics scale and its components (P = 0. 13). There was also a significant difference in the mastery of teaching techniques (P = 0.002) and observance of rules (P = 0.002) components. In the mastery of teaching techniques, the highest and lowest mean scores were obtained in the schools of nursing & midwifery and medicine, respectively. Also, in the observation of rules component, the highest and lowest mean scores were obtained in the schools of nursing & midwifery and medicine, respectively.

Discussion

The results of the present study showed that the total mean score of the teaching ethics scale was at a relatively desirable level from the perspective of students but a desirable level from the perspective of professors. From the viewpoint of professors, all components were at a desirable level and from the viewpoint of students; the components of learner cognition and standard evaluation were at a relatively desirable level. In terms of the perspective of students, the results of the present study are consistent with those of the studies by Sobhani-Nejad et al. and Najafi et al. (2, 11), and inconsistent with those of the study by Jadidi et al. (6), in some components; the reason for this inconsistency might be differences in educational facilities (space, time, and educational equipment) and the nature of some disciplines studied by researchers.

The study results also showed that there was no significant difference between the views of male and female postgraduate students, and the status of these components was at a desirable level from the viewpoints of both genders. In addition, a significant difference was observed between the views of postgraduate and doctoral students so that from the viewpoint of postgraduate students, the observation of teaching ethics was desirable, but from the viewpoint of doctoral students, it was relatively desirable. In the present study, postgraduate students scored significantly higher than doctoral ones in all components of the teaching ethics scale, except for personality traits. However, in a similar study by Jana-Abadi et al., (2015) performed at Sistan and Baluchestan University of Medical Sciences (23), Iran, using the same questionnaire to assess the views of postgraduate students, they reported no significant difference between two groups of degree (master's and doctoral), as well as two groups of gender.

The status of teaching ethics was also examined and compared from the perspective of students of different schools, and the results showed that although there was no significant difference among the schools in the mean score of the teaching ethics scale, there was a significant difference among the schools in the mean score of two components, namely mastery of teaching techniques and observation of rules, so that the highest and lowest scores in these two components belonged to the schools of nursing & midwifery and medicine, respectively. The study by Babasafari et al. (2014) showed no significant

differences among the scores of five components of the teaching ethics scale given by the schools of human sciences and basic sciences (24). The results of the study by Mossadegh et al., (2012) on the evaluation of teaching ethics from the perspective of postgraduate students of the University of Tehran and Imam Khomeini Education and Research Institute, showed no significant differences among the faculty members of human sciences and technical engineering schools in adherence to teaching ethics (25).

A comparison of the views of postgraduate students and their professors concerning teaching ethics and its components showed that teachers had a more positive view than students toward the total scale and each of its components, and the difference was significant. Very few comparative studies have been conducted to simultaneously examine the views of professors and students on teaching ethics. Faculty members assessed the status of professional ethics as desirable in self-report studies, but students' views were opposite (26-31). In the study by Pourkarimi et al. (2019), the results showed a significant difference between the perspectives of students and professors on the professional ethics of faculty members so that for all components, students' views were more negative than those of professors at the University of Tehran (32). This gap is probably due to differences in respondents' observations and conversations. Despite explanations provided on the confidentiality of responses given, the professors showed less interest in self-assessment and completion of the questionnaire and its items; in other words, they showed resistance and often recommended their assessment by students. It seemed that they feared to respond to the questionnaire and even self-assessment. They mostly acknowledged that such information is private. Perhaps the fear of revealing the responses made them give higher scores. Also, if some professors were successful in a certain area, they extended that to other arenas and evaluated themselves positively. Such side factors might have been influential and led to the creation of a gap between the perspectives of students and professors. In general, students had higher expectations of teaching ethics. Perhaps the expectations of different groups participating in the study were different, and they generalized different cases and events to each other, which could have affected the scoring of items and, consequently, components (33).

In the present study, the highest and lowest scores were given to the components of observation of rules and learner cognition, respectively, from the perspectives of students and professors, which was completely consistent with the results of the study by Najafi et al. (2). In a recent study by Jadidi et al. (2017) in Iran, using the same questionnaire, the students of Islamic Azad University, Sanandaj Branch, gave the highest and lowest scores to the components of personality traits and standard evaluation, respectively (6). A similar study by Jana-Abadi et al. reported that students gave the highest and lowest scores to the observation of rules and the component of recognizing different dimensions of the learner, respectively (23). In the study by Sobhani-Nejad et al. (2014), using the same questionnaire to assess teaching ethics, students of Qom University of Medical Sciences, Iran, gave the highest and lowest scores to personality traits and mastery of teaching techniques (11). Knowledge is not enough to be successful in teaching, but it requires teaching skills, referred to as professional ethics teaching (33). A qualitative study conducted in Canada showed that students sometimes experienced professors' immoralities, and professors were less likely to discuss and evaluate such ethical issues (34). Professors always play a role as an ethical model for students in teaching and other matters; therefore, observation of professional ethics, especially in teaching, causes changes in students' behaviors, attitudes, and thinking. Hence, addressing teaching ethics is one of the essentials for planners and politicians of the Iran medical education system, which should be included in the hidden and overt curricula (15). All researchers in this field acknowledge that teaching is a profession with moral nature, and emphasize the observation of teaching ethic components. It seems that not only teaching skills but also personality, character, behavior, and moral characteristics of the teacher in the classroom can motivate students to learn, and ultimately improve teaching quality. Motivated and moral professors can ethically train motivated and healthy students.

Study Limitations

One of the study limitations was that it was a quantitative study and only one questionnaire was used as a data collection tool while interviewing and observation methods could produce different results. In addition, the statistical population was limited to postgraduate students; therefore, caution should be used in the generalizability of results to other educational institutions. Another limitation of the study was that students had less interest in participating in the study. As there was a small number of students in each class, additional information was more likely to be disclosed.

Conclusion

In the present study, teaching ethics gained scores above the median from the perspectives of both students and professors. Although it was more desirable from the perspective of professors, it was still far from the desired and standard status. Observation of rules, regulations and professional requirements in an organization can improve the quality of work and lead to better results and outputs.

Recommendations

- To study factors contributing to professional ethics teaching
- Compilation and design of a course called teaching ethics and its inclusion in the curricula of all disciplines.
- To conduct the continuous evaluation of teachers' adherence to the principles of professional ethics teaching to achieve the curriculum goals.

- To assess teaching ethics indices before applying for admission to the school.
- To identify good and effective practical solutions by conducting more research to promote professional ethics teaching.

Supplementary material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

The authors wish to thank all the colleagues and students who helped with study conduct at Mazandaran University of Medical Sciences.

Conflict of Interests: The authors declare no conflict of interest in the authorship or publication of the manuscript.

Ethical Approvals: The paper was derived from the Master's thesis of Forouzan Sadeghimahalli in Medical Education (ethics approval code: IR.SBMU.SME.REC.1399.02) approved by the School of Medical Education & Management, Shahid Beheshti University of Medical Sciences.

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Strides Dev Med Educ. 2021 December; 18(1):e1030 doi 10.22062/sdme.2021.195142.1030

Research Article

Self-Directed Learning Outcomes and Facilitators in Virtual Training of Graduate Students of Medical Education

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Received: 2020 November 20
Revised: 2021 April 18
Accepted: 2021 April 20
Published online: 2021 October 30
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Citation: Safikhani M, Kohan N, Jahani Y, Nouhi E. Self-Directed Learning Outcomes and Facilitators in Virtual Training of Graduate Students of Medical Education. Strides Dev Med Educ. 2021 December; 18(1):e1035. doi:10.22062/sdme.2021.195301.1035

Abstract

Background: Although virtual training has been considered an educational emergency during the coronavirus crisis, it is still discussed in universities as a capacity. Student learning is the concern of all professors. Self-direction is an efficiency indicator in electronic learning (e-learning) widely used in effective educational systems.

Objectives: The present study aimed to determine self-directed learning outcomes and facilitators in virtual course students of medical education.

Methods: The statistical population of this descriptive-analytical cross-sectional study included the graduate of virtual medical education in the universities of medical sciences in Tehran, Iran, in the academic year 2019. The research instrument was the Persian version of the Self-Directed Learning Readiness Scale. Data analysis was performed using SPSS software (version 16), the indicators of descriptive statistics (e.g., mean, frequency, percentage, and standard deviation), linear regression, and Pearson correlation coefficient.

Results: Out of 201 individuals, 46 (22.9%) and 155 (77.1%) students were male and female, respectively. The mean age of the students was 39.93±8.25 years. The mean values of the scores of self-directed learning outcomes and facilitators were 71.8±9.4 (out of 95) and 70.4±10.6 (out of 125), respectively. There was a direct and significant relationship between self-directed learning outcomes and facilitators ($P<0.001$); accordingly, with the increase of the score of facilitators, the score of self-directed learning also increased. Additionally, the variables of outcomes and facilitators had significant relationships with academic achievement ($P<0.001$).

Conclusion: According to the study results, by increasing self-directed learning facilitators, the outcomes of this type of learning, especially students' academic achievement, increased. Therefore, it is recommended to increase students' participation and consolidate self-directed activities. Furthermore, by the application of technology and program appropriate to the subject of the course, professors in virtual training should strengthen and nurture students' self-direction skills and guide them to do various assignments and activities related to their lesson objectives.

Keywords: Facilitators, Self-directed Learning, Students, Medical Education, Academic Achievement

Background

Among the most widely used technologies in the lives of many individuals around the world are communication technologies through the Internet. The Internet has been able to play an effective role in various topics, one of the most prominent of which is the educational aspect. The Internet provides the professor with numerous capabilities to pave the way for new learning environments called virtual training (1), which has provided many educational benefits, especially in the conditions of the coronavirus crisis; nevertheless, in contrast to virtual training, there is traditional training, which is more professor-centered and based on memorizing the lesson materials and less attention is paid to the student's actual learning (2). By the consideration of these disadvantages, education has tended toward virtual training, the main philosophy of

which is student-centered.

Virtual training is a new distance learning method that has been formed with the expansion of the Internet in the field of higher education (3). In other words, this learning environment is different from face-to-face learning environments in terms of cases, such as being multimedia, accessibility to extensive data, accessibility to various communication facilities, use of synchronous and asynchronous communication tools, and individualization characteristics; therefore, these characteristics impose requirements that the virtual trainee should be able to cope with this new learning environment and, in other words, have specific skills and characteristics (4). Computer and Internet skills, self-learning skills, spontaneity, problem-solving and critical thinking, interest in learning, self-directed skills, ability to establish group communication, questioning power, discussion skills, responsibility, skills of using online learning resources, and applying learning strategies are among these skills and characteristics (5).

Among the above-mentioned skills, the role of inclusive self-direction in the virtual training environment and in general in all technology-based educational environments is very important. Furthermore, several studies have suggested the role of inclusive self-direction in the success of virtual students (6). Self-direction in learning is an educational method widely used in effective educational systems. Self-directed learning can be defined based on the degree of acceptance of inclusive responsibility for individual learning (7). In his famous work, Knowles considers self-direction a process in which learners, with or without the help of others, identify needs, set goals, identify materials and human resources for learning, select and implement appropriate learning strategies, assess their appropriate learning outcomes, and gain the upper hand (8).

The self-directed learning method is designed as a complementary training program (9). This type of learning enables students to adjust their learning processes independently or under the professor's guidance (10). In general, the importance of self-directed learning in virtual training is so that some researchers have suggested the motivation and nurture of self-directed learning in learners as one of the efficiency indicators of virtual training (11, 12). Moreover, with the expansion of online education in the field of medical education, it is necessary to pay attention to the constant changes in the information, the importance of updating knowledge in this field, and nurturing students who are constantly learning during and after their education. Therefore, identifying effective training methods and evaluating their effectiveness is important.

Equipping the students with self-directed learning abilities makes them lifelong learners (13). On the other hand, turning students into self-directed learners is economically beneficial to medical education centers in exchange for spending a large sum of money in the long run (14). According to the results of Edward et al.'s (2015) study, self-directed learning is increasing every day because online learning is increasingly focused on this type of learning (15). Bill et al. (2008) observed that self-directed learning led to graduation promotion among students with this skill (16). Chen et al. (2014) also stated that self-directed learning was important for students' career advancement and enabled them to expand their knowledge and increase their quality of life and work (17).

Given that self-directed learning in virtual training is a necessity of this type of education, students need to actively participate in the teaching and learning process and give meaning and depth to their learning through individual search and guidance or under the guidance of a professor. Although this type of learning can be considered an irreplaceable opportunity in virtual training, with the presence of individuals in new e-learning spaces, serious problems have been created in educational systems; therefore, success in this type of learning requires using the experiences of students and professors in the context of virtual training and conscious and intelligent management of e-learning environments. It is also necessary to have a thorough recognition of e-learning environments to take advantage of this technology and overcome the bottlenecks beyond it.

Objectives

For this purpose, the present study was conducted to determine self-directed learning outcomes and facilitators in virtual graduate students in the field of medical education.

Methods

This descriptive-analytical cross-sectional study was conducted in the academic year 2019. The statistical population of the study included 205 or 201 graduate in the field of virtual medical education. Who were selected by the census method. The research environment was the virtual faculties of the universities of medical sciences in Tehran, Iran. The data collection instrument was a questionnaire consisting of two parts; the first part contained personal characteristics (age, gender, marital status, basic field of study, university of study, and grade point average [GPA]), and the second part was the Persian version of Self-Directed Learning Readiness Scale involving self-directed learning facilitators (25 items) and outcomes (19 items) based on a five-point Likert scale (from "strongly agree" to "strongly disagree"; score 1 to 5).

The score ranges of self-directed learning facilitators and outcomes were 25-125 and 19-95, respectively. The content validity, face validity, and structural validity of this instrument have been confirmed. Furthermore, Kohan et al. (2017) measured the instrument stability using Pearson correlation coefficient and intra cluster correlation coefficient (0.77) and the instrument internal consistency using Cronbach's alpha coefficient (0.91) (18). In the present study, the reliability of the self-directed learning scale by Cronbach's method was obtained at 0.87 for the total test, 0.77 for the subscale

of self-directed learning outcomes, and 0.76 for self-directed learning facilitators.

In this study, in addition to observing ethical points, receiving the ethical approval code (no.: IR.KMU.REC.1397.493), and obtaining permission from the officials of virtual faculties, coordination and planning were performed with the officials of the education departments and the professors. An explanatory guide was written to attract the cooperation of students, which included the research title and general characteristics and how to use the research results. The questionnaires were anonymous, and the research results were entered anonymously in such a way that by referring the researchers to research units and providing the necessary explanations about the research nature and aims, the questionnaires were distributed among 205 statistical samples of the study at the appropriate time in terms of non-interference with educational programs and considering satisfaction to participate in the study. The students who were not available were also contacted by email regarding the necessity of the study and were asked for necessary cooperation with the mentioned project. In each case, in addition to primary explanations and clarification of how to fill out the questionnaires, the questions asked by the subjects were answered, and the ambiguities were removed. Overall, 201 complete questionnaires (response rate: 98%) were returned in a verifiable manner.

Data collection took about 3 months. Data analysis was performed at two descriptive and inferential levels using SPSS software (version 16). In the descriptive analysis of data, the indicators of descriptive statistics (e.g., mean, frequency, percentage, and standard deviation) were used. Additionally, in the inferential statistical analysis, linear regression was used to examine the relationships between demographic variables and academic achievement, and Pearson correlation coefficient was used to examine the relationship between the two variables of self-directed learning outcomes and facilitators. The significance level of less than 0.05 was considered.

Results

Out of 201 individuals, 46 (22.9%) and 155 (77.1%) subjects were male and female, respectively. Furthermore, 27.9% and 72.1% of the participants were single and married, respectively. Previous educational levels of the participants in this study included 29.4% with medical education and PhD, 35.3% with a bachelor's degree in nursing, 21.4% with a bachelor's degree in midwifery, and 13.9% with other fields of study (i.e., health, medical services management, and educational management). The mean age of the students was 39.93±8.25 years (range: 21-59 years). The mean GPA value of students at the end of the semester was 17.29±1.17. The mean value of students' self-directed learning outcomes and facilitators were 71.8±9.43 (out of 95) and 70.37±10.60 (out of 125), respectively, which were higher than facilitators regarding the score. According to the results, with a one-year increase in the students' age, the mean score of self-directed learning outcomes significantly increased by 0.23 (P=0.03). Furthermore, with a one-point increase in the students' GPA, the mean score of learning outcomes significantly increased by 2.40 (P=0.004). Other variables had no significant effect on the score of the outcomes (Table 1).

According to the results, with a one-year increase in the students' age, the mean score of self-directed learning facilitators significantly increased by 0.26 (P=0.005). With a one-point increase in the students' GPA, the score of facilitators significantly increased by 1.76 (P=0.01). Other variables had no significant effect on the score of the facilitators (Table 2).

Pearson correlation coefficient between the outcomes and facilitators was 0.79, and there was a direct and significant relationship between the two variables of outcomes and facilitators (P≥0.0001); accordingly, with increasing the score of outcomes, the score of facilitators also increased. The correlation coefficient between the two variables showed the outcomes and facilitators (Figure 1).

Table 1. Relationships between Demographic Variables and Self-directed Learning Outcomes in Virtual Medical Students in 2019

Variable		N (%)	Mean (SD)	Regression coefficient (95% CI)	P
Gender	Male	46 (22.9)	70.40(1.10)	*	
	Female	155 (77.1)	70.30(1.61)	0.10 (-3.50 and 3.72)	0.95
Marital status	Married	142 (72.1)	69.80(1.07)	*	
	Single	56 (27.9)	70.90(1.67)	1.09 (-2.66 and 4.84)	0.56
Previous field of study	Medicine	59 (29.4)	70.04(1.81)	1.48 (-4.39 and 7.36)	0.62
	Nursing	71 (35.3)	71.75(1.45)	3.19 (-1.56 and 7.96)	0.18
	Midwifery	43 (21.4)	71.05(1.79)	2.49 (-2.63 and 7.61)	0.34
	Others	28 (13.9)	68.56(2.16)	*	
University of study	Iran	41 (20.4)	70.14(1.68)	*	
	Beheshti	126 (62.7)	70.21(1.20)	0.07 (-3.57 and 3.73)	0.96
	Tehran	34 (16.90)	70.70(1.82)	0.56 (-4.13 and 5.25)	0.81
Age (year)			39.93(8.25)	0.23 (0.02 and 0.44)	0.03
GPA			17.29(1.17)	2.40 (0.77 and 0.04)	0.004

GPA, grade point average

Table 2. Relationships between Demographic Variables and Self-directed Learning Facilitators in Virtual Medical Education Students in 2019

Variable		N (%)	Mean (SD)	Regression coefficient (95% CI)	P
Gender	Male	46 (22.9)	72.43(1.42)	*	
	Female	155 (77.1)	70.80(0.96)	-1.62 (-4.80 and 1.54)	0.31
Marital status	Married	145 (72.1)	72.25(0.94)	*	
	Single	56 (27.9)	71.98(1.47)	0.72 (-2.57 and 4.03)	0.66
Previous field of study	Medicine	59 (29.4)	72.30(1.59)	2.82 (-2.34 and 7.99)	0.28
	Nursing	71 (35.3)	73.22(1.280	3.74 (-0.44 and 7.93)	0.08
	Midwifery	43 (21.4)	71.48(1.58)	2.00 (-2.50 and 6.51)	0.38
	Others	28 (13.9)	69.47(1.90)	*	
University of study	Iran	41 (20.4)	70.874(1.47)	*	
	Beheshti	126 (62.7)	72.44(1.50)	1.57 (-1.63 and 4.78)	0.33
	Tehran	34 (16.90)	71.54(1.47)	0.67 (-3.44 and 4.80)	0.74
Age (year)			39.93(8.25)	0.26 (0.07 and 0.44)	0.005
GPA			17.29(1.17)	1.79 (0.35 and 3.23)	0.01

GPA, grade point average

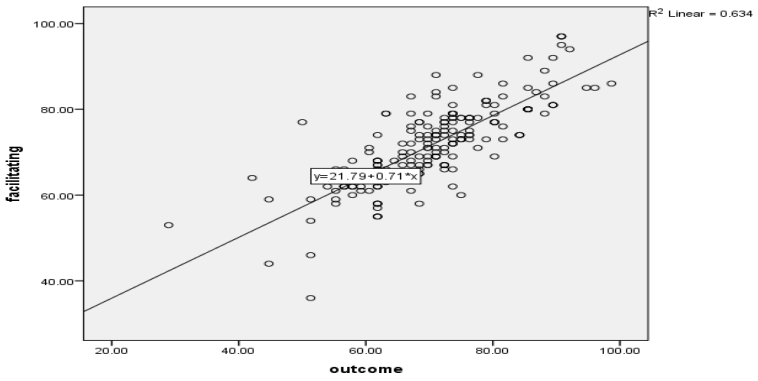

Figure 1. Relationship Between Self-directed Learning Outcomes and Facilitators in Virtual Medical Education Students in 2019

Discussion

Self-directed learning is a basic capacity in a virtual training environment, the facilitation of which helps students use all their senses and power to learn. Based on the results of the present study, the scores of self-directed learning facilitators were at a relatively good level, and the mean score of learning outcomes was also at a high level. There was a direct and significant relationship between the mean scores of self-directed learning facilitators and outcomes; accordingly, with the increase in the score of facilitators, the score of self-directed learning also increased.

Educational content, guidance by professors, methods and facilities, flexibility, choice power, and time management in this type of training have provided a suitable educational environment for virtual students. The results of the studies performed by Shen et al. (2014), Kohan et al. (2017), and Saeid et al. (2016) are in line with the results of the present study (17, 18, 19).

Cazan et al. (2014) and Lounsbury (2012) believe that virtual training affects learners' personality traits, encourages them to progress, and increases learning self-control, self-regulation skills, and adaptation and meditation in cyberspace (20, 21). Keshavarz et al. (2013) also showed that learners learned materials deeper in the process of e-learning (22), and their self-confidence increased in a positive direction (19), indicating that facilitating self-directed learning had positive outcomes in the field of the learning process.

In the present study, there was also a significant relationship between self-directed learning facilitators and the academic achievement of virtual students; accordingly, with the increase of students' GPA, the mean score of facilitators significantly increased. Therefore, the learning facilitators led to students' academic achievement. There was also a significant relationship between self-directed learning outcomes and academic achievement. In other words, as self-directed learning outcomes increased, academic achievement also increased.

Abdullah (2019), Hsu (2005), and Bail et al.'s (2008) studies, which are consistent with the present study, suggest that self-directed learning not only brings high academic achievement but also leads to the promotion of graduates possessing this skill (23, 16, 24). Since e-learning is viewed as one of the self-directed learning facilitators, due to using this modern communication technology, education goes beyond the limits of time and space, and the student receives information resources more rapidly. Additionally, with the help of this technology, learning time will be

reduced by combining audio, video, and text, will pass better, and can lead to students' academic progress. The results of Cazan (2014), Malta et al. (2010), and Fidalgo et al.'s (2014) studies are in line with the findings of the current study, showing that facilitators (e.g., e-learning, movies, and moving pictures) are significantly related to the student's academic performance (20, 25, 26).

In this study, the analysis of the mean scores of self-directed learning facilitators and outcomes with students' characteristics indicated that both variables had direct statistical relationships with age ($P \leq 0.05$). Considering the necessity of knowledge and awareness to pass the course of study among older students through e-learning and the use of various facilitators during their education and work, these students consequently gain higher points than younger students. Furthermore, older students have relatively passed the excitement stemmed from the surrounding environment, are more aware of their ultimate goal of learning (i.e., acquiring knowledge and skill from such an environment), and therefore dedicate more time to study and improve their academic performance. In other words, by increasing the age of learners, self-directed learning outcomes also increase.

The high level of self-directed learning outcomes in older students can be attributed to the experience, self-awareness, responsibility, more interactions, and the increase of learning skills in these students. On the other hand, with an increase in age, individuals become less dependent on others, and learning methods gradually become normal for each person; therefore, they feel they have to change and move toward more self-direction. A study performed by Nadi et al. (2013) showed a significant relationship between students' age and self-directed learning; accordingly, older students had higher self-direction skills, which is consistent with the results of the present study (27).

In Abraham et al.'s study (2011), which is consistent with the present study, a significant difference was observed between the self-directed learning test score and the participants' age (28). Nevertheless, in Litzinger et al.'s study (2005), no significant relationship was observed between the self-directed learning readiness test scores in different age groups (29). There was no difference between self-directed learning facilitators and other demographic characteristics (i.e., gender, the previous field of study, and the university of study) (25). In Ahanchian et al.'s study (2015), there was no significant difference between the total score of self-directed learning in male and female students, which is consistent with the findings of the current study (30).

In today's world, learning and training cannot be limited to the classroom space. In addition, virtual training is inevitable in the conditions of coronavirus disease 2019 and is recognized as a capacity in universities in the post-corona conditions; therefore, strengthening and facilitating self-directed learning due to learner-centered development is the primary responsibility of professors and educational officials. On the other hand, given that the research units in this study were virtual graduate students (with a master of medical education) with educational backgrounds in different areas of medical sciences, they were relatively talented with a mastery of self-direction skills, which is one of the limitations of our study. Therefore, it is recommended to perform this study on other groups and educational levels to better perceive the existing problems.

Conclusion

Self-direction is one of the important factors of academic achievement and blessing in disguise, especially in virtual training. According to the results of the present study, with the increase of self-directed learning facilitators, the outcomes of this type of learning, especially students' academic achievement, increase. Therefore, it is recommended to increase students' participation and consolidate self-directed activities. Furthermore, by the application of technology and program appropriate to the subject of the course, professors in virtual training should strengthen and nurture students' self-direction skills and guide them to do various assignments and activities related to their lesson objectives.

Supplementary Material(s): Is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: This study is the result of a part of a master's thesis in medical education approved at Kerman University of Medical Sciences, Kerman, Iran. The authors would like to express their gratitude to all the officials who helped carry out this research project. Moreover, the authors fully appreciate all the students of virtual training participating in this study. Due to the fact that the research community was limited to virtual master students, so in generalizing the result to other situations, care should be taken.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approvals: This study was approved at Kerman University of Medical Sciences, code of ethics (no.: IR.KMU.REC.1397.493)

Funding/Support: No funding.

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Strides Dev Med Educ. 2021 December; 18(1):e1045 doi 10.22062/sdme.2021.195823.1045

Research Article

Designing the Comprehensive Educational Faculty Development Program in Kerman University of Medical Sciences Based on Kern Planning Model

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Received: 2021 March 02
Revised: 2021 June 13
Accepted: 2021 June 19
Published online: 2021 November 01
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Citation:
Salajegheh M, Norouzi A. Designing the Comprehensive Educational Faculty Development Program in Kerman University of Medical Sciences Based on Kern Planning Model. Strides Dev Med Educ. 2021 December; 18(1):e1045. doi: 10.22062/sdme.2021.195823.1045

Abstract

Background: Educational development of faculty members requires the adoption of clear and coherent strategies that pave the way for achieving goals in this area.

Objectives: This study aimed to design a comprehensive educational faculty development program in Kerman University of Medical Sciences.

Methods: In the current descriptive study, we designed a comprehensive educational faculty development program based on four steps of Kern's curriculum planning model from problem identification and needs assessment to the development of educational strategies in 2020. To implement the steps of problem identification and needs assessment, four focus groups were held with faculty members and some students.

Results: The educational needs of faculty members were determined based on the specific characteristics of the program audiences. As a result of the needs assessment, the specific educational needs of each target group were determined in 19 areas and 32 skills. Then, the specific goals and educational strategies of the program were developed.

Conclusion: The research led to the development of an educational comprehensive faculty development program. These results can help localize the educational needs of faculty members of different medical universities and improve the faculty development in the country.

Keywords: Faculty Promotion, Faculty Members, Program Development, Kern, Needs Assessment

Background

Given the role and position of faculty members in the development of academic institutions, attention to the issue of development of faculty members to effectively play their roles is considered an inevitable necessity (1, 2). In medical universities, the development of faculty members in numerous dimensions is critical due to their important role in community health (3). In addition, evolutions in health care organizations, the increasing complexity of health care, and the changing meanings of medical education, such as new methods of training, assessment, and learning, have led to enhancing requests from the faculty members in the fields of education, research, leadership, management, etc. The ultimate goal is to have creative and beneficial faculty members, successful researchers, and capable physicians (4, 5). To meet these needs, faculty members should acquire new knowledge, skills, and abilities; therefore, many medical universities in the world have planned and implemented educational programs to increase the competencies of faculty members (6, 7).

Development of faculty members means activities planned to prepare or assist faculty members to perform their roles in the fields of education, research, leadership, and management, leading to productivity, usefulness, efficiency, as well as personal and professional development to achieve the goals, perspectives, and missions of the organization (4, 7-11). In other words, development of faculty members is defined as a process that prepares them to play their various roles and strengthens them to be productive and up-to-date (12).

Faculty development programs usually are planned and implemented by focusing on different roles of faculty members such as educational, research, professional, and

individual roles. Accordingly, this study aimed to improve the educational skills of faculty members that ultimately leads to students' high-quality education and better learning (13). Development of faculty members in the educational dimension requires the adoption of clear and coherent strategies that pave the way for achieving goals in this area.

In a systematic review, Steinert *et al.* (2016) reported some of the results of faculty members' educational development programs at both the individual and organizational levels. In this article, researchers emphasized designing development programs according to the needs of the faculty (5). The results of another systematic review by Phuong *et al.* (2017) showed positive behavioral changes in the faculty members, including improved teaching skills, better leadership positions, and increased academic outputs (13). The results of Guraya *et al.* (2019) showed the effect of faculty development programs on strengthening the knowledge and professional capabilities of participants in these interventions (14). Piryani *et al.* (2018) concluded that faculty members' self-confidence in teaching significantly increased after participating in faculty development programs (15). In another study, Colella *et al.* (2019) showed the participants' satisfaction with holding the development programs and the acquired knowledge. The highest changes in professional behavior were reported regarding receiving and providing feedback, assigning and delegating responsibilities and duties, and improving communications (16). Saiki *et al.* (2019) showed the benefits of the faculty development programs, such as increasing knowledge about clinical education methods by focusing on respect and trust toward learners, increased self-confidence in teaching, and the positive role of group interactions in clinical education (17).

In Iran, some studies have also been conducted on educational faculty development programs in medical universities. In a study in 2015 at Shiraz University of Medical Sciences, Kojuri *et al.* found that positive changes occurred in faculty members' knowledge regarding teaching methods, providing feedback, student assessment, time management, and the use of this knowledge in the real environment (18). Dehghani *et al.* proceeded with designing, implementing, and assessing a medical education fellowship course at Kerman University of Medical Sciences in 2019. The results indicated that most faculty were satisfied with the overall quality, increased knowledge, positive attitude changes in faculty members, and the use of what was learned in teaching students (19).

This report well represent the value and position of educational faculty development programs. Despite valuable practices in the field of development of faculty members at Kerman University of Medical Sciences, no comprehensive program has been developed to include various aspects of this important activity so far. On the other hand, dealing with education needs going through various stages and requires practices called planning. In this regard, one of the educational planning models is Kern's model, which is a six-step approach, including problem identification and needs assessment, needs assessment of the program's target group, identification of general and specific objectives, development of educational strategies, program implementation, and assessment (20). This comprehensive model has been designed for the development of an educational program to be used specifically in medical education (21). A study by Loyal *et al.* (2018) was a very valuable experience of designing educational courses for faculty members based on Kern's model. The program designed in this study was such that each of the new faculty members was trained in three ways: holding a professional development seminar, counseling session with peers, and holding an introduction session in the department (22). Therefore, since the present study aimed to design a comprehensive educational faculty development program in Kerman University of Medical Sciences, the planning of the initial four steps was based on Kern's model.

Objectives

This study aimed to design a comprehensive educational faculty development program in Kerman University of Medical Sciences.

Methods

In current descriptive research, we designed a comprehensive educational faculty development program in Kerman University of Medical Sciences in 2020 based on four steps of Kern's curriculum planning model from problem identification and needs assessment to the development of educational strategies. The research was approved by the Research Ethics Committee of Kerman University of Medical Sciences (code: IR.KMU.REC.1399.636). Participants entered the study voluntarily and were free to leave the study at any stage. Also, the research aims and ethical issues were explained to participants in written and oral forms. The participants were also assured of the confidentiality of their information, and they were explained that the results would be used only for research aims.

The first step of Kern's model is related to problem identification and needs assessment. In this research, a focus group was held to explain the problem and to study its dimensions in the university. An electronic invitation was sent to some faculty members and students to attend the meeting. The purpose of the invitation was announced to them, and if they agreed, they were included in the study. The reason for inviting students was to get their opinions on the educational skills required by faculty members to improve the teaching-learning process. The criterion for inviting individuals to this meeting was having management experience, holding faculty development programs, and students interested in participating in the university's educational development affairs. Attempts were also made to consider a variety of different educational groups among the invited individuals. In this virtual meeting, individuals' opinions were collected regarding the educational needs of faculty members, as well as the content and implementation

procedure of faculty members' development programs. On the day of organizing the focus group, the consent of each participant was obtained again, and they were allowed to record their voice.

The focus group meeting was started with the general question "In what areas do you think faculty members need educational skills?" by the chairperson and continued with specific questions such as "What programs are needed to provide these educations?", "What are the necessary facilities for educating faculty members?", and the like. The meeting lasted for about 90 minutes. The chairperson tried to engage all participants in the discussion and give everyone the opportunity to comment, explain, and interpret their experiences. All conversations were recorded, and notes were taken from the discussions and expressed points. At the end of the meeting, the researchers examined and analyzed the statements of the group members. Then, using the conventional content analysis method, which is originated from the inductive content analysis approach, important and key phrases regarding the educational needs of faculty members were extracted.

In the second step of Kern's model, the needs assessment of the target group is performed. In this study, based on the results of the first step and the information obtained from the review of texts, a list of educational needs of faculty members was prepared. Given that the program's target group is the faculty members as the main audiences of development programs, three focus group meetings (involving 15, 10, and 18 individuals) were held with some university faculty members. Prior to focus group meetings, a list of extracted needs in the previous step was prepared and emailed to participants. Each meeting lasted for approximately 45 minutes. In these meetings, an attempt was made to have a variety of different educational groups.

In the third step of Kern's planning model, the general and specific goals of the program are formulated. In this study, considering the results of needs assessment in the previous steps, the general and specific goals of the program were written and provided to four experts in the scientific committee of the faculty development unit of the university, and necessary corrections were made based on their opinions.

In the fourth step of Kern's planning model, the educational strategies required for the program are developed. In this research, based on the information obtained from the first and second steps, as well as the type of educational goals, the development of appropriate educational content and method were performed. The results were then submitted to four experts in the scientific committee of the faculty development unit of the university, and necessary corrections were made based on their opinions.

Also, for a more accurate review and to receive more opinions from experts in this field, a draft of the comprehensive educational faculty development program was sent to the officials of educational development offices of faculties and hospitals in the university (12 individuals). The opinions of all experts were then included in the program, and necessary changes were made. Since the fifth (program implementation) and sixth (program assessment) steps of Kern's model were beyond the objectives of the present study, we ignored applying them in this study.

Results

A total of 15 experts participated in the focus group meeting held for problem identification and needs assessment in the university dimension. Of these, 10 individuals were faculty members (six from basic sciences and four from clinical sciences) and five individuals were students (three medical students, one pharmacy student, and one graduate student of anatomical sciences). According to the results of this step, the educational needs of faculty members were determined based on the characteristics of the audiences of educational faculty development programs. As a result of this step, the needs were identified in six categories, including the special needs of new faculty members, the special needs of faculty members applying for promotion from instructor to assistant professor or from assistant professor to associate professor, the special needs of faculty members applying for promotion from associate professor to professor, the special needs of faculty members applying for promoting specialized knowledge of medical education, the special needs of instructors of educational faculty development programs, and the special needs of future faculty members (PhD students and residents).

Based on the results of the focus group meetings held in the second step, the special educational needs of each target group were identified, which included 19 areas and 32 skills (Table 1). The basis for selecting the target groups in dividing the educational needs of faculty members was the executive instruction of educational faculty development programs for newly employed faculty members in the university and the quality criteria for mandatory educational faculty development programs for new faculty members announced by the Education Development Center of the Ministry of Health and Medical Education (23).

The goals formulated in the third step of Kern's model regarding the comprehensive educational faculty development program included the general goal and specific goals. While the general goal was promoting the educational capabilities of faculty members and improving the organization performance, the specific goals included preparing faculty members to play their role as a teacher in the university upon arrival, readiness to acquire more capabilities during the period of activity as a faculty member in the university, flexibility of courses according to the participants' conditions, attention to different levels of audiences, specializing training courses along with basic development, and strengthening the participation of the development offices of colleges and hospitals in the universities in the development programs.

In the fourth step, the educational strategies considered for the comprehensive educational faculty development program involved a wide range of long-term or short-

Table 1. The special educational needs of the target groups of faculty members

Target Group	Area/ Skill		Educational Strategy
New faculty members	Education	Introductory curriculum planning	Interactive lecture, e-learning
		Basic teaching methods	
		Preliminary student assessment	
	Research in education	Preliminary research method	Interactive lecture, counseling
	Scholarship	Preliminary scholarship	Interactive lecture, counseling
	Educational management and leadership	Preliminary educational management and leadership	Interactive lecture, e-learning
	Communication skills and professionalism	Basic communication skills	Interactive lecture, counseling, providing movies and scenarios
		Basic professionalism	
	University management and regulations	Basic university management and regulations	Interactive lecture, e-learning
Faculty members applying for promotion from instructor to assistant professor or from assistant professor to associate professor	Education	Intermediate curriculum planning	Interactive lecture, e-learning
		Intermediate teaching methods	
		Intermediate student assessment	
	Research in education	Intermediate research method	Interactive lecture, counseling
	Scholarship	Intermediate scholarship	Interactive lecture, counseling
	Educational management and leadership	Intermediate educational management and leadership	Interactive lecture, e-learning
	Communication skills and professionalism	Intermediate communication skills	Interactive lecture, counseling, providing movies and scenarios
		Intermediate professionalism	
Faculty members applying for promotion from assistant professor to professor	Education	Advanced curriculum planning	Interactive lecture, e-learning
		Advanced teaching methods	
		Advanced student assessment	
	Educational management and leadership	Advanced educational management and leadership	Interactive lecture, e-learning
Faculty members applying for promoting specialized knowledge of medical education	Education	Curriculum planning	Interactive lecture, e-learning
		Teaching methods	
		Plan/ student assessment	
	Educational management and leadership	Advanced educational management and leadership	Interactive lecture, e-learning
Instructors of educational empowerment courses for faculty members	Education	Teaching techniques in workshops, virtual education, and e-learning, principles of holding an interactive workshop	Interactive lecture, e-learning
	Communication skills and professionalism	Verbal and non-verbal communication techniques	Interactive lecture, counseling, providing movies and scenarios
Future faculty members (PhD students and assistants)	Education	Preliminary curriculum planning	Interactive lecture, e-learning
		Basic teaching methods (classroom and patient bedside)	
		Preliminary student assessment	
	Communication skills and professionalism	Basic communication skills	Interactive lecture, counseling, providing movies and scenarios
		Basic professionalism	

term, formal or informal, and individual or group activities including workshops, seminars, mentorships, e-learning, online learning, and longitudinal development programs.

Discussion

This study was conducted considering the need for a comprehensive educational faculty development program designed based on the specific characteristics and needs of different audiences. In this study, Kern's planning

model was used to design the comprehensive educational faculty development program in Kerman University of Medical Sciences. The specific educational needs of faculty members were determined in 19 areas and 32 skills and the specific goals and educational strategies of the program were developed.

Steinert *et al.* (2010) investigated the reasons for participation or non-participation of clinical faculty members in development programs; the most important factors for the attendance of faculty members at the mentioned courses were found to be providing a suitable environment for personal and professional growth, the proportion of the development programs' content to participants' needs, and a good opportunity to communicate with colleagues. Also, one of the most important obstacles for not participating in development programs was suggested to be the inconsistency of the goals and content of the course with the needs of faculty members. Finally, it was concluded that the use of comprehensive and codified programs for development courses would increase the acceptance and participation of faculty members (24). In 2016, in a systematic review to evaluate faculty members' development programs between 2002 and 2012, Steinert *et al.* emphasized designing the appropriate content of development courses associated with the needs of the audiences and using proper educational methods based on the principles of adult learning such as experimental learning (5). In a review study in 2019, Guraya *et al.* emphasized the necessity of needs assessment and designing development programs in response to the needs of faculty members (14).

Numerous studies have designed educational development courses for faculty members based on needs assessment using different methods such as questionnaires and interviews. The results of the present study are in line with the findings of Behar-Horenstein *et al.* (2014), indicating educational priorities for faculty development programs from the perspective of faculty members of the School of Dentistry in the fields of education, assessment, scholarship, and educational management and leadership. In the findings of this study, it was stated that designing a development program adjusted to the needs of faculty members before implementing the program would lead to promoting professional growth and ensuring that the provided services are adapted to the needs (25).

Dias *et al.* (2017) examined the factors and barriers effective in the success of faculty development courses and reviewed their educational needs in 22 nursing schools in Pakistan using a questionnaire. The results showed the educational needs in the fields of curriculum planning, teaching and learning, and research in education, even in faculty members with specialized qualifications and high work experience (26). Some of the findings of this research in the areas required for educational priorities are similar to the results of the present study.

The results of the present study are in line with the findings of the research by Shah *et al.* (2018), which along with designing the faculty development program, determined the educational priorities of faculty members using a questionnaire and reported needs such as achieving more skills in the fields of educational capabilities, assessment, and educational management and leadership (27).

In 2018, Manzoor *et al.* examined the educational needs of faculty members of medical and dentistry schools for faculty development courses in Pakistan. The results showed the educational priorities in the fields of teaching and learning psychology, education and assessment skills, research in education, educational management and leadership, and professionalism, which in some cases were consistent with the results of the present study (28).

One of the strengths of this study, which distinguishes it from previous research, is the use of a logical, systematic, dynamic, and interactive approach to planning, which in addition to needs assessment, it addresses other critical stages of educational planning, including setting the goals and educational strategies of the program. These steps were considered in the comprehensive educational faculty development program in Kerman University of Medical Sciences at the design stage.

One of the limitations of this study was the lack of willingness and motivation in participants to collaborate in focus groups due to a busy work schedule and lack of time. To eliminate this limitation, an attempt was made to justify the faculty members about the role of this research in improving the quality of the development programs of faculty members and creating and promoting organizational development at Kerman University of Medical Sciences.

Conclusion

The results of this research led to the development of a comprehensive educational faculty development program in Kerman University of Medical Sciences. This program is undoubtedly rooted in the real educational needs of faculty members and meets the needs of specific audiences. Applying the results of this study can help localize the educational needs of faculty members of medical universities and improve the development programs of faculty members in the country.

Supplementary material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: This study was conducted with the financial support of the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99000898). We are grateful for the sincere cooperation of the faculty members and colleagues of Kerman University of Medical Sciences.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approvals: The research was approved by the

Research Ethics Committee of Kerman University of Medical Sciences (code: IR.KMU.REC.1399.636).

Funding/Support: This study was conducted with the financial support of the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99000898).

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Strides Dev Med Educ. 2021 December; 18(1):e1046 doi 10.22062/sdme.2021.195846.1046

Research Article

Review of Checklist and Global Rating Form Scoring Methods in Objective Structured Clinical Examination Stations: A Narrative Review

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Received: 2021 March 09
Revised: 2021 May 30
Accepted: 2021 June 12
Published online: 2021 November 01

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Citation:
Salajegheh M, Shamaeian Razavi N. Review of Checklist and Global Rating Form Scoring Methods in Objective Structured Clinical Examination Stations: A Narrative Review. Strides Dev Med Educ. 2021 December; 18(1):e1046. doi: 10.22062/sdme.2021.195846.1046

Abstract

Background: The objective structured clinical examination (OSCE) is broadly applied to assess the clinical competence of medical students. Despite the widespread use of the OSCE, the scoring methods used in this test can be a potential source of measurement error and affect the accuracy of the scores.

Objectives: This study was aimed to investigate the checklist and global rating form scoring methods in OSCE stations.

Methods: In this narrative review study, the keywords "OSCE", "Reliability", "Validity", "Utility", "Global", and "Checklist" were searched in Scopus, Web of Science, EMBASE, and Medline databases between 2010 and March 2021. After removing duplicates and considering the direct relationship of the articles to the study's objectives, full-text articles were reviewed.

Results: In total , 30 articles were retrived, of which 19 cases were finalized. The results of retrived articles were divided into five categories, including the correlation of scores, subjectivity and objectivity, validity and reliability, ease of use, and the need to train assessors, and the assessed capabilities in scoring by checklists and global rating forms.

Conclusion: There is widespread disagreement on the superiority of checklist over global rating form. It is recommended that both scoring methods be used in combination to achieve maximum reliability and validity, to assess student skills based on objective criteria, to avoid applying assessor mentality, and to gain maximum validity in test results.

Keywords: OSCE, Global rating form, Checklist

Background

The assessment of clinical skills in medical education has made great progress due to the widespread use of objective structured clinical examination (OSCE) (1). The OSCE is a clinical competence assessment test that can assess numerous capabilities, including taking history, clinical examinations, clinical procedures, interpretation of laboratory results, controlling patient problems, communication, and assessing inclusive attitudes. The OSCE, first designed by Harden in 1975 (2), usually consists of several stations that evoke real clinical interactions and simulations that can be used for specific cases, and immediate feedback is possible (3). In this test, the examinees pass some stations rotationally over a specified time. Students walk through all the stations and move to the next station after receiving a signal (4). At each station, examinees must perform a specific task. In all of these stations, there are observers who use the agreed global rating form or checklist to score the examinees' performance (5).

Due to the weaknesses in traditional tests of practical skills, the use of the OSCE in the assessment of medical students has increased remarkably (6). The advantages of the OSCE include high validity and reliability, the ability to control the complexities of the test compared to the real environment, being suitable for both summative and formative assessments, and possibility of testing a large number of examinees simultaneously under the same conditions (7). Despite the advantages of the OSCE, one of the constant concerns regards the scoring methods in the stations of this test as one of the most important factors affecting the validity of the OSCE. There are

several methods to score the OSCE, including the use of a checklist and a global rating form (8).

In scoring by a checklist, there is a yes/no answer for each item, or a score is considered according to the student's performance in the relevant station. In a global rating form, the examiner gives the student a grade in general, regardless of the checklist score (9). In recent years, there has been much debate about what scoring method to use in the OSCE. Some believe that a checklist is necessary to ensure objectivity in scoring students, whereas others argue that an overall assessment based on experts' opinions is as correct, accurate, and valid as a checklist.

In their research, Karam et al. (2018) suggested that despite the positive features of the OSCE compared to traditional assessment methods, there was a need to conduct studies on the quality and effectiveness of this test to guarantee psychometric criteria for the OSCE results(10).

Objectives

Given the increasing use of the OSCE in clinical settings, awareness of scoring methods using a checklist and a global rating form in the stations of this test can help control the sources of error and, consequently, hold valid tests; therefore, the present study was performed to investigate the scoring methods using a checklist and a global rating form in an OSCE station through literature review.

Methods

The present research is a narrative review. Review studies for the optimal use of the large amount of information produced by articles and providing a combination of evidence are of interest to researchers in various fields. In narrative review studies, scientific sources on a specific topic are described and discussed theoretically and substantively in broader scopes than systematic reviews. In this type of review, the most relevant sources are selected and reviewed (11).

In this study, the keywords "OSCE", "Reliability", "Validity", "Utility", "Checklist", and "Global" were searched in Scopus, Web of Science, EMBASE, and Medline databases to access related articles. Retrieval results were limited to the period between 2010 and March 2021. The references list of the obtained articles was also examined to search for further articles. Duplicates and articles that did not meet the inclusion criteria were excluded from the study, and considering the direct relationship of the articles to the study's aim, only full-text articles were reviewed. The inclusion criteria were determined based on keywords, time interval, relation to the study's aim, language and type of articles, and access to the full text of the article. This research was approved by the Research Ethics Committee of Kerman University of Medical Sciences (code of ethics: IR.KMU.REC.1400.075).

Results

Based on the search results, 30 articles were retrived. After reviewing the titles, five articles were identified as irrelevant in terms of research questions and were removed from the review process. In reviewing the abstracts of the remaining articles, six articles were deleted, and 19 articles, which were directly related to the study's Objectives, were selected. The full texts of the selected articles were studied. All the selected articles were in English. The specifications of the articles included in the study are shown in Table 1.

The results of reviewing the studies based on the characteristics of scoring methods in the OSCE station were divided into five categories, including the correlation of scores obtained from scoring using checklists and global rating forms, subjectivity, and objectivity of scoring using checklists and global rating forms, validity and reliability of scoring using checklists and global rating forms, ease of use and the need to train assessors in scoring using checklists and global rating forms, and ease of use, and the need to train assessors, and the assessed capabilities in scoring using checklists and global rating forms. These results are presented in detail below.

- The Correlation of Scores Obtained by Scoring Using Checklists and Global Rating Forms:

Numerous studies have examined the correlation between checklist scores and global rating form scores. In Sim et al.'s (2015) study conducted among 185 senior medical students using the Spearman correlation coefficient, a significant correlation between checklist scores and global scores was reported(12). In Wan et al.'s (2011) study conducted among 221 students to compare checklist scores to global scores, the passing score was determined by the Angoff method. The Spearman correlation coefficient was calculated between checklist scores and global scores of each station, and Pearson coefficient was calculated between checklist scores and global scores of all stations. Three OSCEs were assessed over two years. All students who had not gained the checklist passing score were rejected in the global rating form, as well (13). In Turner et al.'s (2014) study performed among 183 students to examine professional behaviors, the mean, standard deviation, and correlation were calculated for the checklist and global scores of each station. Then, the acceptance rate was determined for the mentioned scores. In the surveys, high means of checklist and global scores were obtained with low standard deviation. Spearman's correlation between checklist scores and global scores was satisfactorily significant. The results of this study showed that increasing students' skills and experiences in higher years of study led to increasing the correlation between checklist scores and global scores (14).

- Subjectivity and Objectivity of Scoring Using Checklists and Global Rating Forms:

Given that one of the important specifications of the OSCE is the assessment of students based on their objective performance, the OSCE scoring method, which can be performed using a checklist or a global rating form,

Table 1. The specifications of reviewed articles related to checklist and global rating form scoring methods at OSCE stations

Row	First Author	Study Year	Journal Name	Study Type	Scoring Method in OSCE[1] Station	Reference Number
1	Joong Hiong Sim	2015	Education in Medicine Journal	Descriptive	Checklist- Global rating form	11
2	Michael Wan	2011	Medical Education	Descriptive	Checklist- Global rating form	12
3	Kaitlin Turner	2014	Education Research International	Descriptive	Checklist- Global rating form	13
4	A'man Talal Inayah	2013	BMJ Open	Descriptive	Checklist- Global rating form	14
5	Sheena CarlLee	2017	Journal of graduate medical education	Descriptive	Checklist- Global rating form	15
6	Winny Setyonugroho	2015	Patient Education and Counseling	Descriptive	Checklist	16
7	Deb Massey	2017	Nurse Education Today	Descriptive	Checklist- Global rating form	17
8	Mary A. Rawlings	2019	Journal of Baccalaureate Social Work	Descriptive	Checklist- Global rating form	18
9	Md Anwarul Azim Majumder	2019	Advances in Medical Education and Practice	Descriptive	Checklist- Global rating form	19
10	Hsiang-ping Huang	2016	Hu Li Za Zhi	Descriptive	Checklist- Global rating form	20
11	Andul Sattar Khan	2012	Creative Education	Descriptive	Checklist- Global rating form	21
12	Deborah A. Sturpe	2010	American journal of pharmaceutical education	Descriptive	Checklist- Global rating form	22
13	Vanessa N Palter	2013	Annals of surgery	Intervention	Checklist- Global rating form	23
14	Megan E.Gillis	2020	Journal of Surgical Education	Descriptive	Global rating form	24
15	Anitha Muthusami	2017	Journal of surgical education	Descriptive	Checklist	25
16	Michaelina Macluskey	2011	European Journal of Dental Education	Descriptive	Checklist- Global rating form	26
17	Montserrat Solà-Pola	2020	Nurse Education in Practice	Qualitative	Checklist- Global rating form	29
18	Irene W Y Ma	2011	Advances in health sciences education	Descriptive	Checklist- Global rating form	30
19	Giovanni Piumatt	2021	BMC Medical Education	Descriptive	Checklist- Global rating form	31

has a positive effect on the objectivity or subjectivity of the judgment of learners' performance.

The study published by Inayah et al. (2017) was performed to examine the objectivity of the scores obtained from self-assessment and evaluation of general medicine students by the observer using the global rating form in 2013. In this study, students were assessed in two OSCE stations for overall readiness and self-confidence by both methods. The scores of the first station predicted the scores in the second station. The results showed the relationship between overall readiness and self-confidence of students in the second station and those obtained in the first station using the global rating form (15).

CarlLee et al.'s (2019) study was performed on the OSCE, in which 33 internal assistants were assessed in 2017. In the stations of this test, scoring was done using a global rating form by faculty members and a standardized checklist by patients. Assistants also performed self-assessment. The results showed that scoring using the checklist method removed the individuality or subjectivity factor, which is one of the most important criticisms expressed about other scoring methods (16), because examiners record their activities instead of interpreting the activities that examinees perform at OSCE stations, leading to eliminating the subjective scoring problem.

- Validity and Reliability of Scoring Using Checklists and Global Rating Forms:

In terms of psychometric properties including internal stability or reliability between station scores, concurrent validity, and construct validity, the global rating forms have a better status or at least as good status as checklists. The results of Setyonugroho et al.'s (2015) study revealed that the use of global rating forms significantly improved

the construct validity compared to checklists (17). Also, the results of another research on scoring using checklists and global rating forms indicated that global rating forms had higher internal reliability and stability than checklists (18).

The results of Rawlings et al.'s (2019) study also showed that the use of global rating forms created a higher construct validity compared to checklists (19). The findings of Majumder et al.'s (2019) research, in addition to confirming these results, exhibited that global rating forms had a higher construct validity and concurrent validity compared to the checklist method (20). Moreover, the results of Huang et al.'s (2017) study revealed that reliability in a global rating form and a checklist simulated by patients was equal, but the degree of validity was higher in the global rating form (21).

In Khan et al.'s (2012) study performed to assess the performance of general surgery residents using the OSCE, two surgeons were present at each station, one of whom filled the checklist and the global rating form and the other filled only the global rating form. The results showed that inter-rater reliability and construct validity in the global rating form was higher than those of the checklist. It was concluded that for the final performance-based assessment, a global rating form is more appropriate than a checklist (22).

In contrast, Sturpe et al.'s (2010) study conducted among senior medical students at the University of Toronto using an anesthesia simulator showed that inter-rater reliability was higher in checklist scores compared to that of the global scores, but assessments performed on global scores also revealed that this scoring method was useful for assessing clinical competence (23).

Regarding the simultaneous use of global rating and checklist methods, the results of the Palter et al.'s (2013) study showed that in the case of simultaneous use of global rating and checklist, a higher inter-rater reliability was reported (24).

- Ease of Use and the Need to Train Assessors in Scoring Using Checklists and Global Rating Forms:

The ease of scoring for the assessors and their experiences and skills in the OSCE are highly significant factors affecting the scoring. A review of the texts shows that global rating forms deal with the qualitative assessment of the performance of examinees at the station, such as the overall readiness of the examinee to perform the required task or the effectiveness level of their performance, but the use of these forms raises concerns about the need for further training of assessors, which has a significant effect on increasing inter-rater reliability and reducing subjective scoring (25).

If global rating forms are used in the OSCE, station designing will be easier, fewer forms will need to be completed per station, and the examiners' training time will be shorter (26). In contrast, the use of checklists adds to the complexity of the test, their ease of use for examiners is low, examiners need time to become familiar with checklists, and the use of checklists limits examiners (27). Studies have also shown that test organizers are more inclined to use information that is aggregated or general (28).

- The Assessed Capabilities in Scoring Using Checklists and Global Rating Forms:

Most checklists used in OSCE stations have two opposites (yes and no), and this scoring method ignores some high levels of capabilities such as organizing and creating knowledge or skills related to students' attitudes, including professional ethics and empathy, and therefore, does not provide the possibility of proper and appropriate assessment of a set of medical tasks (29). In this regard, the results of Solà-Pola et al.'s study indicated that students change their behaviors based on how they are assessed (30). In another study, two independent assessors assessed the recorded performance of 34 junior residents on a simulator for formative assessment. Each assessor used three tools: a checklist consisted of 10 items, a checklist consisted of 21 items, and a global form consisted of nine items. The results showed that in 32% of cases, despite the high checklist score, students were not clinically competent. Therefore, in this regard, the global score should be considered (31). Also, the results of Piumatti et al.'s (2021) study conducted to assess students' communication skills showed that checklists were not appropriate for assessing communication skills, and global rating was helpful in this regard (32).

Discussion

The present study was performed to investigate the checklist and a global rating form scoring methods in an OSCE station. Assessment in OSCE can lead to a more objective and accurate assessment of the skills expected of the students (33). The OSCE, in addition to having many advantages such as quick feedback, the same test conditions for all examinees, the ability to assess a diverse range of skills in an environment similar to the real world, greater objectivity compared to most assessment tools, diversity of examiners, which in turn reduces bias, motivating students to learn, and high reliability and validity (in the case of proper design and implementation), has limitations too. Scoring in the OSCE depends on the performance of the student, the patient, and the examiner and has a significant effect on the individual's score (34). Also, the given scores only reflect the overall performance of the examinee and are not an indication of their individual abilities. In other words, conventional tests reflect only the performance of the candidate and are incapable of proving their competence (35).

Problems in the relationship between the examiner and the examinee do not usually affect the individuals' attitudes toward the test, and the final outcome depends on the examinee. In general, in scoring using a checklist, the details of student performance are given more value, and this method is more appropriate for inexperienced examiners. In contrast, in a global rating form, more

attention is paid to student ability, and experienced examiners prefer this method (5). Based on the evidence, there has always been disagreement about the priority of checklist or global rating. According to Sim et al.'s study, the scores obtained from checklists and global rating forms are well correlated. Although both scoring methods provide good results, the authors have suggested that, in the case of using a scoring method for the assessment stations of process skills, a checklist is preferable (11).

In Hodges et al.'s study, the global rating method had better construct validity and higher reliability compared to the checklist. The global rating method also made a very good distinction between individuals with a one-year difference in the medical course (36). In general, the results of some studies show that checklists are problematic in distinguishing between senior residents from junior residents in the OSCE. Also, when using checklists, the benefits of using experienced examiners and the strengths of their professional judgment are minimized (12). Today, the use of modern checklists in which items have different weights has led to validated assessment results and helped improve the assessment results obtained from the checklist. Judgments about the weighting of specific items should be considered when designing stations and should be consistent with the clinical assessor's expectations of the relative importance of the tasks (37). In a systematic review study by Ilgen et al., the reliability between items and between stations in the global rating method was reported to be higher than that in the checklist method, leading to a more accurate assessment of skills (37). In general, there is usually a need to train assessors in conducting the OSCE. Therefore, it is suggested that faculty development courses in designing, holding, and assessing OSCE in stations can be helpful (38, 39). Although the results of most studies reveal that the use of global rating forms in the OSCE is more appropriate, it is generally recommended that both methods be used for scoring in OSCE (40, 41).

Limitations

Given that the present study is a narrative review and does not have any predefined and systematic methods, the selection of articles and their inclusion in the study may be biased and reinforce the results of the study toward the views of the authors. However, the authors have tried to reduce the probable biases of the study as much as possible by studying multiple sources.

Conclusion

Scoring by checklists and global rating forms can both be used to determine students' clinical competence by observing the necessary requirements such as validity and reliability and using experts. There is widespread disagreement on the superiority of one over the other. It is recommended that both scoring methods be applied in combination to achieve the maximum reliability and validity.

Supplementary Material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: This study was conducted with financial support from the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99001194). We are grateful for the sincere cooperation of our colleagues.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approvals: This research was approved by the Research Ethics Committee of Kerman University of Medical Sciences (code of ethics: IR.KMU.REC.1400.075).

Funding/Support: This study was conducted with financial support from the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99001194).

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Strides Dev Med Educ. 2021 December; 18(1):e1060 doi 10.22062/sdme.2021.196170.1060

Research Article

Learners' Preferences in English Language Learning: A Cross Sectional Study at Hormozgan University of Medical Sciences

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Received: 2021 May 22
Revised: 2021 September 10
Accepted: 2021 September 12
Published online: 2021 November 26

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Citation:
Mahmoodi H, Haddad Narafshan M, Shahabi H. Learners' Preferences in English Language Learning: A cross sectional study at Hormozgan University of Medical Sciences. Strides Dev Med Educ. 2021 December; 18(1):e1060. doi: 10.22062/sdme.2021.196170.1060

Abstract

Background: Learning a language has become more highlighted for medical students because it works as an approach for expressing and exchanging thoughts and feelings.

Objectives: The present study was conducted to investigate the preferences of English as an international language among Iranian medical students.

Methods: This cross-sectional survey was carried out on three different cohorts of language learners from Hormozgan University of Medical Sciences. Four hundred students aged 18 to 46 were selected using the convenience sampling method. Exclusion of the upper-intermediate ones yielded 372 intermediate participants. The English Language Preferences Questionnaire was used to identify the factors on English language learning preferences. Frequency, and Pearson's correlation coefficient were used to analyze the data using SPSS.

Results: Speaking (42.8%) was the most preferred skill. Among participants, 83.1% preferred an English class of different activities, such as group work and projects. Also, 26.5% of students preferred to repeat what they heard, and 4.2% chose to copy from the board. Media and watching movies received a high percentage (81.2%). In addition, 47.8% of the participants preferred an immediate reflection on their errors in front of everyone, 56.5% showed interest in using both the native and English. Moreover, there was a statistically positive relationship between learning activities and task preferences among the participants ($r = .39$, $p < .01$).

Conclusion: Educational scholars and syllabus designers should focus on incorporating learners' preferences into academic settings to revolutionize the traditional curriculums. These findings have substantial implications for the design of academic English courses for medical students.

Keywords: Language learning, Learner Preferences, Students of Medical Sciences

Background

In the era of modern communication, the expression of thoughts brings about raised universal interactions. Language learning has become more highlighted because it acts as an approach for the expression and exchange of a variety of thoughts (1). Both educational scholars and syllabus designers have sharpened the focus on incorporating learners' preferences and engagement in academic settings worldwide to initiate the basis for traditional curriculums and syllabuses, which were increasingly found to be ineffective. There are many individual differences since the way through which the individuals' learning is less or much different from the others (2). Therefore, for example, an auditory learner can learn better through hearing, and in contrast, the other one learns by seeing; that is called visual learner. (3) Given the growing significance of learner-centered pedagogy, English for academic or specific purposes (EAP/ESP) research has suggested the involvement of students' voices in a great number of studies. ESP is a learner-centered approach to teaching English as an additional language, focusing on developing competent communicative teaching a specific discipline, such as academics, medicine, accounting, business, IT, teaching, engineering, etc. ESP commonly refers to teaching the English language to university students or employed people looking into the particular vocabulary and skills they need to be upgraded in their field of activities. ESP programs are designed based on students' needs to improve their English in a certain professional field of study and

are generally taught at the university. EAP merely focuses on university students, while ESP courses focus on the language, skills, and genres appropriate to the specific activities the learners need to carry out in English either in academic settings or within the community. Generally, to elaborate on the differences between ESP and EAP, it could be said that EAP is just like general English; it adapts to almost all fields or areas, while ESP is adaptable only to particular fields or areas.

These courses provide language instruction for academic study in universities. Language skills addressed include listening comprehension, fluency development, oral intelligibility, reading, grammar, writing, and vocabulary development. To address why medical students are required to learn the English language, it would be said that medical terminology allows all medical professionals to understand each other and communicate effectively. When everyone understands what a condition, medicine, or procedure is, they can fulfill their roles accordingly, whether that is delivering medicine or billing for medicine. On the other hand, English is essential to doctors worldwide since much medical and scientific literature is written in English. In addition, it is common for international meetings to hold their conferences in English. Medical students and professional doctors require English to read and understand documents, write articles, and participate in international conferences, where English is the most dominant medium of interaction. Moreover, students must be updated with the most recent scientific progression; therefore, learning English in its academic form can contribute to this critical issue.

To illustrate the logic behind such numerical studies, for instance, Hutchinson and Waters (4) asserted that what leads to the rise of ESP is how it meets and treats the learners' specific needs, demands, and requests in terms of the situations in which they are placed. Strevens considered two principles in the recent developments in teaching English (5). He believed that those principles draw on the learner's specific needs and attempt to increase the learner's communicative ability to function in authentic discourse situations. Hence, instruction in a field like ESP roots in these two basic principles in academic contexts. Likewise, the concept of preferences in a higher education context is considered a fundamental aspect of an organization's texture where it grounds the borderline of philosophies, epistemologies, and consequently, the differences. It has been stated that tailoring learners' wants and preferences in outlining a learner-centered curriculum are significantly essential (6). Understanding the growing needs and demands of language learners is both observable and unobservable within their learning attempts. What should be attended to in such exploration shapes learners' needs and preferences (7)? As English has become an everyday subject of learning; initiations have emerged to embrace students' needs from various backgrounds with a deepened focus on individual preferences. Considering the learners' autonomy through independent learning or out-of-class activities could be a key response to learners' diversities (8, 9).

Therefore, a shift of focus in research has occurred to investigate the matter of usefulness and importance in terms of preferred activities and tasks in the learning process from the students' points of view. In a study by Falout et al. suggested that Japanese students preferred communicative over traditional grammar-based activities (10). Sullivan found that learners seek opportunities to communicate and build a circle of connections with their peers and their English teachers (11). Kang et al. assessed the perceptions and preferences for English language teaching among English as a Foreign Language (EFL) in schools, colleges, and universities worldwide in non-English-speaking countries and the teaching method of pre-service teachers and learning activities in the classroom (12). They showed that teachers resort to their teaching methods by selecting such activities as one-on-one conversation, taking up language games, and pronunciation practices as the most preferred ones and think that those methods are superior to the out of date activities, such as translation and grammar exercises as the least preferred ones.

Lau and Gardner indicated that given the different disciplinary features of academic English learning, the students had specific distinct preferences (13). Some students favored the solitary mode of learning, while others were inclined to collaborative learning. Moreover, the first group showed their strongest belief in learner autonomy. These differences strongly indicate the need to develop an academic English curriculum and courses to fill the existing gap. Therefore, learning a language or a portion of it as ESP in academic settings requires an intimate focus on students' differences and preferences on fulfilling their tasks. It is worth noting that integrated curricula following a comprehensive teaching approach have focused on knowledge acquisition of foreign languages (14-18).The attempt at learning a language at the academic level calls for taking up the highly favored strategies, appropriately fit the curriculum. Therefore, a shift has occurred to contribute learners' preferences into all educational and academic systems dimensions.

Bada and Okan, for instance, argued that those teachers who exert effort to analyze their students' needs to unfold their capabilities, potentials, and preferences are among successful instructors with effective language teaching styles (19). Al Hummaira indicated that students care about opportunities given by their teachers to fully engage them in discussions or problem-solving activities in the classroom (20). Moreover, he uncovered that students expect their teachers to keep them active by assigning group tasks as out-of-class activities. In other words, the expectations of students and the teaching situation can be built if English language learning meets students' needs effectively, especially the four language skills (speaking, reading, listening, and writing). Khan et al found visual learning the most preferred model and revealed that high-achieving college students are among those who rely on their visual sense in learning preferences rather than the

auditory sense (21).

To discover the influential factors, Fatemi et al. demonstrated that individual differences and specific personality characteristics are influential factors that affect the mentality of EFL students; therefore, they can shape their willingness and tendency toward learning language and other academic activities (22). Likewise, the aspect of sex was discovered effectively on individuals' preferences; it was revealed that female students preferred kinesthetic style, whereas male students were inclined to benefit from a variety of learning techniques. (23, 24).

Objectives

Every individual follows distinct alternatives of how to obtain, retain, and recall information, which are intrinsically dependent upon unique features and traits that are not often perceived or consciously taken by students for the analysis and comprehension of new information (25).Therefore, the current study was done to address the medical students' preferences regarding learning the English language.

Methods

This cross-sectional quantitative survey was carried out on three different cohorts of language learners (medical, paramedical, nursery, and midwifery students) from the Hormozgan University of Medical Sciences from September 2020 through January 2021. Four hundred students aged 18 to 46 years were selected using the convenience sampling method. Initially, the Longman Placement Test (26) (LPT) was used to draw on participants with a homogenous English language proficiency level since learners' English language proficiency level affects their language preferences. Based on the results, 93% of the participants were at the intermediate and 7% at the upper intermediate level of the English language. With the exclusion of the upper-intermediate ones (based on the placement test results), a sample of 372 intermediate participants was left. Ethical approval was obtained from university officials based on the university's ethical guidelines. The test comprises 100 written multiple-choice questions assessing learners' grammar and vocabulary knowledge. The participants were given 50 minutes to complete the questions, and the scoring was as follows:

Pre-Elementary: 00-20, Elementary: 21-35, Pre-intermediate: 36-60, Intermediate: 61-85, Upper-Intermediate: 86-100.

To uncover the participants' English language preferences, the English Language Preference Questionnaire (ELPQ) was used, which was designed and developed by the researchers of the present study considering the literature review (Gardner (27) and Chalak and Kassaian (28) and objectives of the study. ELPQ included nine factors labeled Dominant skills, Class activities, Working Style, Error Correction, Media Preferences, Topic Preferences, Learning Activities, Task Preferences, and Classroom Language. The participants were asked to mark whether they agreed with the items on a 5-point Likert scale (1 'strongly disagree' to 5 'strongly agree'). To design the questionnaire, at first, the relevant literature of the English language and learning preferences was scrupulously examined. Then several semi-structured interviews were performed with some researchers, teachers, and learners in the field of English language to examine whether the interviewees could approve the variables taken from the literature and to check whether or not there were any other affecting variables the interviewees could recommend. The items were examined by some experts to evaluate their redundancy, face validity, content validity, and language clarity. After obtaining the comments of the experts, the value of content validity was calculated based on the CVR formula, and if the calculated content validity value was equal to or higher than the determined value in Lawshe's table, the item was preserved; otherwise, it was eliminated from the list of the items. The feedback contributed to some revisions modifying the structure of questions 3, 5, and 8 as they were structurally vague. Therefore, these questions were structurally simplified. These steps helped the researchers construct an 18-item questionnaire. Cronbach's alpha was used to estimate the questionnaire reliability. The overall Cronbach's alpha for this questionnaire was 0.81, which revealed a good internal consistency of the questionnaire.

The chance of direct contact with students as a member of the research society constituted mutual trust between the researchers and the participants (29-31). The participants were oriented to the objectives of the study, procedure, and limitations and then were asked to participate voluntarily. To keep the participants' information confidential, all identifications were removed, and pseudonyms were used instead. All the completed questionnaires were treated anonymously. Frequency (n), percent (%), and Pearson's correlation coefficient were used for the analysis of data using SPSS version 26 software.

Results

Of total, 135 (36.3%) students were male and 237 (63.7%) were female. Also, 32% of participants were students of nursing, 11% midwifery, 35.2% paramedical, and 21.8% were medical students (Table 1).

As it is shown in Tables 2 and 3, female participants preferred to obtain speaking skills more than other skills (24.5%), which also proceeds the same skill in male participants (18.3%), which shows the significance of speaking skills among medical sciences students. General preferences of the participants' English language skills were in the following order for the students of nursing, midwifery, and paramedical: speaking, reading, vocabulary, grammar, listening, and writing; however, it was slightly different for the medical students: speaking, vocabulary, reading, grammar, writing, and listening.

Regarding class activities, 83.1% of them preferred having an English class with several activities, such as pair/group work and projects. Regarding students' preferences for working styles in the classroom, 55.1% preferred teamwork.

Table1. Demographic characteristics of the participants

Gender	Education	N (%)
Male	Nursing	54(14.5)
	Midwifery	0(0)
	Paramedical	56(15.1)
	Medical	25(6.7)
Female	Nursing	65(17.5)
	Midwifery	41(11)
	Paramedical	75(20.1)
	Medical	56(15.1)
Total		372(100)

Table2. Comparison of the preferred language skills based on gender

Skill	Female	Male	
	N (%)	Frequency	Percent (%)
Reading	60(16.9)	18	5.20
Grammar	18(5.20)	15	3.20
Vocabulary	35(10.25)	19	6.20
Writing	10(2.65)	4	0.75
Speaking	97(24.5)	69	18.3
Listening	17(4.20)	10	2.65
Total	237(63.7)	135	36.3

Table 3. Comparison of the preferred language skills based on field of study

Skill	Nursing		Midwifery		Paramedical		Medical	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reading	28	7.25	7	2.20	34	11.00	10	3.65
Grammar	8	1.2	4	0.75	14	2.70	7	2.20
Vocabulary	17	4.20	6	1.05	19	5.75	11	3.90
Writing	3	0.6	1	0.15	4	0.75	6	1.05
Speaking	56	17.55	20	6.25	48	12.55	42	10.1
Listening	7	1.20	3	0.6	12	2.45	5	0.9
Total	119	32	41	11	131	35.2	81	21.8

Table 4. Working styles, ways of learning, media preferences, and topic/subject preference

Responses Distribution	Reply	Frequency	Percent (%)
Working Style	Individually	79	21.2
	In pair	86	23.1
	In group	205	55.1
The Ways of Learning	Reading	64	15.7
	Listening	64	15.7
	Problem-solving	28	9.2
	Copying from the board	17	4.2
	Listening and taking notes	69	16.8
	Reading and taking notes	45	11.9
	Repeating what they hear	85	26.5
Media preferences	TV/video/radio /movies/tape/cassette	298	81.2
	Written materials on the board	42	10.5
	Images/posters	32	8.3
Topic/subject Preference	General subjects	216	58.1
	Related to their academic major	135	36.3
	Both	21	5.6
Error correction	immediately, in front of everyone	178	47.8
	Later, in the end, in front of everyone	77	20.7
	Later, in private	115	30.9
Language of the classroom	English	133	35.8
	Persian	25	6.7
	Both	210	56.5

It conveys a clear message to the teachers that teamwork gives students the sense of more comfort, productivity, and relaxation, where their voices would be heard, and their views would be considered and valued. In response to the ways of learning, 26.5% of students preferred to repeat what they heard, and just 4.2% of them preferred to copy from the board. TV/video/radio/tape/cassette and movies received a high percentage of preference (81.2%) in terms of media and topic preferences. Considering the preferred topic, 58.1% of participants preferred general subjects (Table 4).

Regarding the preferred style of correcting errors, 47.8% of the participants preferred an immediate reflection on their errors in front of everyone. In response to the language type use, 56.5% of students showed their interest in using both native language and English language. Therefore, those who believe L1 plays a minimal role in the teaching of language are invited to think back of its role and contributions it makes to the fields of language learning and teaching (Table 4).

There was a statistically significant and positive relationship between learning activities and task preferences among the participants ($r = 0.39$, $p < 0.01$).

Discussion

The world is dramatically changing due to globalization and technological development. This rapid transformation has proceeded with a constant need to change traditional ELT pedagogy. Since multilingual and multicultural interaction with English users worldwide has become an interest in diverse contexts, it is of urgent importance for ELT-oriented researchers and educators to understand and improve students' perceptions of the English language (32). The findings of this study can alter and expand previous literature on academic language learning by considering the differences in practice modes. Becher and Towler have documented disciplinary variations consistent with the present study (33). If learners' overarching preferences can be identified within specific disciplinary fields, educational approaches can be tailored to enhance learning capacities. Therefore, disciplinary teachers need to recognize their students' learning preferences and adjust their teaching based on them.

On the other hand, it should not be neglected that what students prefer is not always part of their needs (26). Seemingly, teachers embark on the activities based on their perception of their students' demands and needs. Therefore, teachers are required to modify the activities students do not prefer to follow because they do not enjoy having them in their learning experience, even if such activities are considered useful for students. Few academic language teachers are inclined to share most of their students' learning preferences, which could result in an unclear picture of those preferences failing to accommodate them. Thus, determining the boundaries of these overlapped areas in designing the corresponding ESP/ EAP courses is a need that should not be neglected.

This quantitative study was designed and accomplished to know the preferences in English language learning among Iranian Medical students. The results showed that the participants' English language skills' preferences are in the following order: speaking, reading, vocabulary, grammar, listening, and writing using TV/video/radio/tape/cassette and movies working on general subjects. Learning medicine is a complicated task followed by the stressing need for individual commitment, developing reading habits, and establishing communicative skills. Therefore, reading skill is significant in clinical skills; it increases knowledge and thinking process regarding everyday clinical challenges (29). Concerning the developments in language teaching, Strevens pointed to two principles being drawn on the learners' specific needs and attempt to increase their communicative ability to function in authentic discourse situations (5). Hence, a shift of focus in research is required to investigate the matter of usefulness and importance in terms of preferred activities and tasks in the learning process from the students' points of view. Falout et al., for instance, indicated that traditional grammar-centered activities were mostly disliked by students (10). In the same vein, Sullivan revealed that students welcome chances to communicate and interact with their classmates and their English language teachers (11).

Furthermore, the results revealed that conversations, dialogues, and communicative practices in team or group work are the most preferred learning activities among participants of the study with the help of a teacher who plays the role of a facilitator and guide rather than a participant. In other words, the expectations of students and the teaching situation can be built if English language learning meets students' needs effectively, especially the four language skills (speaking, reading, listening, and writing). Moreover, the results showed the participants' interest in using both their native language and the English language. Therefore, L1 role in and contributions to the field of language learning and teaching should be reassessed. Referring to the preferred style of correcting errors, the participants preferred an immediate reflection on their errors in front of everyone. Quinn believed that a deeper concentration on learners' error correction helps them vividly notice their weaknesses (34).

Therefore, both educational scholars and syllabus designers should sharpen the focus on incorporating learners' preferences and involvements to academic settings all around the world to revolutionize the bases of traditional curriculums, which were increasingly found to be ineffective. The findings of the current study would be useful for both students and teachers to maximize the learning outputs by taking into account the students' preferences before designing the course curriculum because the materials, which cover the students' needs, interests, and demands can act as a strong motivator to support and promote students' achievements in learning a language.

Conclusion

This study provides those responsible for curriculum

design with important information to adjust their English language teaching while taking learners' preferences into account. In brief, given the growing global importance of the English language and the salient interpretation of the impact of these shifts on students of medical sciences' attitudes towards learning the English language, there is a need for theoretical and practical exploration of learners' preferences towards the English language. Based on the above-mentioned, teaching the English language can be better designed to satisfy different students, thereby strengthening the possibility of their ability to apply the English language successfully in their future educational and professional life. Furthermore, to minimize the effects of irrelevant course content selection, the ESP practitioners are strongly required to conduct a proper needs analysis. Despite its strengths, there are some limitations in this study that should be taken into consideration. First, the study sample is for the typical Iranian context, limiting the generalizability of the results to other settings. Our data were obtained from 372 students from three different fields of medical, paramedical, and nursing, and midwifery in Iran, and these results may not be generalizable to other EFL contexts. Besides, since the informants were all Iranian, this aspect of the participants made it difficult to generalize the findings across other contexts. Therefore, a future study may consider recruiting participants with diverse ethnic backgrounds. It would be valuable to replicate the study in other contexts to check the results. Additional longitudinal studies are needed to study participants' preferences.

Acknowledgments

We are pleased to thank the students and academic staff of the Hormozgan University of Medical Sciences who have rendered their voluntary consent for participating in the project.

Conflict of Interests: The corresponding author declares that there are no competing interests to be expressed on behalf of all the authors.

Ethical approval: The current study was approved by the Ethics Committee of the Hormozgan University of Medical Sciences (1398.075). Besides, participants were assured that the collected data would be used only for research, and the name of the participants would be kept confidential.

Funding/Support: HM contributed to the study design, data collection, and manuscript drafting. MHN contributed to the study design, data analysis and interpretation, and study revision. HS contributed to manuscript drafting.

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Strides Dev Med Educ. 2021 December; 18(1):e1054 doi 10.22062/sdme.2021.195925.1054

Research Article

Smoothing Transition from High School to Medical School Through E-Learning Module

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Received: 2021 March 27
Revised: 2021 September 03
Accepted: 2021 September 09
Published online: 2021 November 02

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Citation:
Khabaz Mafinejad M, Jahan S, Khaiat Rasouli M, Hatampour K, Ganjedanesh MR, Ahmadi N, Valizadeh Samakoosh Z, Rezaiee M, Moradi M, Taherahmadi M. Smoothing Transition from High School to Medical School Through E-Learning Module. Strides Dev Med Educ. 2021 December; 18(1):e1054. doi: 10.22062/sdme.2021.195925.1054

Abstract

Background: Numerous medical students feel that they are not ready to study medicine at the beginning of entering university. One way to reduce the challenges of entering the university is to provide opportunities to familiarize students with the university.

Objectives: This study was conducted to design an educational e-learning module for freshman medical students to help a successful transition to university life.

Methods: This study was a single-group study with a post-test design at Tehran University of Medical Sciences, Tehran, Iran, within 2018-2019. The transitional e-learning module included content regarding academic integration, social integration, and information integration.The e-learning module for new medical students was implemented as a 20-day course at the beginning of their attendance at the university. After the students completed the e-Learning course or module, a questionnaire was completed to assess students' attitudes toward the quality of the transitional e-learning module. The data were analyzed using SPSS software (version 22.0).

Results: Out of 209 questionnaires, 135 questionnaires were returned. The findings showed that more than 65% of the students believed that the program could prepare them for academic integration into the institution. In total, the highest (8.62±1.15) and lowest (7.07±2.39) scores belonged to the "information integration" and "social integration" sections, respectively.

Conclusion: The e-learning module was implemented to provide students with practical support to adapt to the university. The survey findings showed that it helped freshman medical students prepare for academic and information integration into the university.

Keywords: Curriculum, Medical Education, Virtual, Transition

Background

One of the major challenging phases for students is their transition from high school to university (1-3). The beginning of the 7-year period of the medical curriculum is a turning point in the life of students. After years of effort, they find themselves in a new position in terms of social environment, educational program, and lifestyle. The ability to integrate oneself into new settings can be highly troublesome for most medical students. Numerous students are not familiar with the environment before entering the university and do not have much information about their roles and expectations. Therefore, most medical students describe this phase as a transition shock and might experience high stress and anxiety levels (4).

Several studies provide evidence that students' transition between different educational phases and rise of stress levels and negative emotions are related (5-7). Numerous medical students feel that they are not ready to study medicine at the beginning of entering university (8). A study showed that although students are highly motivated when they enter university, most of them

face a new phase of their lives that is quite challenging (9). Fromme et al. (2008) believe that transition from high school to university is a turning point that requires students' personal growth and behavioral changes (10).

One possible reason for medical students' stress could be unawareness of what to expect during the course and lack of information on how to cope with the university. The importance of this problem is necessitated by the fact that a large number of students drop their training after they are enrolled in colleges because they fail to complete their program timely and face the new life at university inappropriately (11). However, transition periods might also present individuals with opportunities for personal development and growth. Therefore, Nielson, in the theory of work role transitions, believes that the transition period should not be considered a short period; nevertheless, this period is a dynamic process during which an individual is transferred from a certain set of conditions to another situation with different features and during this transition change of expectations, tasks, or responsibilities by the individual is considered a major challenge (12). From the point of view of Panser et al. (2004), numerous university-designed curricula are offered to prepare students to contribute greatly to the dream of many problems they face when it comes to their university life (13).

One way to reduce these challenges is to provide opportunities to familiarize students with university. According to Pittman and Richmond (2008), the role of universities in the students' transition process is essential (14). It requires the application and use of adaptive strategies to function properly in the new environment (15-17). Undoubtedly, considering students' individual and social issues upon entering university and providing appropriate support can be a step toward reforming and conducting orientation programs (13). Therefore, university officials and educational planners should be aware and use the best management methods to assist students in the transition process from high school to university.

Undoubtedly, to achieve this important goal, various methods are available to prepare learners to enter the university. Today, the explosion of information, along with the growth of technology and the emergence of recent advances in behavioral and cognitive sciences that have caused widespread changes in modern educational strategies, is a set of conditions that lead to innovation in the use of interactive methods in medical education programs (18). On the other hand, currently, cyberspace has become an important topic in medical education, and the use of cyberspace platform facilities in teaching students has been widely welcomed (19, 20). The results of studies showed that with the expansion of information and communication frontiers, the use of information technology and social media in medical specialties is increasing widely (21). On the other hand, the current students are from the millennial generation with its own characteristics, a generation among which the use of cyberspace has become widespread (22).

Although the value of the transitional course in medical education is well established (23-25), a very limited number of interventional studies have been performed in this regard. Furthermore, research into what matters to conducting educational intervention in different transition phases shows that choosing methods that are understandable, user-friendly, and fit for available facilities and resources is often neglected (9). Therefore, further studies are needed to assess the transitional course to better understand how and what elements provide support for students (26).

Objectives

This study was conducted to design an educational e-learning module for medical students to help a smooth and successful transition to university life. A part of this aim sought answers to the following research question:

What are the freshman medical students' perceptions of the effectiveness of the transitional e-course from high school to university?

Methods

This study was an interventional single-group study with a post-test design conducted at School of Medicine, Tehran University of Medical Sciences (TUMS), Tehran, Iran, within 2018-2019.

The course of undergraduate medical education at TUMS is a 7-year program consisting of 2.5 years of basic sciences, 1 year of pathophysiology, 2 years of clerkship, and 1.5 years of internship. Medical students in Iran enter university through the entrance exam. The face-to-face transition ceremony from high school to university is held at TUMS as a 2-day program in the first week of medical students' attendance in Medical School since 2011. Since there are approximately 20 days from the announcement of university entrance exam results to university attendance, to use this opportunity to familiarize medical students with university, a transitional e-learning module from high school to college was designed and implemented.

The population of this study included the medical students of TUMS, entering October 2018-2019. The inclusion criterion for this study was being admitted as a new medical student at TUMS. The exclusion criterion was the unwillingness to participate in the course.

This transitional e-learning module was designed to familiarize and adapt freshman medical students with the university. For the recognition of the students' needs, the literature was reviewed, and senior students' opinions were gained using a focus group. In the designing phase, a draft of the program was prepared through several meetings with representatives of various stakeholders, including medical educationists, educational managers, and medical students. An educational-supportive program was designed and implemented as a transitional e-learning module to facilitate freshman medical students' interactions with

the university. Additionally, the program was designed in various sections to increase the effectiveness of the course, including 1) academic integration, 2) social integration, and 3) information integration.

Content regarding academic integration includes educational clips, applied information, educational regulation information, and news and announcements. Educational videos contained getting familiar with the medical curriculum, basic sciences lessons, psychological skills, and understanding the relationship between basic and clinical sciences. Moreover, one of the indirect purposes of this part of the project was becoming familiar with faculty members, professors, and the different facilities of the campus. Overall, 15 video clips were prepared and made available for students; three of these video clips introduced educational programs and medicine courses; three video clips discussed expected competencies, such as "medical ethics and professionalism", "reasoning and problem solving", and "personal development"; eight video clips introduced the basic sciences courses; one video was about the relationship between basic and clinical sciences courses. The most commonly used free medical software, such as general and medical dictionaries and three-dimensional anatomy software, was introduced. Helpful websites and main medical reference books were also presented. For news and announcements, information about university rules and regulations, including how to register and introduction of academic, sports, and welfare facilities of the university, was provided in this section.

Content regarding social integration includes six study guides regarding familiarity with student lifestyle and cultural differences, city, university map, city tourist sites, and public transportation system. In addition, this part was rendered to familiarize students with different student organizations and activities. Content regarding information integration includes interaction and communication with students to answer their concerns and questions individually and provide frequently asked questions. Furthermore, one hundred questions were answered to provide information for students.

A researcher-made questionnaire was used to assess students' attitudes toward the quality of the transitional e-learning module. The questionnaire consisted of 12 close-ended items scored based on a 4-Likert scale and 5 close-ended items scored within the range of 1-10 points. The content validity of the questionnaire was assessed by eight experts in the field of medical education and medicine. In this phase, the experts were asked to give their opinions on the clarity and importance of each item on the questionnaire qualitatively. Face validity was assessed by reviewing the opinions of five medical students on the clarity of the items. In this stage, the experts were asked to comment on each item. The reliability of the questionnaire was measured by evaluating the internal consistency of the questionnaire's items using calculating Cronbach's alpha (0.68). The data were analyzed using SPSS software (version 22.0). Frequency and mean (standard deviation) were used to analyze the descriptive data.

Ethical approval to conduct the present study was obtained from the Ethics Committee of TUMS (IR.TUMS.VCR.REC.1397.639). The participants were offered the opportunity to complete an anonymous voluntary survey at the end of the program. All participants were assured that their responses would remain confidential.

Results

A total of 209 students participated in the e-learning module from high school to university using convenience sampling. The mean age of the participants was 18.2 years (range: 18-20 years), and 48.4% of the participants were female. A total of 209 questionnaires were handed out individually among new entrants, out of which 135 (64.5%) were returned. The results of the survey showed that more than 65% of the students believed that the program could prepare them for academic integration into the institution. Moreover, 68.1% of the students believed that the university had more facilities at the time of entering (Table 1). On average, the highest (8.62±1.15) and lowest (7.07±2.39) scores belonged to "content regarding information integration" and "content regarding social integration" sections, respectively. Tables 2 and 3 show the results of program evaluation.

Discussion

In this study, an educational-supportive e-learning module was designed and implemented to facilitate medical students' adaption process in the 2018-2019 academic year. According to Westerman (2014), the

Table 1. Students' Familiarity with Conditions before Entering the University

Familiarity with university	At the time, I believed the university had more facilities	At the time, I predicted the university's facilities correctly	At the time, I believed the university had fewer facilities	I do not have any comments
University amenities	113 (83.7)*	12 (8.9)	8 (5.9)	2 (1.5)
Educational facilities	92 (68.1)	30 (22.3)	2 (1.5)	11 (8.1)
Welfare facilities	81 (60)	24 (17.8)	14 (10.4)	16 (11.8)

*The values are as N (%)

Table 2. Students' Views on the Effectiveness of the Transitional E-course from High School to University

Subject	A lot	Medium	A little	I do not have any comments
Effectiveness of educational videos in becoming familiar with the medical program	38 (28.1)*	58 (43)	8 (6)	31 (22.9)
	More than 75%	**75-50%**	**49-25%**	**Less than 25%**
Effectiveness of introduced software in studying medicine	25 (18.5)	75 (55.7)	26 (19.2)	9 (6.6)
Effectiveness of introduced websites in studying medicine	25 (18.5)	59 (43.7)	40 (29.6)	11 (8.2)
Effectiveness of introduced textbooks in studying medicine	43 (31.8)	61 (45.2)	20 (14.8)	11 (8.2)
	A lot	**Medium**	**A little**	**I do not have any comments**
Introduction to the university's welfare facilities	34 (25.2)	61 (45.2)	20 (14.8)	20 (14.8)
Introduction to student associations and journals	67 (49.7)	34 (25.1)	12 (8.9)	22 (16.3)
	Good	**Medium**	**Weak**	**I do not have any comments**
Giving immediate response to questions and concerns	119 (88.1)	16 (11.9)	0 (0)	0 (0)
	More than 75%	**75-50%**	**49-25%**	**Less than 25%**
The content is effective in solving the concerns	50 (37)	69 (51.1)	12 (8.9)	4 (3)
	Good	**Medium**	**Weak**	**I do not have any comments**
Effectiveness of news and announcements	101 (74.8)	23 (17)	8 (6)	3 (2.2)

*The values are as N (%)

Table 3. Students' Scores of the Quality of Different Sections of the Transitional E-course

	Quality (0-10 score)	Minimum	Maximum	Mean	Standard deviation
Academic integration	Content regarding educational clips	0*	10	7.29	1.70
	Content regarding applied information	1	10	7.95	1.41
	Content regarding educational regulation information	3	10	7.75	1.56
Social integration	Student lifestyle in Tehran and cultural differences	0	10	7.07	2.39
Information integration	Response to concerns and FAQs	5	10	8.62	1.15

*FAQs, frequently asked questions

transitional course at the beginning of students' presence in college can create challenging and stressful situations for them and be accompanied by numerous opportunities and threats (27).

During this transition, the changes in expectations and responsibilities are considered big challenges for each student, which requires using supportive strategies to have proper functions in the new environment. Transitional courses can play a critical role in getting students situated in an unfamiliar setting (28). Furthermore, orientation courses can help students cope with the vast knowledge and skills required in the dynamic and rapidly changing health care system (29). Therefore, the purpose of this study was to facilitate communication and interaction with TUMS before attending the university campus by providing a comprehensive transitional e-learning module from high school to university.

In addition, according to the present study, medical students face numerous challenges, such as the lack of familiarity with university regulations and unfamiliarity with learning styles and the lifestyle at university. A possible explanation for some of the current study results might be the lack of adequate preparation and mentoring and the lack of administrative support from the university. Some authors have speculated that this transfer might be accompanied by several concerns, including getting familiar with the new setting, understanding new rules and regulations, acquiring learning skills, and gaining new knowledge considering different needs (8, 27), which is in line with the results of the current study. A study performed by Radcliffe and Lester (2003) demonstrated that most students describe the transition from high school to university as great stress, especially considering the change in their lifestyle at the beginning of their attendance to the university while being unfamiliar with its processes (8). Therefore, it is necessary to design supportive programs to meet this need.

The transitional e-learning module in the present study was designed and implemented as a longitudinal 20-day course based on a needs assessment survey for recognizing

the academic and psychological needs of medical students. Designing numerous support programs to meet new students' needs can be presented with different forms and content (30-32). A possible explanation for this might be that the careful and systematic selection of the structure and content of such programs plays the most important role in their effectiveness. The main reason for transition programs' failure is choosing templates that are limited to a short period and content that does not consider students' academic and psychological needs (6). In this study, a longitudinal 20-day e-learning module was designed to increase the ease of transition from high school to university for medical students. The present findings seem to be consistent with those of other studies reporting that a 1-month similar orientation program was designed in Government Medical College, Nagpur, India, in August 2019, which had six orientation modules (33).

Based on the researchers' knowledge, the transitional e-learning module of Medical School in TUMS occurred for the first time in Iran before new students' presence on the campus. The results of evaluating the aforementioned course showed that medical students were quite satisfied with the different features of the program. It seems possible that these results are because the proposed course framework can be considered a guide for designing other transition periods from high school to university based on three principles. Firstly, this course identifies various aspects of the transition to the university that are hard and challenging for many medical students. Secondly, the presented course matches the needs recognized by students and their function in the university. Thirdly, it was easy to communicate with the students in this course using an online environment.

One of the main features of this program is the development of a structured academic e-learning module comprised of various sections for helping students toward a smooth transition from high school to university. The present study findings seem to be consistent with those of other studies demonstrating that three factors should be considered to have a successful transition, namely 1) presenting an accurate academic program to prepare students for the transition from one phase to another, 2) providing financial support in college to transit to different phases, and 3) preparing a website or virtual platform by the educational institute to support students for attending the university (34).

Despite the project's strengths, our analysis in this article is limited to perspectives of medical students in the survey. In addition, since participating in the course and returning the questionnaires were optional, there was a high dropout rate in the completed questionnaires. It is suggested to perform studies over a long-term period to investigate the effect of the transition course on stress control in new medical students. For running a similar orientation program from high school to college, it is recommended to have an appropriate assessment of students' needs; therefore, it can be helpful to have a student representative in the working group to develop an orientation program. Furthermore, students prefer to communicate directly and ask their questions and concerns; consequently, considering how to connect with students during the orientation programs can be essential.

Conclusion

The educational-supportive e-learning module for new medical students was designed and implemented to provide them with practical support to adapt to the new settings. The survey findings showed that medical students were satisfied with participating in the transitional e-learning module, and it helped them prepare for academic, information, and social integration. It is essential to provide students with a structured educational program to assist them toward a smooth transition to university. The successful design and implementation of this program can be a good model to develop similar supportive programs in the years ahead and at other universities.

Acknowledgments

The authors would like to express their gratitude for all the efforts of medical students in conducting this study. Moreover, the authors would like to show their appreciation toward the officials of Medical School at TUMS who contributed to this program.

Conflicts of Interest: None.

Ethical Approvals: The study was approved by the ethics committee at Tehran University of Medical Sciences (No. IR.TUMS.VCR.REC.1397.639).

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e1024 doi 10.22062/sdme.2021.194978.1024

Research Article

Future Studies: Dimensions and Components in the Educational System of a University of Medical Sciences

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Received: 2020 September 16
Revised: 2021 April 03
Accepted: 2021 April 05
Published online: 2021 November 07

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Citation:
Parvaneh M, Niaz Azari K, Enayati T. Future Studies: Dimensions and Components in the Educational System of a University of Medical Sciences. Strides Dev Med Educ. 2021 December; 18(1):e1024. doi: 10.22062/sdme.2021.194978.1024

Abstract

Background: One way to make change in the field of education is through future studies. Considering the role of future studies in building a better future for the country's medical education and health system, the establishment of the required bases in medical education is necessary.

Objectives: The present study aimed to investigate the dimensions and components of future studies in the educational system of a university of medical sciences.

Methods: In this grounded-theory study, the statistical population included expert and knowledgeable faculty members with an experience of delivering services as directors, principals, and deputies of the faculties of Babol University of Medical Sciences, Mazandaran, Iran. In-depth and exploratory individual interviews were held through a questionnaire containing six standard items within October and December 2018.The interview process was completed based on the data saturation law, and the required conclusion was drawn with 10 samples.

Results: A questionnaire with 50 components in three main dimensions, including infrastructure (25 components), management and faculty members (9 components), and outputs (16 components), was designed. Moreover, the validity and reliability of the questionnaire were confirmed.

Conclusion: It is time to build necessary capacities for future studies in the universities of medical sciences and provide the possibility for extensive participation and support of researchers and faculty members in future studies programs in the field of medical education and health research in Iran. The dimensions and components obtained from this study can be helpful in this regard.

Keywords: Future Studies, Dimensions, Components, Universities, Education, Medical, Science

Background

Humankind is experiencing the early years of the third millennium while the world is full of new uncertainties, opportunities, and threats. The trend of various human evolutions and developments indicates that the future is not similar to the past, and the way to prevent neglecting and lagging behind others is to think about the future and move toward building the future intelligently (1). Future studies is a relatively new interdisciplinary fiel that is dramatically developing methodological topics (2).

The first activity of future studies was carried out by a group of researchers led by Ogburn in the United States during 1930-1933 in the form of scientific analysis. Subsequently, since the mid-1940s, a German professor named Ossip coined the term futurology (3). The modern future studies was officiall recognized within 1950-1960 with the publication of "The Image of the Future" by Polak in 1951 and "The Art of Guessing" by Vattal in 1964. Afterward, international futuristic research centers and institutes were established (4). Japan's futuristic processes began in 1970 (5). Germany implemented the "Technology on the Brink of the 21st Century" program in the early 1990s and the "Future" program in 2001 (6). Sweden in the 1990s (7), South Africa since late 1995 (6), and Turkey in 2003 (7) have launched their projects.

The French had a substantial impact on the global future studies movement by publishing the "Perspective" journal. In the light of the efforts of Jouvenel et al., the future is no longer considered a field only for scientists (8). The history of future studies in Iran backs to half a

century ago; however, coherently, only a 10-year history can attribute to it. The field of future studies in our country should be organized according to the existing behavior (2).

Future studies is the knowledge that teaches man how to face vague futures, face the slightest difficult in this confrontation, and get the most benefit (1). Future study is a transdisciplinary study that can affect all sciences (9). Through using past experiences, analyzing the future problems of the health system, and reviewing upstream documents, the evolution and innovation program in the medical sciences education was developed with a preventive and futuristic approach. This program aimed to solve the future problems of the health system through the implementation of responsive education and human resources training according to the future needs of Iran's health (10).

Future studies are the knowledge that informs the organization of probable future events, opportunities, and threats, reduces its ambiguities, doubts, and concerns, and increases the ability to make intelligent choices (11). The education system requires a type of evolution in its structure and content. Educational systems work to achieve specific goals. In the meantime, educational indicators have a unique role as a tool in further cognition (12). A part of the field of future studies in universities has been devoted to the future study of higher education itself, which is mainly observed in the fields such as student number forecasting, financia forecasting, future forecasting of academic disciplines and majors, and university marketing (13).

Objectives

In the first step, it is necessary to consider proper organization according to the need to pay attention to the concept of future studies in universities. By paying attention to these dimensions and components, it is possible to get closer to the result (i.e., the institutionalization of this concept in the academic context by applying the concept of future studies in universities). Therefore, the present study aimed to investigate the dimensions and components of future studies in the educational system of Babol University of Medical Sciences, Mazandaran, Iran.

Methods

A grounded-theory study was conducted aiming to investigate the dimensions and components of future studies in the educational system through in-depth and exploratory individual interviews within October and December 2018. It was initially analyzed in a specifi classification using a documentary study and historical approach and the course of developments and conceptual dimensions.

In the next stage, for the identification of the fundamental factors, the necessary qualitative data were collected through interviews with scientific experts and the management group, including directors, deputies, and faculty members, who had been purposefully selected due to their positions in decision-making regarding the educational system. Then, concepts, categories, and primary and secondary factors were identified and analyzed using a coding process based on the systematic design of the grounded-theory strategy and the content analysis method as a research technique.

For the determination of the samples for the interview, the purposive sampling method was used, which included faculty members with executive experiences at the macro-levels of decision-making in the university as directors, principals, and deputies of Babol University of Medical Sciences, and particularly experts in the field of medical education and research (in terms of both taking managerial responsibility and having authorship). An interview lasted for 30-50 minutes. After 10 interviews, the primary and secondary factors in the previous interviews were repeated (i.e., data saturation).

The valuable opinions of expert professors and several expert graduates in this field were used to ensure the validity of the questionnaire containing six items. Simultaneously, the participants were also asked to help for analyzing and interpreting the data. The items of the questionnaire were as follows:

1. What are the barriers to promoting the culture of looking at the future and future studies among all the stakeholders in the educational system of medical sciences?
2. What strategies do you recommend for strengthening future studies in the country's medical sciences educational system among the policy-makers of the country's medical sciences education (academic level)?
3. What strategies do you recommend for strengthening future studies in the country's medical sciences educational system at the level of administrators of the universities of medical sciences?
4. What strategies do you recommend for strengthening future studies in the country's medical sciences educational system at the level of faculty members?
5. How do future studies affect the promotion of the qualitative indicators of education?
6. How do future studies affect the promotion of the quantitative indicators of education?

During the interviews, the researchers checked the accuracy of their perceptions of the interviewees' statements using guiding questions. In the intervals between the interviews, the researchers analyzed the data to complete the incomplete cases by receiving new information from the participant. Structured processes were used to record, write, and interpret the data to avoid bias and achieve the objectivity index in research. Teamwork was also considered in the analysis of the interviews.

Coding and Analysis Process

In the first stage, the primary categories and secondary components were identified based on the open and axial coding of the data obtained from the

in-depth and exploratory interviews with the experts and the refinement of conceptual codes. Additionally, the priority of each factor was determined based on the frequency of concepts expressed in the interviews. Stratified content analysis and the analytical technique proposed by Strauss and Corbin (2006) were used in this study. The data were analyzed at the sentence and phrase levels for each interview, and conceptual codes were extracted from the transcripts of the interviews. Sometimes, a sentence was related to more than one concept. The concepts were identified by extracting common conceptual codes and refining repetitive cases using theoretical foundations, and comparing some conceptual codes.

In the next stage, the above-mentioned concepts were organized in the form of secondary categories. Moreover, by continuously reviewing these categories and their concepts, primary categories (i.e., dimensions) were temporarily named. The transcripts of the interviews were re-examined, and the categories were carefully reviewed to ensure the proper organization of each concept. From the beginning of the analysis, the boundaries and titles of each category were not definitively determined, and these categories were revised throughout the process. Open and axial coding stopped when a meaningful classification was obtained. After reviewing interview transcripts several times, secondary categories became repetitive, and no new information was found in the transcripts of the interviews; even if new information was found, it was consistent with the existing classification. The performed classificatio was not the only possible classification with absolute boundaries; however, it can be considered sufficien for the next steps of data analysis and questionnaire design.

Results

Based on data analysis and its compliance with theoretical foundations

simultaneously and according to the approval of the Ministry of Health regarding the criteria and indicators of educational ranking of universities of medical sciences (Ministry of Health, Deputy Minister of Education, Rad project, 2014), primary factors (i.e., dimensions) and secondary factors (i.e., components) of future studies in the university educational system could be classifie into three dimensions with 50 components.

1. Infrastructure Dimension

The results of the coding and stratified content analysis of dimensions showed that nine components were present in the infrastructure dimension of future studies (Figure 1). From the participants' viewpoint, it is very important to pay attention to the economic aspects and monitor the use of the budget. Allocating a particular budget to a successful university, along with future studies, is of particular importance. Furthermore, appropriate budget allocation for various fields of education, research, and culture with a fair and equitable view of educational groups should be considered. Moreover, an adequate budget should be allocated to long-term research (interviews 9, 2, and 8).

Paying attention to the planning and plan forecasting system is a strategy to strengthen future studies in the medical sciences educational system (interview 6). By considering appropriate measures, it is possible to promote the scientific, cultural, and even social levels of stakeholders, especially medical and paramedical graduates, in the community (interview 8). Paying attention to the importance and necessity of future studies, laying the groundwork, providing necessary infrastructures, increasing capacity, and attracting the participation of the desired individuals can be effectiv solutions to strengthen future studies (interview 10).

One of the most important issues is to recognize the current situation in the field of medical sciences affairs and capabilities and then draw a scheduled future considering demographic information, regional capabilities, and financial capabilities and facilities and make courageous decisions that have sometimes become habits by mistake over the years (interview 5).

2. Management and Faculty Members Dimension

In this dimension, 25 components were considered (Figure 1). For strengthening future studies in the medical sciences educational system, it is required to consider enhancing the participation of all academic groups. Furthermore, it is recommended to interact with influential individuals and institutions regarding intellectual, financial, and executive aspects, along with comprehensive and futuristic goals at the macro-level (interview 4). Paying attention to the planning and plan forecasting system, using the opinions of elites, and forming the committees of experts are good strategies to strengthen future studies (interview 6). Involving all stakeholders in various educational and cultural affairs implementing various programs at the university level and monitoring them, and self-assessment in all field can be good strategies to strengthen future studies (interview 8).

3. Outputs Dimension

This dimension of future studies, with 16 components, is effective in this process (Figure 1). Future studies has a positive effect on the promotion of the quantitative indicators of education, both in terms of faculty members and physical space and equipment (interview 2). The impact of future studies on educational quality is definite A principal or faculty member, who teaches or manages affairs with a future study approach, provides a specifi perspective that drives the entire educational system forward in that direction (interview 3). Future studies leads to increasing scientific productions, technology products, and theorizing and promoting scientific and executive positions at the national, regional, and global levels (interview 4).

Figure 1 displays the coding and paradigm pattern

of the dimensions and components of future studies in the university educational system. This conceptual model shows how the dimensions and components of the present qualitative study relate to each other.

Figure 1. Results of content analysis and coding and paradigm pattern of dimensions and components of future studies in the educational system of Babol university of medical sciences, Mazandaran, Iran, based on qualitative research findings

Discussion

Based on the analysis of participants' viewpoints, the primary categories and factors (i.e., dimensions) and the secondary categories and factors (i.e., components) of future studies in the university educational system can be classified into three dimensions with 50 components. The significance of the findings in comparison to those of other studies is provided by dimensions in this section.

The Supreme Leader announced the declaration of the second step of the Revolution on the occasion of the 40th anniversary of the victory of the Revolution, and while stating the current situation of the country, with a long-term view, specifies the country's course in the second 40 years of the Revolution. One of the important topics emphasized in this declaration is the development of science and technology (14), which underlines all the three dimensions of infrastructure, management and faculty members, and outputs.

Having the futuristic ability to identify future types and the desired status of scientific authority in medical education and planning to achieve it will be very effective. Teaching to think about the future and to research for is a necessity, and if educational planners do not address this issue using an anticipatory approach today, they will inevitably address it tomorrow (15). This finding is consistent with the findings of the current study regarding the "management and faculty members" and "outputs" dimensions.

The world that is being formed is not only new but also entirely different from the past, and uncertainty is the main determinant of the future of universities (16). Future studies enhances the ability of society to make intelligent choices and allows society to know where it can go (i.e., exploratory futures), where it should go (i.e., normative futures), and through which paths it can more easily reach desirable futures (i.e., strategies)(17). Strong and Bishop argue that relating history to the future facilitates the introduction of tasks(18). Additionally, Bell believes that instead of mere research, we should shape it ourselves, aiming to predict the humanities in the future (19).

In Pour Abbasi's study, an elite panel was formed, and the country's upstream documents were obtained (i.e., mandatory declarations and propositions in the higher health education system and evolution and innovation packages in medical education). Finally, three education-related categories, including achieving scientific authority and promoting national dignity, beneficial science that serves the needs of society and justice in access to facilities, and eliminating deprivation from the content of the resulting declaration and the compliance of evolution and innovation packages with these categories, were examined (20).

Numerous universities try to gain more share of the world's vast market of higher education. This market has been formed in two areas of education and research, and common axes have been defined in their programs (21). Universities need appropriate models and tools for qualitative evaluation and assurance of the related programs and processes and the efficienc and effectiveness of graduates in the job market to perform their serious tasks and their dynamics and promotion (22). The goal of futurists is to discover, innovate, examine, evaluate, and present a picture of possible, probable, and better futures (23). The findings of the above-mentioned articles are all in line with the findings of the present study regarding the "infrastructure" dimension.

One way to make a change in higher education is through future studies and futurism. Given the issues of scientific authority, future studies, and futurism in recent years, especially in the evolution plan of the country's educational system, the academic community is still at a stage that needs education on future studies and futurism (24). An organization should always consider the circumstances. Awareness of possible trends is one of the first and most necessary steps that should be taken to create a brighter future (25). After examining the terms foresight (i.e., prediction) and future studies, the path used by future studies in the organization should be shown and mentioned as a supporter to portray and create the desired future (26).

Predicting the future, making desirable changes in the future, and identifying the factors of change are considered the most important effects of future studies on the humanities (27). The dimensions of quality of learning experiences, learning flexibilit , content, and professor-student formal and informal relations had significant positive associations with the dimensions of students' future study ability (28).

The innovation and novelty of this research field, misconceptions and unscientifi expectations from future studies and appropriate methods of its application, limited familiarity of professors, students, and researchers with this field of study, being time-consuming and having financial cost, and finall , a lack of accumulation of knowledge obtained from the findings of future studies are possible factors affectin the lack of attention to future studies in general and scenario writing in particular (29). Minsky stated that in most cases, world-renowned universities attracted talented students and faculty members from around the world (30). The ultimate goal of numerous future studies in the field of educational management and planning is to help promote educational systems to train capable generations (31).

Implementing future studies and futurism at the national level requires infrastructure, including teaching the methods of future studies and futurism as a scientific mechanism to provide necessary components of decision-making and policy-making at the macro-level (32). Future studies in the field of the country's medical education and health is facing numerous problems and obstacles. Despite the importance of future studies, this type of study is an unfamiliar topic for stakeholders in the medical education field (33). Therefore, it is necessary to prepare a comprehensive plan for the development of future studies discipline and create different courses of future studies as soon as possible (34).

The lack of a clear methodology has exposed the researchers in this field to problems, such as ambiguity in the research method, low credibility, and difficult in defending the results (35).

Abeles states that universities are constantly changing; therefore, research on humanities in universities requires the acquisition of knowledge of the factors creating change (36). All the findings of the above-mentioned studies are consistent with the findings of the current study regarding the "management and faculty members" dimension.

Scott states that it is essential that higher education policies be organized via a comprehensive multilevel approach and that all stakeholders and related institutions be noticed at all levels (37). Altbach says that everyone aspires to a global university; however, the problem is that no one knows what a global university is and how to achieve it (38).

Over the past two decades, research has clearly shown that the performance of perspective-oriented organizations is better than other organizations (39). Futurism is a strategy to respond to the competitive environment, overcome crises, and improve performance at organizational and national levels to help decision-makers create a desired future by gathering information, environmental dynamism, and increasing awareness and insight (40). How to achieve excellence, superiority, and authority at national and international levels has become one of the main issues for policy-makers at the national analysis level and higher education institutions at the institutional analysis level (41).

Masini believes that students' future study ability can be improved through education during their studies in the university. One of the important variables that can affect the development of students' future study ability is the quality of learning experiences (42). Freed believes that the skill of thinking about the future and recognizing it should be developed in students; it means that students should be able to imagine the desired future and possible problems and changes and believe in their ability to respond to such a future and make a change in it (43). All the findings of the aforementioned articles are consistent with the findings of the present study regarding the "outputs" dimension.

The view in this study was based on the fact that future studies in the field of medical education is a relatively new and evolving process and is vital for improving the educational system status because educational systems need a practical guide to be more effective and efficien and improve their performance to ensure that they will reach the desired destination with good quality.

Limitations

Since the statistical population of the present study consisted of experts and senior managers responsible for policy-making and management of academic and hospital activities, scheduling appointments for the interview process was performed slowly due to the group's busy schedule. For this reason and to avoid multiple referrals, some questionnaires were sent via email. There were also some limitations in this regard that did not include staff and students; therefore, the design and implementation of studies with methodology and other related objectives should be on the agenda.

Conclusion

The dimensions and components of future studies in the educational system can be classified into three main dimensions, including infrastructure, management, and faculty members, and outputs, with 50 components. It is suggested to consider proper organization concerning the concept of future studies in universities; the implementation of these dimensions and components depends on the support of the Ministry of Health and Medical Education. Accordingly, it is necessary to prioritize the revision of course titles of different disciplines to define newly selected courses, add new topics with the above-mentioned content to the currently approved courses, or design and hold training workshops on the topic of future studies.

It is also suggested to run short-term educational courses to explain the concept of future studies to faculty members and administrators. Meanwhile, paying attention to the formation of committees and related working groups should be at the top of the university's activities. Moreover, university administrators should apply this new concept in the management of educational affairs to optimally show the long-term effects of employing each of the dimensions and components.

Supplementary Material(s): Is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: The authors would like to express their gratitude to the esteemed faculty members of Babol University of Medical Sciences for their unique cooperation in conducting this study.

Conflict of Interests: The authors declare no conflict of interests.

Ethical Approvals: The present study was designed as a PhD thesis with IR.IAU.SARI.REC.1399.043 at Islamic Azad University-Sari Branch.

Funding/Support: This project was supported by Sari Branch Islamic Azad University, Sari, Iran.

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Strides Dev Med Educ. 2021 December; 18(1):e1064 doi 10.22062/sdme.2021.196255.1064

Research Article

The Relationship between Academic Underachievement and Problematic Cell Phone Use among Medical Students

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Received: 2021 Jun 11
Revised: 2021 September 03
Accepted: 2021 September 05
Published online: 2021 November 14

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Citation:
Moslemizadeh S, Ahmadipour H. The Relationship between Academic Underachievement and Problematic Cell Phone Use among Medical Students. Strides Dev Med Educ. 2021 December; 18(1):e1064. doi: 10.22062/sdme.2021.196255.1064

Abstract

Background: Academic underachievement is a growing phenomenon among medical students, influenced by several factors.

Objectives: This study investigated the relationship between academic underachievement and problematic cell phone use among medical students at Kerman University of Medical Sciences.

Methods: This cross-sectional study was conducted on 300 medical students at KUMS during the academic year 2019. The Persian version of Problematic Cellular Phone Use Questionnaire was used for data collection. Also, the demographic data of the students were recorded, and they were asked to declare if they had a history of academic underachievement in the previous year. Data were analyzed by SPSS software version 20.0 using Chi-square test and logistic regression.

Results: The mean age of medical students was 22.41±2.6 years, and the majority (74.3 %) of them were female. The chance of academic underachievement was 6.37 times higher in medical students who have problematic cellular phone use compared to those without it (OR=6.37, P=0.001). Also, this chance was 4.45 times higher in medical students who had a history of psychological disorders compared to those without (OR=4.45, P=0.02).

Conclusion: The current study revealed that the chance of academic underachievement was higher in medical students with problematic cellular phone use and a history of psychological disorders. Given that academic underachievement is not uncommon, its related factors must be appropriately identified and intervened on time.

Keywords: Academic ,Underachievement, Cell Phone Use, Medical Students

Background

Academic underachievement is defined as reducing a student's academic performance from an acceptable level to an undesirable level. Its examples include a decrease in the grade point average compared to this amount in the previous semester, renewal or repetition of a course, extension of the study period as well as student probation. (1) According to the literature, generally, 28 percent of medical students encounter academic underachievement per year.(2)

Unfortunately, it is a growing phenomenon among medical students, which in addition to personal consequences (physical and psychosocial problems, reluctance to continue the study and even dropping out), is a fundamental social problem. Due to the sensitivity of the medical field and its relationship with public health, the consequences will affect the health system and, ultimately, the community. Based on the previous studies, several factors, such as personality factors, the economic, social, and cultural status of the family, financial problems, the level of interest of the student in their field of study, as well as the quality and conditions of the teaching-learning environment affect academic underachievement. (1)

Another factor that can be associated with academic underachievement in medical students is problematic cell phone use. Nowadays, the high accessibility of

smartphones has caused the new generation (Digital citizens) to spend more time using them during their daily life. Although more student access to smartphones can be an opportunity to enhance the learning process, if this is not channeled in the right way, it can negatively affect students' academic performance.(3)

Yadav and Yadav revealed that more than half of medical students at the University of Western Maharashtra, India, were using mobile phones during college hours, which certainly has a negative effect on their concentration and learning.(4)

Neha Sharma et al. found that very few medical students used their mobile phones for academic purposes.(3) Arwa Jamal et al. reported sleep and concentration problems as the main side effects of smartphone use among female medical students at Taibah University in Saudi Arabia, which can affect their academic performance.(5) Najam Siddiqi et al. showed that 65% of medical students at Oman Medical College sent or received messages during the lectures, and 20% of them played games, which may distract them from concentrating on the learning process (6).

Objectives

According to the corresponding author's experience, most medical students who were referred to the counseling center of Kerman Medical School due to academic underachievement reported that unnecessary use and excessive spending time on social networks are some of the main reasons for their failure. Given the importance of identifying the dimensions of this issue, the current study was done to determine the relationship between academic underachievement and problematic cellular phone use (CPU) among medical students at Kerman University of Medical Sciences (KUMS) during the academic year 2019.

Methods

This cross-sectional study was conducted on 300 medical students at KUMS during the academic year 2019. Our statistical population was medical students who were studying at different educational levels during the study period. The participants entered the study using the quota sampling method, and those who answered less than 90% of the questions were excluded from the study.

The Persian version of the 12-item Problematic Cellular Phone Use Questionnaire (PCPU-Q) was used for data collection. The first seven questions investigate the problematic CPU symptoms in the previous year, and the following five items measure the dysfunction in academic performance, relationship with the family and friends, physical and psychological conditions, and financial problems due to problematic CPU. A Yes/No scale was used for the responses. Equal or more than four positive responses in the first seven questions implies problematic CPU. The validity and reliability of the original and Persian versions have been confirmed in previous studies. (7, 8)

Also, the demographic data of the students (age, gender, educational level, place of residence, marital status, and monthly household income) were recorded. The participants were asked to declare if they had a history of academic underachievement (a decrease in the grade point average compared to its value in the previous semester, renewal or repetition of a course, and extension of the study period in the last year.

Data were analyzed using SPSS software version 20.0 (SPSS Inc., Chicago, IL, USA) by Chi-square test and logistic regression.

Results

The mean age of medical students was 22.41±2.6 years, and the majority (74.3 %) of them were female. Table 1 shows the demographic characteristics of the participants.

Of 300 medical students at different educational levels, 59 students (19.7 %) declared that they had a history of academic underachievement in the previous semester.

Our results showed that the frequency of academic underachievement had no statistically significant difference according to the participants' characteristics except for the history of psychological disorders. The frequency of academic underachievement was higher in medical students who had a history of psychological disorders (12.4%) compared to those without it (4.6%) (P=0.03; Table 2).

Also, 139 (46.3%) students were found with equal or more than four positive responses in the first seven questions on PCPU-Q, indicating problematic CPU. This frequency had no statistically significant difference

Table 1. Demographic characteristics of the medical students

Characteristics		N (%)	Characteristics		N (%)
Gender	Male	77 (25.7)	Residence	Dormitory	113 (37.7)
	Female	223 (74.3)		With the parents	106 (35.3)
Marital status	Single	243 (81.0)		Owen's home	81 (27.0)
	Married	57 (19.0)	Household income	Poor	14 (4.7)
Educational level	Basic sciences	117 (39.0)		Moderate	112 (37.3)
	Physiopathology	45 (15.0)		Good	152(50.7)
				Missing	22 (7.3)
	Clerkship	71 (23.7)	History of psychological disorders	Yes	18 (6.0)
	Internship	67 (22.3)		No	282 (94.0)

according to the participants' characteristics.

The frequency of academic underachievement was higher in medical students who had problematic CPU (79.7%) compared to those without it (38.2%) (P=0.001; Table 2).

The logistic regression results revealed that among the study variables, the history of psychological disorders and the problematic CPU could significantly predict academic underachievement. The chance of academic underachievement was 6.37 times higher in medical students who had problematic CPU compared to those without it (OR=6.37, CI95%=2.93-13.87, P=0.001).

Also, this chance was 4.45 times higher in medical students who had a history of psychological disorders than those without it (OR=4.45, CI95%=1.22-16.20, P=0.02).

Table 2. Comparison of the academic underachievement frequency in medical students according to demographic characteristics and history of psychological disorders

Characteristics		Academic underachievement		Characteristics		Academic underachievement	
		Yes	No			Yes	No
Gender P=0.17	Male	11 (14.3)	66 (85.7)	Residence P=0.15	Dormitory	26 (23.0)	8 7(77.0)
	Female	48 (21.5)	175 (78.5)		With the parents	10 (12.3)	71 (87.7)
Marital status P=0.16	Single	52 (21.5)	191 (78.5)		Owen's home	23 (21.7)	83 (78.3)
	Married	7 (12.3)	50 (87.7)	Household income P=0.75	Poor	4 (7.2)	10 (4.45)
Educational level P=0.23	Basic sciences	25 (21.6)	91 (78.4)		Moderate	20 (36.4)	92 (41.2)
	Physiopathology	5 (11.1)	40 (88.9)		Good	31 (56.4)	121 (54.3)
	Clerkship	18 (25.4)	53 (74.6)	History of psychological disorders P=0.03	Yes	7 (12.1)	12 (6.4)
	Internship	11 (16.4)	56 (83.6)		No	52 (87.9)	229 (95.4)

Discussion

About twenty percent of the studied medical students at KUMS declared that they had academic underachievement in the previous semester. Esmaeilpour-Bandboni et al. (2016) reported that 28.1 percent of the students at the Guilan University of Medical Sciences confronted academic failure.(1) Derby et al. found that 11 percent of medical students in the US are seriously considering dropping out. This study also noted that about 3 percent of medical students do not graduate.(9)

Another study in Iran conducted by Azari et al. reported that about 12 percent of medical students had the experience of academic underachievement/failure at least once.(10) According to the mentioned studies, academic failure is not uncommon among medical students. On the other hand, these students are involved in patient care in clinical settings; therefore, it is necessary that the reasons for their academic failure be carefully evaluated and intervened.

Our study showed that among all the characteristics of the participants, only the previous history of psychiatric disorders had a significant relationship with academic failure. Medical students who had a previous history of psychiatric disorders were four times more likely to fail academically. This result is consistent with the study conducted by Wanda Tempelaar et al. in the Netherlands. They found that underachievement at secondary school is associated with general mental health problems.(11)

We found that academic underachievement was about 6.5 times higher in medical students who had problematic CPU, which is consistent with studies conducted in this regard. (4-6)

Unlike the present study and the studies mentioned above, Sharma et al. revealed that about 60 percent of medical students in Rajasthan, India had acceptable marks despite the excessive use of mobile phones. They argued that this finding indicates that most of the students participating in their study have used mobile phones to improve their academic performance.(3)

As mentioned above, academic failure among medical students is not an uncommon phenomenon, which can have irreparable consequences (due to the nature of studying medicine) in addition to numerous personal and social consequences. The present study and similar studies in this regard have identified several factors related to this phenomenon that should be carefully considered by planners, policymakers, and educational officials. The present study was cross-sectional, which limits temporal sequencing between variables. On the other hand, the history of academic underachievement was expressed by the students, and the study was limited to students of the Kerman University of Medical Sciences; thus, its generalization should be made with caution.

Conclusion

The current study revealed that the chance of academic underachievement was higher in medical students who had problematic CPU and a history of psychological disorders. Given that academic underachievement is not uncommon, its related factors must be appropriately identified and intervened on time.

Acknowledgments: The authors declare their gratitude to the medical student who participated in the study.

Conflict of interest: The authors have no conflicts of interests.

Ethical Approvals: This study was confirmed by the ethical approval (Code: IR.KMU.REC.1396.2064).

Funding/support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e91790 doi 10.22062/sdme.2021.91790

Research Article

Explaining the Residents' Perception of Desirable Clinical Education: A Qualitative Content Analysis

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Received: 2020 February 23
Revised: 2021 January 16
Accepted: 2021 January 19
Published online: 2021 November 22

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Citation:
Sara Shafian, Soleiman Ahmadi, Parvin Rezaei-Gazki, Roghayeh Ershad Sarabi. Explaining the Residents'Perception of Desirable Clinical Education: A Qualitative Content Analysis. Strides Dev Med Educ. 2021 December; 18(1):e91790. doi: 10.22062/sdme.2021.91790

Abstract

Background: Specialized and subspecialized medical education is of key importance in the higher education system due to the special role of residents in various fields in the educational-medical system of universities and the important role of graduates of these fields as specialized and subspecialized physicians in the community health system; therefore, the examination of their views on desirable education can lead to the improvement of the quality of education.

Objectives: The present study aimed to explain the views of residents of Kerman University of Medical Sciences, Kerman, Iran, on desirable education.

Methods: This study was performed using qualitative content analysis. A total of 17 participants were selected by purposive sampling in the academic year of 2019-2020 from the educational hospitals of Kerman University of Medical Sciences and interviewed in face-to-face and semi-structured manners. After collecting the data, all the interviews were implemented and reviewed, and categories were extracted.

Results: Data analysis led to the extraction of six main themes, including capable clinical professors, effective clinical environments, comprehensive planning, comprehensive and preventive educational rules and regulations, efforts to improve educational processes, and educational management.

Conclusion: Health promotion is one of the needs of today's society. Clinical education should be responsive to society, and the desirability of this education will lead to community health promotion. In this regard, it is suggested that education and health officials take an effective step toward improving residency course education by proper planning, performing continuous evaluations of the status of residency education, and considering the factors affecting the desirable clinical education.

Keywords: Residents, Content analysis, Clinical education, Qualitative study

Background

Clinical education is a process in which students gain experience gradually with the presence of the patient and prepare their minds to solve the patient's problems using the acquired experiences and logical arguments (1). A clinical environment enables learning focused on real problems in a professional work environment. It is the only environment in which the skills of biography, physical examination, clinical reasoning, decision making, empathy, and professional commitment are learned as integrated (2) and lead to creating the necessary opportunities for students to be able to bring theoretical information closer to practical facts (3). Additionally, it is considered the best place to learn medical knowledge where the student learns to care for the patient and is motivated for self-directed learning (4).

Specialized and subspecialized medical education is of key importance in the higher education system due to the

special role of residents in various fields in the educational-medical system of universities and the important role of graduates of these fields as specialized and subspecialized physicians in the community health system. Residency courses often include educational courses in medical centers where residents provide patients with care under the supervision of a clinical professor (5) and learn by participating in the treatment of patients in clinical settings (6).

In recent years, effective clinical education has been considered by numerous researchers in the fields of medical sciences (7). The existence of various problems, such as the unclear goals of clinical education, stressful hospital environments, less willingness of experienced trainers to be present in clinical environments, unrealistic evaluations, and shortage of welfare and educational facilities, are among the obstacles to the achievement of clinical education goals (8, 9). On the other hand, from the students' perspective, the quality of clinical education is not desirable, and factors, such as insufficient access to trainers, inadequate time required for dealing with different cases of the disease to fully practice what has been learned in the clinical environment, and stressful situations, are among clinical education problems (10). The improvement of the quality of clinical education leads to training capable and competent students in the clinical field (11). This quality improvement leads to effective clinical education and, ultimately, better learning (12) on the one hand, and providing appropriate and high-quality care services to patients on the other hand (13-15).

For the achievement of efficient clinical education, it is necessary to continuously evaluate the current state of education (1). Using learners' opinions for evaluation is one of the common and well-known methods (16) performed using various research approaches, including quantitative and qualitative methods. Recently, an approach to qualitative methods has emerged in deeply revealing the underlying factors affecting clinical education, and some studies have also been conducted in this regard (17-19). Abbaszade conducted a qualitative study aiming to assess the clinical trainers' perceptions of the challenges and strategies of clinical education and concluded that proper planning for effective education affected the process of acquiring clinical skills. In this regard, attracting and employing experienced clinical professors and making efforts to improve the educational environment can have significant effects (20).

In a qualitative study performed using the ethnographic method, Seabrook explained the professors' views on education in a clinical environment. The most important concerns of these individuals were the lack of a clear structure for education, insufficient time, space, and resources to facilitate education and learning, insufficient supervision of students, and lack of support and recognition of education (17). Another qualitative study conducted by Hoffman and Donaldson investigating the stresses of clinical environments and their effects on clinical education and learning showed that three stressors, including the number of patients, time, and multiple and different roles of individuals, affected the medical team of clinical education (18).

Another qualitative study was conducted by Ramani et al. using the content analysis method to examine professors' views on barriers to clinical education and their strategies to improve it. Ramani et al. concluded that the main barriers to clinical education, including the low quality of professors' clinical skills and, therefore, the tendency to theoretically present educational materials, were the type of perception of these individuals of clinical education skills (19).

Objectives

According to the reviews of the research team, residents believed that there were limited studies related to evaluating desirable clinical education. Considering the importance of the quality of education of residents on the one hand, and their effective role in patients' health on the other hand, the residency education system needs to conduct specialized research using quantitative and qualitative tools to achieve practical solutions to improve the quality of education. Therefore, the present study aimed to assess the residents' perception of desirable clinical education.

Methods

This study was performed using qualitative content analysis. This method analyzes written, spoken, or visual messages and, as a research method, is a purposeful way to describe a phenomenon. This method allows the researcher to examine the desired topics to be further perceived. In qualitative content analysis, raw data are purified based on inference and interpretation and are placed within categories (21-22). In the present study, the participants were selected purposefully. Residents' sampling was performed with maximum diversity (e.g., gender, different fields, different incoming students, and different educational-medical centers) and continued until achieving data saturation. Sample selection criteria included studying residency course and declaring consent to participate in the study.

The data were collected using semi-structured interviews with residents in the academic year of 2019-2020 in the educational hospitals of Kerman University of Medical Sciences, Kerman, Iran, including Afzalipour, Shahid Bahonar, Shafa, and Shahid Beheshti educational-medical centers. Data collection continued until data saturation was achieved. In the present study, data saturation was obtained through interviewing 17 participants.

In the present study, the interview guide was used in five sections to collect the data. The interview guide is an essential tool to help the researcher extract facts, ideas, processes, and views of individuals (23). The interview questions focused on the current clinical education, clinical education problems, characteristics of a desirable clinical professor, characteristics of a desirable educational environment, and characteristics of a desirable educational

program. At the end of the questions, an open-ended question was raised so that the students could add any additional points, if they had, regarding the characteristics of desirable clinical education. Each interview lasted 20 to 60 minutes. The interviews were conducted within July-September 2019.

The collected data were analyzed by contractual qualitative content analysis. For this purpose, Graneheim and Lundman's method was used to analyze the data. Graneheim and Lundman have proposed five steps for analyzing qualitative data, including transcribing the whole interview immediately after each interview, review the whole transcript of the interview to gain a general understanding of its content, determining the semantic units and primary codes, classifying similar primary codes into more comprehensive categories, and determining the content hidden in the data (24).

The data were collected and analyzed simultaneously. Data analysis was performed manually. After each interview, the recorded audio files were implemented as text in Word software (version 2016), and the data were encoded before proceeding with the next interview. The data obtained from all the stages of coding interview transcripts were also managed in MAXQDA 2019 software. For further assurance, the audio file of the interview was matched with the Word file.

In the present study, the validity of the findings was assessed using Guba and Lincoln strategies (25). The data were analyzed using a review of the transcripts of the interviews by participants in the project and the project colleague. Additionally, the individuals experienced in qualitative research were asked to re-perform some parts of the coding process. The corrective opinions of the research team professors were used regarding the interview process, their analysis, and the extracted data. The transcripts of the interviews, extracted codes, and subcategories were shared with some participants and two nursing PhDs, and their opinions were used.

Consolidation in data collection method and field interviews and notes were used. Finally, diversity was considered in sample selection. Regarding the transferability criterion, the purposive selection method was used with maximum diversity. The credibility criterion was also met by regularly collecting data, constantly comparing them, accurately recording and writing, and observing the neutrality and agreement of analysts on categories. Moreover, the data reliability criterion was fulfilled by researchers' long engagement with and immersion in the data (21).

For the observation of ethical considerations, the possibility to access participants was initially provided by receiving a letter of introduction from the Center for the Study and Development of Medical Education of Kerman University of Medical Sciences. Written consent was obtained from those who were inclined to participate in the study. In addition, written information was provided to the participants regarding the study and its objectives and questions. In the present study, all the information, including names, interview files, and transcripts, remained confidential. Moreover, a code was used instead of mentioning the participants' personal information.

According to the information in the informed form informed consent form, the participants had the right to withdraw leaving from the study at any stage, but is not required to provide their reason. there was no need to provide a reason for their withdrawal; however, none of the participants left the study. All the subjects were informed of the study aims, and the interviews were recorded with their consent. The participants were also assured that the recorded information would remain confidential, the audio file would be removed after implementation, and that if they wished, and they could receive the audio file of the interview from the researcher and be informed of the overall results.

Results

Of 17 Residents participating in the present study, 9 and 8 participants were female and male, respectively. The subjects' age was within the range of 28-39 years. Furthermore, the subjects' education level ranged from the first to the fourth year of specialized fields, including radiology, obstetrics and gynecology, resident al medicine, pediatrician, cardiovascular, dermatology, surgery, and anesthesia. Moreover, 12 participants were married, and the other participants were single.

First, in the data reduction phase, the author began to determine the semantic units and extract the codes. Out of 388 semantic extracted units, 168 codes were obtained. Then, from the data-rich and in-depth descriptions, six categories were extracted, including capable clinical professors, effective clinical environments, comprehensive planning, educational management, comprehensive and preventive educational rules and regulations, and efforts to improve educational processes (Table 1).

Capable Clinical Professors

According to the participants' views, the capability of professors is one of the most important categories in desirable clinical education because they carry the main burden of education. In this regard, several statements pointed to this issue such as:

"Professors should be proficient in up-to-date sciences and share their experiences with resident s. Professors should be updated and proficient in science and pay attention to the rules, not relationships." (Participant 3)

"For the improvement of the education system, it might be better to use professors who are ranked in the specialized board." (Participant 1)

Effective Clinical Environments

According to the findings of the present study, in addition to the capability of professors, space and clinical environment are also effective in the desirability of residency course education. Devoting adequate facilities to residency education in accordance with the science of the day can be very effective.

Table 1. Main Categories and Subcategories of Desirable Clinical Education from the Perspective of Residents

Main categories	Subcategories
Capable clinical professors	Employing full-time faculty members (without the office) Employing capable faculty members in medical education Employing responsible faculty members Employing elite faculty members Employing faculty members based on legal criteria and not existing relationships Empowering faculty members to use up-to-date knowledge Paying attention to the professor's academic level when hiring Increasing the work motivation of faculty members using economic resources Presence of faculty members in residents' night shifts Regular and active presence of faculty members in educational hospitals Effective and regular presence of faculty members in mornings and educational rounds Employing faculty members according to the number of residents in educational departments Professional and logical behaviors of faculty members with residents in education, especially while occurring errors Not delegating managerial duties to clinical faculty members Prioritizing the residents' education by faculty members
Effective clinical environments	Providing facilities and equipment required for educational groups based on up-to-date technology Utilizing new educational technologies by faculty members Utilizing educational facilities and equipment in suitable places Residents' education in using educational facilities and equipment Utilizing educational facilities and equipment tailored to the needs of resident s Allocating suitable rooms for educational classes and pavilions in the wards Utilizing the latest edition of educational resources and references Providing educational resources and references in print and electronically by the libraries of educational hospitals Providing online access to reliable electronic medical resources Increasing welfare facilities specific for educational resident s
Comprehensive planning	Distribution of educational guides (i.e., the introduction of field and university) upon students' arrival Development of residents' educational goals and programs by professors and notification to students Development of the educational program for residents considering educational logbooks Development of the educational program along with the operational plan and schedule (i.e., annual, monthly, weekly, and daily) Development of a program for residents' being on-call along with professors
Educational management	Delegating the necessary authority to residents to adjust their responsibilities and duties using a hierarchical system in residency education and patient treatment Futurism in residency education Reviewing the process and objectives of residents' education in accordance with the world's up-to-date resources at the appropriate time Adapting the educational programs with the world's top universities Adjusting the number of patients to be visited by the resident Determining residents' description of duties and responsibilities Time separation of residents' educational and medical activities Considering a light work schedule at the end of the residency course Considering a six-month theory course at the beginning of the residency course Upper-order supervision over the way of educating residency in medical universities Supervision of the officials of universities of medical sciences for the presence of professors in educational hospitals Providing educational programs to residents upon their arrival
Comprehensive and preventive educational rules and regulations	Improving the quality of educational rounds based on the developed bylaws and instructions Selecting the topics of rounds by educational resident s Professional and logical behaviors of professors in educational rounds Holding rounds for educational purposes and not therapeutic purposes Management of educational rounds by professors Holding regular morning reports Holding morning reports based on the existing bylaws and instructions Improving the educational quality of morning reports Management of morning reports by professors Assuring the professors of raising real cases by resident s Establishing specialized educational clinics
Efforts to improve educational processes	Holding theory classes in educating some materials according to the needs of the educational department Appropriate and operational planning in holding theory classes Holding theory classes before practical education according to the needs of the educational department Using appropriate evaluation methods in clinical education Educating residents according to the educational goals of educational programs Prioritizing residents' education and considering treatment to be the next priority Lack of education higher than the scientific level of resident s Allocating enough time to residents' education Using residents as hospital teachers to teach lower-level students Prioritizing professors to residents' practical and specialized education Emphasizing evidence-based education in residency education

The participants also pointed to this issue with several comments such as:

"We have good educational facilities; it is not a matter of facilities; however, our main problem is the proper use of educational facilities in hospitals. Some experienced professors do not know how to use these facilities properly

or do not care about it at all and continue their traditional training." (Participant 11)

"In terms of the education system, I think we are stagnating. I respect professors; however, here, the education using educational facilities is their last priority." (Participant 17)

Comprehensive Planning

Comprehensive planning refers to the existence of a pre-defined program in residency education. This general issue was also considered in the present study by the participants.

"There should be a written plan for each year of residency. For example, what a first-year resident needs to learn should be clear. Each year, there should be a specific educational protocol." (Participant 7)

"There should be a program for residents so that the resident is primarily targeted. They should state what kind of resident they want to train ... medical or educational? Then, they tell us what our resident is now and what is not. Afterward, they should plan for education according to the facts and looking to the future." (Participant 9).

Educational Management

In this area, the participants mentioned that the issue of residency education in the educational policy-making of the Ministry of Health, special attention in the form of adjusting residents' duties and responsibilities, continuous reviewing of educational programs based on the science of the day, and developing more regulatory mechanisms in residency course education should be considered.

"I wish the curricula of our field would be updated and proposed based on the curricula of the world's top universities." (Participant 5)

"The supervision of university officials over the residency course is very low; everything is up to the professors and departments ... Sometimes we need an upper-order individual to oversee the way we are educated and how we are treated." (Participant 16).

Comprehensive and Preventive Educational Rules and Regulations

According to the participants in the present study, educational rules and regulations should be considered equally for all educational groups. The rules related to education and evaluation should be applied uniformly and appropriately to all groups.

For example: "In my opinion, these frameworks (i.e., responsibilities) should not be written by a group of first-year, second-year, third-year, or fourth-year residents, graduates, resident s, stagers, and professors but to be written and collected by an impartial individual…; unfortunately, we see a new rule every day." (Participant 11)

"We have some rules for educating the residency course not being imposed in groups, and everyone looks at them and applies them as they like. Adherence to educational rules is low in some cases." (Participant 12)

"I do not know if it is the same in all universities ... Why is it not clear how much we have to be on-call? Why do we have to work such long hours? To God, we hurt both ourselves and the patient ... Sometimes we can no longer work properly." (Participant 13).

Efforts to Improve Educational Processes

One of the most important educational contexts in the residency course is the use of morning reports, clinical rounds, and grand rounds, which should be effectively planned and implemented. The theory classes of the residency course should be held before the practical classes in the wards, and the evaluation process in the wards should be planned in a written and specific way.

"In many morning reports and rounds, there is no proper and professional treatment and behavior. Professors treat us far from the scientific and up-to-date routines of the world." (Participant 10)

"Of course, education has greatly diminished ... If we have a chance and there is a hospitalized case, we will be able to learn something, and on the other hand we are responsible for educating another group. It would be better if these procedures were corrected." (Participant 8).

Discussion

Regarding the opinions of residents regarding the desirable clinical education, the role of professors was emphasized. In this regard, clinical professors should first be proud of their profession and increase their knowledge in their field and their theoretical and practical knowledge regarding new teaching methods. An influential clinical professor should have a clear perception of the components of the residents' educational program. Residents should also consider the professor-student relationship in their communication. They should also seek information and understand the standards of the medical profession and what is expected of them. Those involved in education should consider that they are responsible for the efficiency of a clinical team and should play a guiding role in the progress of the medical team (26).

The results of the present study showed different dimensions regarding desirable education from the perspective of residents. "Capable clinical professors" was one of the most important issues raised by residents for desirable education. This issue was raised by all the participants so that they considered this issue more important than other issues and suggested the important role of faculty members as an integral part of desirable education. This finding was consistent with the results of Shaterjalali et al.'s study, declaring based on Delphi's study that the teacher and the quality of his/her performance was the most important component in promoting clinical education (27).

In another study, Esteghamati et al. suggested the hidden curriculum as the most important component of education from the residents' perspective; nevertheless, in this curriculum, the role and performance of a capable clinical professor are prominent in various educational

aspects (28). Some of the most important cases raised by students on this issue are employing full-time faculty members who are literally always available, employing faculty members in proportion to the number of residents in educational departments, professional and logical behaviors of faculty members with residents in education, especially while occurring errors, and not delegating managerial duties to clinical faculty members.

Numerous studies have confirmed the findings of the present study and expressed the characteristics of a capable clinical professor. In Adhami et al.'s study conducted based on the opinions of the residents of medical specialty at Kerman University of Medical Sciences, the highest scores among the studied domains were assigned to the practical skills and ethics of clinical professors, and the lowest score was allocated to teaching methods (i.e., theoretical and practical). Although professors' practical skills are at a high level from the residents' point of view, the teaching methods of clinical education are at the lowest level. In addition, among the options available in the area of teaching methods, the use of different teaching methods (e.g., group work and problem-solving methods) gained the lowest score (29).

The results of Abedini et al.'s study showed eloquence, receptivity and kindness, and mastery of the subject as the most important characteristics of a good academic professor. Receptivity and kindness for a teacher mean accepting the learner with emotion, intimacy, and good intentions and creating an open environment, along with sincere and complete cooperation in the heart of the class, leading to providing the initiative for learners according to their ability and capacity and showing them the means and ways of progress (30).

In another study, mastery of the curriculum materials was mentioned as an expected criterion (30), which is consistent with some results of the present study emphasizing the empowerment of faculty members in utilizing the up-to-date knowledge and considering the academic level of a professor when hiring. This finding means that a faculty member should have complete mastery and expertise in the materials he/she teaches. Other criteria include regular and active participation in educational programs, seriousness, interest, commitment to education and teaching, and monitoring the proper performance of the student's practical tasks (31). In Navabi et al.'s study, the criteria of a capable teacher included eloquence, mastery of the subject of teaching, appropriate accent and voice, timely attendance at the classroom, and use of teaching aids at the right time in the right way (32).

In line with the results of Boor et al.'s study (33), the characteristics of a capable professor based on the perception of residents were specified in four general categories. The first category involved personal characteristics, including commitment, supportiveness, honesty and rectitude, credibility, high receptivity of criticism and ideas of others, and his/her charismatic personality. The second category was related to professors' proficiency, including characteristics, such as expertise, being a role model, and having up-to-date knowledge. The third category included specifications, such as teaching methods and tutorship. In the third category, the teacher should be able to distinguish between his/her medical role and teacher role and facilitate education. The last category involved professors' supervisory roles, such as being approach-oriented, performing various activities in addition to medicine, including research, and as a coach alongside the students, not as a person who humiliates them (33).

Another finding of the present study was an effective clinical environment as one of the features of desirable education. The implementation of educational processes in a standard and appropriate manner is one of the most important issues, according to the professional residents' views with a special role and importance in desirable education. The implementation of morning reports, educational rounds, and educational grand rounds according to the existing standards can play an effective role in improving residents' specialized education. These findings are consistent with the results of van Vendeloo et al.'s study; according to the opinions of the studied residents in the aforementioned study, the learning environment is a determinant in professional activity and learning (34).

Since these skills are effective and teachable, instructors can help students progress by teaching these skills and, as facilitators, play a prominent role in empowering learners in effective and efficient learning (35). From the perspective of residents, comprehensive planning is to perform precise and executive planning before implementing any educational program and being able to provide them with a specific path and reduce their confusion and worries. This is another important aspect raised in desirable and effective education. Some plans include the distribution of educational guides (i.e., the introduction of the field and university) upon students' arrival, development of residents' educational goals and programs by professors and notification to students, and development of the educational program, along with the operational plan and schedule (i.e., annual, monthly, weekly, and daily).

As the evidence shows, the foundation of education is educational planning (36). Effective educational management and leading an effective educational program require correct and appropriate management. Given the importance of residents' education to promote community health, effective educational management can play a critical role in improving the shortcomings of educational programs. The importance of this issue is evident in expressing the views of residents on desirable education.

Another result of the present study included comprehensive and preventive educational rules and regulations, which are of great importance. Education is the creation of an environment in which employees can learn behaviors, information, skills, abilities, and tendencies related to their occupation. The implementation of educational programs based on the framework of

educational rules and regulations leads to increasing the quality of education in the residency course. Furthermore, the adherence to rules and regulations during education results in the stability and uniformity of such educational programs, including updating the set of educational rules and regulations for residents, not frequently changing the approved rules and regulations, notifying the educational rules and regulations to the residents upon arrival, and following the educational rules and regulations in dealing with delinquent students. The results of this part of the study confirm the findings of Bigzadeh et al.'s systematic review on examining the challenges of clinical education in Iran. Bigzadeh et al. pointed out the managerial challenges and the lack of a comprehensive educational program in Iranian clinical education (37).

In another part of the findings of the present study, the dimension of "efforts to improve educational processes" was mentioned. For example, the regular and active presence of faculty members in educational hospitals and the effective and regular presence of faculty members in the mornings and educational rounds lead to promoting residency education and using educational facilities and equipment appropriately. From the perspective of residents, not only the provision of these facilities is important, but also the correct and optimal use of them can play an effective role in the improvement of residency educational processes.

Conclusion

The results of the present study can help find ways to increase the awareness of clinical professors regarding the importance of their work to achieve high-quality residency education. On the other hand, it is suggested to examine the views of clinical professors on desirable clinical education so that they can illuminate the path, and awareness is achieved from their desires and expectations to create a desirable clinical environment. In addition to strengthening the quality of patient care services, promoting the educational quality of residency courses will lead to the improvement of the educational quality of medical students in the residency courses, and ultimately, result in the graduation of capable and expert physicians.

Strengths and Limitations

One of the strengths of this study is the expression of demands and mental ideals of residents for effective clinical education and, finally, the provision of effective health services. The unwillingness of residents to participate in the project is the limitations of the current study.

Supplementary Material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: The authors would like to express their gratitude to Hadiseh Alimoradi and Dr. Batool Tirgari for collaboration with the research team in performing this study.

Conflict of Interest: There are no conflicts of interest.

Ethical Approvals: Ethical approvement of this study by the National Center for Strategic Research in Medical Education (NASR) with the code number 960504.

Financial support: The entire project was financially supported by the National Center for Strategic Research in Medical Education (NASR).

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Strides Dev Med Educ. 2021 December; 18(1): e1070 doi 10.22062/sdme.2021.196387.1070

Research Article

Effect of a Short Training Course on Empathy level in Medical Students: A Quasi-Experimental Study

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Received: 2021 July 05
Revised: 2021 October 30
Accepted: 2021 November 10
Published online: 2021 December 08

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Citation:
Shakurnia AH, Maniati M, Khajeali N, Barani M. Effect of a Short training course on Empathy level in Medical Students: A Quasi-Experimental Study. Strides Dev Med Educ. 2021 December; 18(1): e1070. doi: 10.22062/sdme.2021.196387.1070

Abstract

Background: Empathy is an important component of effective communication of a patient-practitioner relationship. Medical students are expected to know this ability as part of their education.

Objectives: This study aimed to assess the effect of a short-training course on the empathy levels of medical students.

Methods: This is a quasi-experimental study conducted on eighty second-year medical students in Ahvaz Jundishapur University of Medical Sciences (AJUMS), Iran, 2019. The intervention comprised of a lecture-based short training course, which was taught by a psychiatrist and was held in two sessions (Two hours each) for two consecutive weeks. Empathy was assessed using the Jefferson Scale of Empathy-Student version (JSE) before and after the intervention. Students with empathy scores higher than average were considered high empathy group, and those with scores lower than average as low empathy group. Data were analyzed using paired T-tests through SPSS software, version 16.

Results: The mean JSE score was 99.66±13.4 and 101.62 ± 16.37, before and after the -intervention, respectively. However, despite the score increased, the difference was not statistically significant (p = 0.054). Nevertheless, the empathy scores of high-empathy students significantly increased after the -intervention (110.49 Vs 114.15, p=0.002). The empathy level also showed a significant enhancement in female students after training (p=0.006).

Conclusion: This study shows that a short training course is somewhat effective in developing medical student empathy. The findings suggest a need for revision of content and implementation of this course training into the existing medical curriculum.

Keywords: Empathy, Communication, Social Skills, Training Programs, Medical Students, Medical Education

Background

Empathy is defined as the ability to understand and share the feelings of another. In medicine, it can be simply described as an appropriate understanding of the patient. (1) Empathy is considered a main element of professionalism in medicine. When patients sense empathy from their physician, they are more concordant with treatment and more likely to get better health outcomes. The empathy communication skill not only is a key element in successful physician-patient interactions but also will ensure the safety of the physician from burnout. (2)

For decades, clinical empathy has been considered extremely important for physicians in the western world. It is commonly recognized as a necessary trait for providing effective patient care. Physicians' empathy is an important skill for health professionals, and the teaching and learning of this skill should not be neglected in medical education. However, research indicates that the medical students' empathy is often stunted during training, and our understanding of how empathy is learned during medical education is still limited. (3-5)

Empathy skill is a quality that is either already present in medical students or learned by them during medical education courses. Overall, health profession degrees devote less curricular time to the development of interpersonal skills. Previous studies point to the steady decline of empathy in medical students during medical training, and one common criticism against physicians is that they often lack empathy skills, that they are too detached, and that their approach to patient care is dispassionate. (6)

According to international evidence, many students have a limited ability to communicate empathetically during clinical experiences. Some researchers have cited insufficient student time, busy schedules, and inadequate education as the main causes of students' lack of empathy skills. (7, 8) While studies have shown that the proper application of empathy skills not only does not bring the mentioned problems but also many benefits such as early detection of diseases, problem-solving, economic cost-effectiveness, and no need for emotional effort.

Since its inception, different universities have been investigating empathy along with effective physician-patient communication and have produced curricula that focus on this issue. (9) Unfortunately, the medical education curriculum in Iran does not have a share in the training of empathy skills, and if there is any attempt to address this, it is most likely to be in the form of a medical ethics course of about a few hours of communication skills training, which is inappropriate in terms of the credit and time allocated. Moreover, little, if any, medical curricular time is specifically devoted to the enhancement of empathy in Iran's medical education system.

Considering that empathy is the main component of communication between physicians and patients, and since at our university, empathy training is provided to pre-clinical medical students as part of a communication skills course, the present study aimed to evaluate this pedagogic method to see whether it might positively improve student empathy skills. It should be noted that lectures with group discussions can be effective in changing students' knowledge and attitudes, and teamwork on empathy can increase students' empathy skills. (1, 8) This is because concerns have been raised about whether this instructional method is sufficient to promote truly empathic medical students and whether it can significantly improve medical students' empathy skills. Thus, this study investigated the effectiveness of the short training course in terms of changes in student empathy scores in Ahvaz Jundishapur University of Medical Sciences. The results of this study will help policymakers in their efficient planning of training courses to promote the empathy skills of physicians in future.

Objectives

This study aimed to assess the effect of a lecture-based short training course on the empathy levels of medical students.

Methods

This is a quasi-experimental study conducted on medical students in Ahvaz Jundishapur University of Medical Sciences (AJUMS), Iran. The study population consisted of all second-year medical students (n = 94) who enrolled at the beginning of the 2019 academic year at School of Medicine.

In Iran, training courses are designed and implemented to develop the professional skills of medical students. These courses were offered for medical students in the pre-medical phase in the curriculum, which aimed to develop students' professional competencies. One of the professional training courses that were held for medical students was the empathy communication course.

Empathy is a complex issue, and it has not been specified in medical education research. In this course, the conceptual framework of empathy was used, which includes cognitive and emotional processes, the definition of empathy skills, the difference between empathy and sympathy, empathy techniques, and barriers to empathy. This course was taught by a psychiatrist. Indeed, this course was implemented to introduce with empathy concept and help medical students develop general competencies for empathy skills, which formed the basis of clinical empathy development. The course was designed using a lecture-based learning approach to develop student empathy. These topics were offered through a short lecture with questions and answers, discussion and teamwork under the supervision of the instructor. Students were introduced to the empathy concept in the course; lectures were given on empathy and some communication skills, which are considered a key component of empathy. At the end of the course their teamwork and what they learned about empathy from the conversation with each other.

Students' empathy levels were assessed using the student version of the Jefferson Scale of Empathy (JSE) to evaluate the impact of student learning with the short training course. This scale, formerly developed by Hojat et al. to assess empathy among medical students, physicians, and health professionals, has been shown to have acceptable validity and reliability. (10) This questionnaire has been reported valid and reliable in many studies (11, 12) and has been widely used in medical education research (13). It is a 20-item instrument using a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The score interval ranges from 20 to 140, with higher scores indicating higher levels of empathy. This instrument has three factors: perspective-taking (10 items), compassionate care (8 items), and standing in the patient's shoe (Two items).

The Persian version of JSE used in this study had been translated and validated by Rahimi-Madise et al. (14) The Cronbach's alpha coefficient for the entire scale, perspective-taking, compassionate care, and standing in the patient's shoe components were 0.74, 0.73, 0.71, and 0.51, respectively. In our study, the internal consistency of the JSE was measured using Cronbach's alpha, coefficient which was 0.84 for the whole instrument.

Before the training course, the needs assessment form, which was held in separate meetings with experienced professors in the field of psychiatry and medical ethics, as well as several students, collected their views on educational needs by brainstorming method. The educational content was planned based on the comments obtained.

At the beginning of the first week of the semester, the students participated in the empathy training course, which was held in two sessions (Two hours each) for two consecutive weeks. The educational pattern used in the training course was according to the educational package approved by the Ministry of Health. It included life skills, self-awareness, and empathy communication skills, which were matched based on the training received by the researcher in this regard and concerning the situation and needs of the student's internship. Finally, at the end of the training, students were allowed to discuss with the instructor. In addition, each session ended with a group discussion on the topics of that session. Activities were based on work in small groups and group presentations. Participants examined the medical definitions of empathy and the semantics of empathy versus other terms, such as sympathy, affinity, and caring. In this study, student empathy was measured pre-intervention in the first week of the course as a baseline and the measurement was repeated at the end of the course in a pre-and post-training format. In evaluating the training course to measure the level of skills, self-assessment is through students. To comply with the ethical points, according to the Helsinki Declaration, informed consent was taken from the students before the start of the training course, and if someone did not want to continue attending the course, they could leave the study.

After obtaining the ethical approval from the Ethics Committee of AJUMS, and coordinating with the School of Medicine, the researcher distributed the questionnaires among subjects. Students were invited to participate voluntarily. Informed written consent was obtained from all the medical students, and they were asked to fill the questionnaires honestly. The questionnaires were anonymous, and the subjects were assured that their information was confidential. The completed questionnaires were coded with a unique identifier, cataloged, and stored digitally in an encoded archive.

The data were entered into the Statistical Package of Social Sciences v.18.0 (SPSS Inc., Chicago, IL), and adequate statistical analysis was conducted. Mean and standard deviation (SD) was calculated for continuous variables, while percentages were calculated for categorical variables. To analyze the data more accurately, the students were divided into two groups based upon the pre-test empathy score (i.e., baseline empathy scores before training) using the median score. Accordingly, students with empathy scores higher than average were considered high empathy group and those with scores lower than average as low empathy group. Paired-samples T-tests were used to test the significant difference in the JSP scores before and after training. The level of statistical significance was set at $p<0.05$.

Results

Of the 94 medical students who participated in the training course, 80 students completed the JSE questionnaires before and after the training course (response rate 85.1%). The mean age of students was 21.2±1.3 years; 38(47.5%) were male, and 42(52.5%) were female.

The mean JSP score was 99.66 ± 13.47, with a minimum of 69 and maximum of 133 before the course. This score was 101.62±16.37, with a minimum of 70 and maximum of 134 after the training course. Despite the increase in the score after the training course, the difference was not statistically significant (t = 1.96, p = 0.054). Table one shows the medical students' total score of empathy and its subscales pre-and post-training.

Table1. The comparison of empathy scores and its three subscales pre- and post-training

Items	Pre-training Mean (SD)	Post-training Mean (SD)	t	p
Empathy	99.66 (13.47)	101.62 (16.37)	-1.958	0.054
Perspective-taking	52.73 (7.35)	53.43 (8.05)	-0.775	0.441
compassionate care	38.56 (7.97)	39.3 5(9.33)	-0.900	0.371
Standing in the patient's shoe	8.51 (2.34)	9.05 (2.11)	-1.870	0.065

Table 2. Comparison of pre- and post-training empathy scores for high- and low-empathy groups

Items		Pre-training Mean (SD)	Post-training Mean (SD)	t	p
Lower empathy group	Empathy	88.3 (7.1)	88.5 (9.8)	0.108	0.91
	Perspective-taking	47.9 (5.6)	48.2 (5.5)	0.185	0.85
	compassionate care	32.7 (6.7)	33.1 (8.1)	0.239	0.81
	Standing in the patient's shoe	7.6 (2.3)	8.1 (1.9)	1.04	0.30
Higher empathy group	Empathy	110.5 (8.1)	114.1 (10.4)	3.29	0.002
	Perspective-taking	57.3 (5.7)	58.4 (6.8)	0.945	0.35
	compassionate care	44.1 (4.2)	45.3 (5.9)	1.50	0.14
	Standing in the patient's shoe	9.3 (2.2)	10 (1.8)	1.54	0.13

A comparison of mean scores of empathy levels is shown in Table two. Students with higher empathy in the pre-test improved significantly in their empathy scores over the semester (t = 3.29, p = 0.002). However, there was no change in empathy scores in the empathy level in the lower empathy group (t = 0.108, p = 0.91).

A comparison of empathy scores by gender revealed that empathy scores significantly increased in female students after training course (pre-and post-training 102.76 Vs 106.64; p=0.006), but had no change for male students (pre-and post-training 96.23 Vs 96.08; p=0.913).

Discussion

There is a consensus today that empathy, as a vital element in the physician-patient relationship, is one of the important topics in medical education. (15) Unfortunately, the medical education curriculum in Iran does not involve any empathy training, and if there are any efforts to address this, they are more likely to be in form of medical ethics courses involving two to four hours of empathy training, which is inappropriate in terms of the credits and time allocated.

The present study was conducted to evaluate the effect of short training communication skills on empathy levels of second-year medical students. The results showed that the average score of empathy along with all its dimensions was not statistically significant after participation in the training course. Possibly, the short duration of the training and the use of passive methods led to this result, which needs to be examined more closely.

Studies to date are contradictory regarding possible changes in empathy skills in response to the training activity. Some researchers speculate that empathy skills can be improved through educational strategies, but others believe it is a personality trait that cannot be taught. (16) Our findings did not show a significant increase in empathy skills after the training activity. Of course, it should be stated that we would have probably come up with different results if we had measured the level of empathy skills in this group of students once again a few months after the training. Furthermore, this is one of the limitations of this study, which is recommended to be considered in future studies. Similar to this study, the result of Delprete showed that the level of empathy of medical students did not change significantly one week after the empathy training course. (17)

In addition, it is possible that exposure to the cognitive method of instruction did not appear to improve empathy skills. In fact, cognitive method training does not seem to be the best method to teach professionalism in medicine. According to the literature, interactive training methods such as role modeling and mentoring guided by faculty are more effective methods in developing professionalism. (3) Therefore, one reason for non-effectiveness of our training course in improving empathy skills in medical students can be the fact that face-to-face encounters and interactive techniques are the necessary components in training empathy. This is because empathy is a quality that largely depends on interpersonal engagement. (2)

Another possible reason for our results is that we assessed the empathy level of students immediately after the workshop and did not attempt a long-term follow-up of these students after training. Therefore, it must be acknowledged that at least in the short-term timeframe of this study, we should not expect any significant change in empathy levels and that alterations in a person's sense of empathy are developed and solidified over periods of months and years, rather than weeks.

Although research has not specifically examined the impact of such short courses in medical schools on improving the empathy skills of medical students in Iran, there are many reports from different universities that training courses have improved students' empathy. (3, 7) However, the difference lies in the longer duration of the courses reported in these studies and the more active methods adopted such as role-playing and establishing relationships with the patient. On the other hand, there are also studies reporting that conducting empathy training did not improve students' empathy skills, which is consistent with the findings of the present study. (17) Researchers believe that learning can be significantly facilitated if the four elements of thinking, feeling, observation, and action are involved simultaneously in the learning process. (1, 8) Naturally, using appropriate methods in the implementation of training courses can increase the efficiency and effectiveness of these training courses. Numerous studies have suggested communication skills training courses in the medical education curriculum for medical students and have found interventional studies in this area to be essential. (7, 18) However, few, if any, effective and specific methods have so far been proposed for these training.

Findings of the study showed that empathy scores in the high empathy group increased significantly after the intervention, while the scores of the low empathy group did not show significant change. Probably the topic of empathy was more important and appealing to the high empathy group, so it could be argued that a greater interest in the content of the empathy training led to a greater impact on education and ultimately a significant increase in the students' empathy scores. It is possible that the group with higher empathy scores may be more motivated to learn empathy and communication skills compared with the other group. More careful studies will shed more clarity on this assumption.

We found empathy scores of female students were higher compared with male students, and the empathy scores of female students significantly increased after the training course. In most studies, female students' empathy scores have been reported to be higher than those of male students, which is in agreement with the results of the present study. (19) Some authors speculate that this difference may be due to females' greater capacity for empathetic communication, for providing support that is more emotional rather than rational, and for spending more time with their patients compared with their male

counterparts. Females have been reported to be more receptive to emotional signals, spend more time with patients, and offer more preventive and patient-oriented care and more emotional support, whereas men are more likely to offer rational solutions. (20) Therefore, these traits could be argued to have led to developing empathy skills in female students after participating in the training course.

It is important to note that this study aimed to investigate the effect of a short-term and limited training course on enhancing the level of empathy of medical students, but due to using non-active teaching methods and assessing the level of student empathy immediately after the workshop, we were not able to show the positive effect of our training on improving students' empathy. Possibly, if we had used active teaching methods and measured students' levels of empathy a few months after the training course, different results would be obtained.

Literature establishes that communication and empathy skills are a competency requiring formal teaching. (21) Evaluation of performance using multiple evaluators and multiple methods is of paramount importance. Many strategies that can be used to improve professionalism in the educational environment are available, but an optimum combination of methods is yet to be found. (22, 23) Empathy is a teachable communicative skill; however, there are many problems related to communication training. These problems are linked to educational courses, teaching methods, and the gap between theory and practice. (16) It should be noted that empathic skills cannot be improved overnight. They can only be developed in line with increased life experiences and first-hand interactions.

This study has limitations. This was conducted among medical students of only one medical college. Therefore, the results cannot necessarily be generalized. Another possible limitation of the study is the absence of a control group. In addition, we did not attempt a long-term follow-up of these students as they progressed through empathy training. Despite these limitations, our study presents the way for developing training courses to increase empathy levels in medical students.

Conclusions

Even though the implementation of this training course led to the enhancement of empathy levels and a change in attitude in high empathy groups and female students, it failed to improve the overall empathy skills among all medical students. In disagreement with other studies showing that training courses, similar to those used in this study, should have a significant impact on empathy, we did not draw such a conclusion in our study and believe that time constraints, the training methods, and longitudinal follow-up also play an important role in the success of empathy promotion courses. Therefore, further studies are needed to evaluate the impact of these factors on improving empathy in medical students and to explore alternative measures and activities to enhance the curriculum of the medical school to educate more effective and compassionate physicians. The findings suggest a need for revision of content and implementation of this course training into the existing medical curriculum.

Acknowledgments

The authors would like to thank all the students who participated in this study.

Conflict of Interests: The authors declare no conflict of interests.

Ethical Approvals: This study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (IR.AJUMS.REC.1398.870).

Funding/Support: None.

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Strides Dev Med Educ. 2021 December; 18(1):e1038 doi 10.22062/sdme.2021.195607.1038

Research Article

The Comparative Study of Accreditation Standards of Medical Sciences Educational Programs in Iran and Some Other Countries of the World

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Received: 2021 January 20
Revised: 2021 July 10
Accepted: 2021 July 11
Published online: 2021 December 11

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Citation:
Sharifi P, Manzari Tavakoli AR, Kamyabi M, Zeinaddiny Meymand Z. The Comparative Study of Accreditation Standards of Medical Sciences Educational Programs in Iran and Some Other Countries of the World. Strides Dev Med Educ. 2021 December; 18(1):e1038. doi: 10.22062/sdme.2021.195607.1038

Abstract

Background: Program accreditation is a quality assurance educational program implemented in many countries.

Objectives: This study aimed to compare program accreditation standards of the Ministry of Health of Iran with several selected countries and to extract program accreditation standards to benefit from the experiences of other countries.

Methods: The present descriptive-comparative study was performed in 2020. The information required for the study was collected by searching on the Internet on valid websites of accreditation institutes of medical sciences and higher education in Iran and other countries. Among them, the World Federation for Medical Education (WFME) program accreditation standards and eight countries from different continents were compared with Iran. The research was conducted using the Beredy model.

Results: The results showed that the standards in the studied programs were significantly different both quantitatively and qualitatively. It was also found that the accreditation standards of educational programs in Iran, Kazakhstan, and the WFME were consistent regarding the areas' number and titles, but there was a difference in the number and titles of the criteria and indicators.

Conclusion: Considering the vital role of graduates of medical sciences in promoting community health and also given the current and particular situation and the global conflict with COVID-19 epidemic, which has disrupted face-to-face education and evaluation at all educational levels, upgrading and improving the quality of medical education programs seems necessary more than ever. Therefore, to evaluate and promote the quality of these programs, it is suggested to codify accreditation standards of educational programs locally and according to the current conditions.

Keywords: Accreditation, Educational Program, Comparative Study, Beredy Model

Background

Universities are considered the most important educational institutions, centers for science and culture production and training specialists required by the country, and also centers for creating new knowledge and advancing the frontiers of science. The primary mission of universities includes education, research, and social services, of which the role of education is more critical due to its nature (1). Medical education is a part of the higher education system that deals with human life, and community health depends on the quality of education in these universities (2). Today, the disciplines of medical sciences are increasingly expanded. In addition to providing healthcare services, the universities of medical sciences have an essential mission to train capable and qualified individuals who have the knowledge, attitude, and skills required to maintain and promote the health of community members (3). Thus, educational systems must maintain their dynamism to coordinate with the advancement of knowledge and science. In doing so, continuous and permanent evaluation of the quality of the educational system and the improvement of different courses and programs is essential. Given the critical responsibility to maintain and promote community health, this necessity is especially more tangible in the professions

of medical sciences (4). Some countries have reduced this concern in the last two decades and tried to address it through continuous evaluation. Some of the efforts include implementing internal and external evaluation plans at the national level and establishing regional and international accreditation mechanisms (5). Global studies confirm that higher education institutions need a codified, scientific, and institutionalized evaluation system to evaluate the quality and accreditation of curricula (6). Numerous evaluation models have been considered to evaluate the quality of higher education. Among these models, the accreditation model has gained relatively universal acceptance and has been used almost as a model for specific evaluation of higher education in many countries and a large number of universities (7).

In recent years, accreditation has been proposed as one of the essential methods of quality assurance and promotion in medical sciences education in the country, and some measures have also been taken to establish accreditation structures in some parts of medical education (5). For example, in 2017, the Secretariat of the General Medical Education Council reviewed the national standards for accreditation of general medical education programs, which had been codified in 2007, and announced the country's universities of medical sciences (8). Also, to codify national accreditation standards of educational programs, the Secretariat of the Pharmacy and Specialized Education Council of the Ministry of Health made the draft standards of the general pharmacy course available to the country's universities of medical sciences to be considered by these universities; at present, the accreditation of the general doctoral course program in the country's pharmacy schools is underway (9). In most countries, however, there are independent institutions of educational program accreditation that act to codify and review the national standards for educational program accreditation; for example, the World Federation for Medical Education (WFME) in the United States recommends a set of global standards in basic medical education (10). The Academic Quality Assurance System (AQAS) is an independent organization recognized by the German Accreditation Council (GAC) since 2001 and is an informed body for the accreditation of higher education institutions and programs in Germany. The AQAS is also a vital member of the European Nations for Quality Assurance in Higher Education (ENQA) and is listed on the European Quality Assurance Register for Higher Education (EQAR) (11). By summarizing the definitions presented classically for accreditation, accreditation refers to granting a license or certification to an educational center that has met the pre-determined criteria based on the judgment of experts in the relevant field (12). According to the definition provided by the United States Council for Higher Education Accreditation (CHEA), accreditation is a process based on self-assessment and peer-assessment designed to ensure the quality of the institution or university educational course to improve the quality and accountability and determine whether the desired institution or program has met the standards published by the relevant accreditation organization and its mission and objectives or not (13).

Accreditation can be performed for an institution as a whole (institutional accreditation) or only includes accreditation courses under cover (specialized accreditation). If the unit to be evaluated in the accreditation system is an institution as a whole, the quality of the organization and its activities, including administrative affairs, budget, other resources and facilities, research affairs, educational facilities, and quality assurance mechanisms in that institution are evaluated, but if it is an educational course, the quality of the course is evaluated in a specific area (14). Program accreditation is a type of quality assurance performed in many countries and is usually associated with accountability and improving program quality (15). Program accreditation is typically used for programs, departments, or colleges that are part of the institution. Although the general frameworks of institutional and program accreditation are not much different, they are significantly different regarding implementation, criteria, and standards of judgment (16, 17).

In recent years, efforts have been made to develop national and local models for accreditation of educational programs in some medical sciences disciplines in Iran and other countries. The following items are some of these measures and studies.

In a study conducted to review and compare the standards and indicators of quality assurance and accreditation in higher education, Dameh (2011) analyzed the regional analysis and case studies of prominent accreditation experts. The author proposes the CIPOF (Context-Input-Process-Output- Feedback) accreditation model in this research, which has eight main areas (18). In another study conducted to propose a set of standards and indicators in quality assurance and accreditation, Hamalinen et al. (2004) also proposed a conceptual framework with five categories of standards (19). In a study conducted to determine the relative importance of the set of standards used by accreditation agencies worldwide, Van Xanten et al. (2012) concluded that there was a difference in the importance of some accreditation standards and some criteria were more important than others (20).

Blouin (2020), who identified new and effective accreditation indicators to determine the value and impact of accreditation, proposed eight program accreditation standards (21). In a study, Queto et al. (2006) compared the accreditation systems of medical education programs of the undergraduate course in nine developing countries (Argentina, India, Kenya, Malaysia, Mongolia, Nigeria, Pakistan, Philippines, and South Africa) with accreditation methods in the United States. The results of their study showed that accreditation systems in these countries existed with well-defined criteria, standards, and procedures and these systems were also similar to the accreditation systems of developed countries. The criteria of this study included in the areas of mission and objectives, educational programs, students, scientific/educational staff, educational resources, financial support and financial stability, the process of evaluation, monitoring, and improvement of curriculum, educational

management, executive and senior management, and leading planning strategies and activities (22). Allahdadian et al. (2008) conducted a study to propose appropriate national standards for nursing and midwifery based on international standards (a case study of master's course in nursing and midwifery). According to the results of their study, 28 standards (criteria) and 224 indicators in master's course were proposed as the final standard (23). In an effort to codify local standards for the accreditation of clinical nursing education, Naseri et al. (2010) conducted a study to codify accreditation standards for clinical nursing education in Iran based on international standards. The results of their study led to proposing 55 standards in five areas of faculty members and assistant clinical instructors, students, educational programs, clinical facilities, and teaching-learning activities for the accreditation of clinical nursing education in Iran (24). Aliyari et al. (2016) also conducted a study to codify and present a model for accreditation of the undergraduate course curriculum of nursing in medical universities first identified nine factors, 39 criteria, and 143 indicators and then, according to global experiences, characteristics, and the existing conditions in the country codified and localized their proposed model (6). Safdari and Meydani's research entitled "The Comparative Study of Healthcare Information Management Accreditation Standards in Canada, USA, and New Zealand" was conducted by a comparative method to be used as a model for reviewing the country's medical record standards under information management standards (25).

Considering that a coherent, consistent, and strict national quality assurance system makes the stakeholders in the higher education department sure that the standards are met (14) and also given the importance of accreditation programs in improving the quality of higher education, especially medical sciences education, this study aimed to compare the accreditation standards of undergraduate degree educational programs in the field of medical sciences using a comparative research method and benefit from the successful experiences of other countries. After comparing the similarities and differences, the final standards were extracted, and suggestions were provided for their application in Iran, and finally, took a step toward aligning national standards with international standards.

Objectives

This study aimed to compare program accreditation standards of the Ministry of Health of Iran with several selected countries and to extract program accreditation standards to benefit from the experiences of other countries.

Method

The present research is a descriptive-comparative cross-sectional study conducted in 2020. One of the research methods in reviewing and modernizing educational programs is conducting comparative studies. Comparative studies are a rational strategy for using the experiences of others (26). In definition, a comparative study is a practice in which two or more phenomena are put together, and their differences or similarities are analyzed. Comparative study leads educational program to create the ability to solve educational problems and difficulties and shows the set of factors and contexts effective in creating the successes and failures of educational systems (27-29). The Beredy model (1969) was used in the present study. This model is an absolute and abstract method among the methods of comparative studies that identifies four stages of description, interpretation, proximity, and comparison in comparative studies (30). In the description stage, research phenomena are prepared based on evidence and information, note-taking, and preparation of sufficient findings for review and critique in the next stage. The information is assessed and analyzed in the first step, i.e., in the interpretation stage. In the proximity stage, the information prepared in the previous stage is classified and put together to create a framework for comparing similarities and differences. In the comparison stage, the research problem is examined and compared according to the similarities and differences and answering the research questions (26). Based on this model; first, the required information about the latest accreditation standards of educational programs of medical sciences educational institutions extracted from related electronic sources, databases of organizations providing accreditation services in the world, as well as databases such as Springer, Web of Science, PubMed, Science Direct, Iranmedex, Magiran, Elsevier, Emerald, Ovid, Oxford, ProQuest, ISI web of Knowledge, MedLib, Irandoc, SID, Cochrane library, Scopus, ERIC, Embase, and search engines such as Google Scholar and Google and referring to the relevant internal authorities (standards for educational programs of the Ministry of Health, Treatment, and Medical Education) and reviewing the accreditation systems of world educational programs between 2004 and 2020 and using keywords such as "Program Accreditation", "Specialized Accreditation", "Assessment", "Criteria", "Degree", "Medical Sciences", "Standards", "Bachelor", "Quality Evaluation", and "Quality Assurance" was obtained and studied.

Inclusion and exclusion criteria of studies in this research were:

Inclusion Criteria

• Standards of program accreditation for the undergraduate degree in medical sciences (clinical and nonclinical) and higher education

• Articles in English, valid Persian articles, documents

Exclusion Criteria

• Institutional accreditation standards, hospital accreditation standards, postgraduate accreditation standards

• Gray literature, electronic and printed information not endorsed by reputable publications

• Reports, ideas, editorials, and views

In this study, the accreditation standards of educational programs in the field of medical sciences based on searching on the databases mentioned above

were used. To compare the accreditation standards of the world countries (all five continents); first, the countries that had a codified and national plan for the accreditation of undergraduate degree educational programs in all disciplines of medical sciences were selected. The first preference was the bachelor's course in all disciplines of medical sciences, and in the absence of a program in this course, the use of nursing accreditation standards, the preliminary stage (first 4 years) of general medicine (basic medical education (BME), primary medical programs (PMP)) in countries such as Iran, Malaysia, Kazakhstan, and Australia, respectively. In the next step, in the absence of a specific accreditation program for medical sciences, accreditation standards that were generally codified for higher education in an undergraduate degree (such as the European Union and the United Arab Emirates) were used.

In the next stage, experts in the areas of institutional and program accreditation with specializations in curriculum planning, educational management, educational psychology, and medical education identified, reviewed, and analyzed the accreditation standards of various educational programs. The information was then tabulated for each accreditation standard so that the name of each university was placed in the rows of the tables. In this way, by ordering the data, similarities and differences were determined, and practical and specific suggestions and solutions were presented. The present study was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1399.455).

Results

The findings of this study were the result of reviewing accreditation standards of nursing in the United States, Kazakhstan, and Caribbean Community, Australian and Malaysian medical introductory standards, and higher education in the United Arab Emirates, South Africa, and the European Union. In Iran, national standards for accreditation of undergraduate degree educational programs have not yet been announced. Therefore, for comparison, national standards of general medicine were used as reference standards in Iran. Also, given that the WFME standards are a valid and international reference and countries around the world have used these standards to improve the quality of medical education to develop and design accreditation standards of educational programs in the field of medical sciences, it is recognized as a valid reference for comparing standards (10).

The study results on each of the accreditation systems of the studied educational programs are presented separately in Tables 1-11. It is worth noting that some of the studied countries did not have information in some areas; therefore, their names are not mentioned in some tables.

According to Table 1 regarding 10 countries and the accreditation program studied by Iran, the WFME, the United States, Australia, and Kazakhstan have the mission and objectives area; of course, with a slight difference in the titles of the areas and also in the number of criteria and indicators, the number of criteria and indicators varies from 2 to 9 and 6 to 26, respectively.

According to the information presented in Tables 2, 3, and 4, three areas of the educational program, students, and educational resources were areas with which all 10 countries and the program under study had a complete agreement and were included in their accreditation program.

According to Table 5, the area of student evaluation has not been included in United States accreditation standards. This area is one of the criteria in the field of course evaluation in the United Arab Emirates, one of the criteria in the field of students in Caribbean Community, and one of the criteria in the field of continuous monitoring and periodic review in the European Union.

According to Table 6, the area of faculty members exists in all countries and programs under study, with

Table 1. Comparison of accreditation standards in the area of mission and objectives based on the studied countries

The Studied Countries		The First Area: Mission and Objectives
National Standards of General Medicine in Iran		Mission and objectives, including two criteria: 1- Mission and objectives and 2- Authority, which is evaluated by six indicators (8).
World Federation for Medical Education		Mission and results, including four criteria: 1- Mission, 2- Organizational autonomy and academic freedom, 3- Educational results, and 4- Participation in codifying mission results, which is evaluated by 26 indicators (10).
The United States		Mission and administrative competence, including these criteria: 1- Mission and philosophy, 2- Administrative competence, 3- Program policies, 4- Management organization, 5- Managers' competence, 6- Authorities and responsibilities, 7- Program budget, 8- Participation of stakeholders, and 9- Distance education, which is evaluated by 11 indicators (31).
Australia		Outcomes (results) of the program, including two criteria: 1- Objective and 2- The results of the medical program, which are evaluated by 7 indicators (32).
Eurasia	Kazakhstan	Mission and results, including four criteria: 1- Mission, 2- Organizational autonomy and academic freedom, 3- Educational results, and 4- Participation in the development of mission and results, which is evaluated by 14 indicators (33).
Caribbean Community		Organizational regulations, including four criteria: 1- Senior and executive management, 2- Vision, mission, values, and strategies, 3- Academic environment, and 4- Safe and positive environments, which is evaluated by 24 indicators (34).

Table 2. Comparison of accreditation standards in the area of educational program based on the studied countries

The Studied Countries		The Second Area: Educational Program
National Standards of General Medicine in Iran		An educational program, including four criteria: 1- Program framework, 2- Educational content, 3- Educational strategies, and 4- teaching-learning methods, which is evaluated by 20 indicators.
World Federation for Medical Education		An educational program, including eight criteria: 1- Program framework, 2- Scientific method, 3- Basic medical sciences, 4- Behavioral and social sciences, medical ethics, and spiritual rights, 5- Clinical sciences and skills, 6- Program structure, composition, and duration, 7- Program management, and 8- The relationship between medical practices and the health sector, which is evaluated by 40 indicators.
The United States (Nursing)		A curriculum, including the criteria: 1- Regulations, 2- Program design, 3- Program content, 4- Educational processes, 5- Healthcare areas, and 6- Evaluation methods, which is evaluated by 11 indicators.
Australia		A medical curriculum, including six criteria: 1- Duration of the medical program, 2- Curriculum content, 3- Curriculum design, 4- Curriculum description, 5- Local health, and 6- Choices opportunities for students to promote the breadth and variety of experiences, which is evaluated by 10 indicators.
Asia	The United Arab Emirates	Educational programs, including fourteen criteria: 1- Program planning and development, 2- Budgeting for programs, 3- Requirements for structuring and completing the program, 4- Framework of national competencies, 5- Postgraduate studies program, 6- General education, 7- Compensatory courses, 8- Internship or practical course, 9- Teaching methods, 10- Student evaluation, 11- Course presentation, 12- Course and program evaluation, 13- Program effectiveness, and 14- Content change of programs, which is evaluated by 85 indicators (35).
	Malaysia	Program development and presentation, including three criteria: 1- The statement of academic goals of the academic program and learning outcomes, 2- Program development: Process, content, structure, and teaching-learning methods, and 3- Program presentation, which is evaluated by 17 indicators (36).
Eurasia	Kazakhstan	The educational program, including eight criteria: 1- Program framework, 2- Scientific method, 3- Basic medical sciences, 4- Behavioral and social sciences, medical ethics, and spiritual rights, 5- Clinical sciences and skills, 6- Program structure, composition, and duration, 7- Program management, and 8- The relationship between medical measures and the health sector, which is evaluated by 25 indicators.
Caribbean Community		The educational programs, including six criteria: 1- Curriculum codification and management, 2- Clinical, educational program, 3- Education and evaluation, 4- Satellite campuses, online programs, and license issuing (geographically separated campuses, online and Franchise Programs), 5- Program evaluation and review, and 6- The program effectiveness, which is evaluated by 49 indicators.
South Africa		Program design includes seven criteria: 1- Communication with the institutional mission and planning, 2- Needs of students and other stakeholders, 3- Intellectual credibility, 4- Coherence, 5- Rhetoric, 6- Specifications and needs of professional and occupational education, and 7- Learning content development, which is evaluated by 14 indicators (15).
The European Union		Design and approval of programs, including eight criteria: 1- Designing under the general objectives of the program, organizational strategy, and with specific learning outcomes, 2- Participation of students and other stakeholders in program design, 3- Using the external experts and reference points, 4- Reflecting the goals of higher education in the Europe Council, 5- Uniform and regular student progress, 6- The student workload amount and volume, 7- The best placement structure, and 8- The formal process of organization approval, which does not have any specific titles (37).

Table 3. Comparison of accreditation standards of the area of students based on the studied countries

The Studied Countries		The Third Area: Students
National Standards of General Medicine in Iran		Students, including three criteria: 1- Student admission and selection, 2- Student counseling and support, and 3- Presence of student representatives, which is evaluated by 17 indicators.
World Federation for Medical Education		Students, including four criteria: 1- Student admission and selection policy, 2- Student recruitment rate, 3- Student counseling and support, and 4- Student representative, which is evaluated by 20 indicators.
The United States (Nursing)		Students, including four criteria: 1- Student policies, 2- Student support services, 3- Program general information, and 4- Student's educational background, which is evaluated by 12 indicators.
Australia		Students, including six criteria: 1- Student recruitment rate, 2- Admission and selection policy, 3- Student support, 4- Professionalism and readiness for practice, 5- Student representation, and 6- Payment of compensation and student insurance, which is evaluated by 15 indicators.
Asia	The United Arab Emirates	Students, including fifteen criteria: 1- Codified list (about the institute and its programs), 2- (How to) accept bachelor's degree, 3- (How to) accept postgraduate studies, 4- Admission and transfer, 5- Recognition of previous learning (RPL), 6- Registration and Academic background, 7- Academic status (full-time, part-time) of the student and number of credits, 8- Student support services, 9- Counseling services, 10- Activities and publications (articles, research, etc.), 11- Student behavior and academic honesty, 12- Student appeals and prosecution, 13- Student handbook, 14- Graduates, and 15- Feedback from students, which is evaluated by 95 indicators.
	Malaysia	Student selection and support services, including five criteria: 1- Student selection, 2- Transfer, 3- Student support services, 4- Student representation and participation, and 5- Graduates, which is evaluated by 20 indicators.
Eurasia	Kazakhstan	Students, including four criteria: 1- Student admission and selection policy, 2- Student recruitment rate, 3- Student counseling and support, and 4- Student representative, which is evaluated by 17 indicators.
Caribbean Community		Students, including six criteria: 1- Admission, 2- Transfer and guest students, 3- Student services, 4- Learning environment, 5- Student evaluation, and 6- Student representative, which is evaluated by 36 indicators.
South Africa		Student recruitment, admission, and selection, including seven criteria: 1- Employment, 2- Legal consequences, 3- Extensive access, 4- Fairness and impartiality, 5- Learning obligations, 6- Occupational needs, and 7- The program capacity to provide high-quality education, which is evaluated by 13 indicators.
The European Union		Student (admission, progress, recognition, and certification), including four criteria: 1- Academic achievement, 2- Admission policies, processes, and criteria, 3- Official recognition of higher education qualifications, and 4- Qualifications of graduates (indicators have been expressed in descriptive terms).

Table 4. Comparison of accreditation standards in the area of educational resources based on the studied countries

The Studied Countries		The Fourth Area: Educational Resources
National Standards of General Medicine in Iran		Educational resources, including six criteria: 1- Physical facilities, 2- Clinical education resources, 3- Information technology, 4- Research and scholarship, 5- Medical education proficiency, and 6- Educational exchanges, which are evaluated with 21 indicators.
World Federation for Medical Education		Educational resources, including six criteria: 1- Physical facilities, 2- Clinical education resources, 3- Information technology, 4- Medical research and scholarship, 5- Educational proficiency, and 6- Educational exchanges, which are evaluated with 29 indicators.
The United States (Nursing)		Resources, including three criteria: 1- Financial resources, 2- Physical resources, and 3- Learning and technology resources, which are evaluated with 4 indicators.
Australia		Learning environment, including four criteria: 1- Physical facilities, 2- Information resources and library services, 3- Clinical learning environment, and 4- Clinical supervision, which is evaluated by 12 indicators.
Asia	The United Arab Emirates	Learning resource center, including five criteria: 1- Facilities and infrastructures of the learning resource center, 2- Staff, 3- Activities, 4- Electronic and non-electronic complexes, and 5- Cooperation agreements, which is evaluated by 19 indicators.
	Malaysia	Educational resources, including four criteria: 1- physical facilities, 2- Research and development, 3- Financial resources, and 4- Educational specialization, which is evaluated by 12 indicators.
Eurasia	Kazakhstan	Educational resources, including six criteria: 1- Physical facilities, 2- Clinical education resources, 3- Information technology, 4- Medical research and scholarship, 5- Educational proficiency, and 6- Educational exchanges, which are evaluated with 26 indicators.
Caribbean Community		Educational resources, including three criteria: 1- Public facilities, 2- Finance, and 3- Information resources and library services, which are evaluated with nine indicators.
South Africa		Infrastructure and library resources, including six criteria: 1- Places, 2- Information technology and education infrastructures, 3- Size and extent of library resources, 4- Integration of library resources in the curriculum, 5- Management and maintenance of library resources, and 6- Library support and access to students, which is evaluated by 12 indicators.
The European Union		Student learning and support resources, including five criteria: 1- Physical resources, 2- Staff support (for students), 3- Planning and providing student learning and support resources, 4- Organizing activities and support facilities, and 5- The role of administrative and support staff (indicators have been expressed by descriptive terms).

Table 5. Comparison of accreditation standards in the area of student evaluation based on the studied countries

The Studied Countries		The Fifth Area: Student Evaluation
National Standards of General Medicine in Iran		Student evaluation, which includes no sub-area or criteria and is evaluated by 10 indicators.
World Federation for Medical Education		Area name: Student evaluation, including two criteria: 1- Evaluation methods and 2- The relationship between evaluation and learning, which is evaluated by 15 indicators.
Australia		Student learning evaluation, including four criteria: 1- Evaluation approach, 2- Evaluation methods, 3- Evaluation feedback, and 4- Evaluation quality, which is assessed by 11 indicators.
Asia	Malaysia	Student learning evaluation, including three criteria: 1- The relationship between evaluation and learning outcomes, 2- Evaluation methods, and 3- Student evaluation management, which is evaluated by 11 indicators.
Eurasia	Kazakhstan	Student evaluation, including two criteria: 1- Evaluation methods and 2- The relationship between evaluation and learning, which is evaluated by 13 indicators.
South Africa		Student evaluation policies and procedures, including seven criteria: 1- Internal evaluation, 2- Balance between internal and external evaluation, 3- Monitoring student progress, 4- Evaluation validity and reliability, 5- Recording the results, 6- Security, and 7- Recognition of prior learning (RPL), which is evaluated by 16 indicators.

the difference that in Australia, it is not an independent area but it is considered one of the criteria in the area of medical program provisions (Table 11).

According to Table 7 of the studied programs, only Iran, Australia, Kazakhstan, and the WFME have the area of course evaluation.

The information in Table 8 shows that the area of executive and senior management, except in the United States and the European Union, has been included in the rest of the programs under study. This area is one of the criteria for the area of medical provisions in Australia (Table 11).

The information in Table 9 indicates that the area of continuous review has been used by Iran, Malaysia, Kazakhstan, the European Union, and the WFME.

According to the information in Table 10, the area of teaching-learning has been used by Australia, South Africa, and the European Union. In Iran, it is a criterion in the area of the educational program. In the United States, it is one of the criteria in the area of curriculum and educational processes. In the United Arab Emirates, it is one of the

Table 6. Comparison of accreditation standards in the area of faculty members based on the studied countries

The Studied Countries		The Sixth Area: Faculty Members
National Standards of General Medicine in Iran		Faculty members, including two criteria: 1- Calling and recruiting faculty members and 2- Rank promotion and activities of faculty members, which are evaluated by 13 indicators.
World Federation for Medical Education		Faculty members, including two criteria: 1- Recruitment and employment policy and 2- Activities and progress of faculty members, which is evaluated by 12 indicators.
The United States (Nursing)		Faculty members and staff, including six criteria: 1- Competence and credibility of faculty members and staff, 2- Number of faculty members and staff, 3- Non-nursing faculty members, 4- Instructors, 5- Cooperation type of faculty members (full-time-part-time), and 6- Performance of faculty members, which is evaluated by 10 indicators.
Asia	The United Arab Emirates	Faculty members and professional staff, including 16 criteria: 1- Faculty members handbook, 2- Professional staff handbook, 3- Calling and terms of employment, 4- Academic degrees, 5- Faculty members of postgraduate studies, 6- Professional staff qualifications, 7- Faculty members workload, 8- Part-time faculty members, 9- Roles of faculty members, 10- Professional development, 11- Staff background, 12- Evaluation, 13- Behavioral regulations, 14- Disciplinary actions and consequences, 15- Complaint, and 16- Postgraduate studies assistants (the use of postgraduate students as assistants in teaching and education), which is evaluated by 65 indicators.
	Malaysia	Academic staff, including two criteria: 1- Recruitment and management and 2- Service and promotion, which is evaluated by 15 indicators.
Eurasia	Kazakhstan	Faculty members, including two criteria: 1- Recruitment and employment policy and 2- Activities and progress of faculty members, which is evaluated by 11 indicators.
Caribbean Community		Professors and staff, including three criteria: 1- Number, qualifications, and performance 2- Personnel policies, and 3- Professional development of professors and staff, which is evaluated by 15 indicators.
South Africa		Staff, including eleven criteria: 1- Qualifications, 2- Teaching experience, 3- Evaluation competence (regarding students), 4- Research characteristics, 5- Development of faculty members, 6- Degree and seniority, 7- Full-time and part-time staff, 8- Employment rules and conditions, 9- Methods of selection, appointment, establishment, and payment, 10- Contractual arrangements, and 11- Administrative and technical staff, which is evaluated by 13 indicators.
The European Union		Educational staff, including five criteria: 1- Recruitment processes, 2- Recruitment conditions, 3- Occupational development, 4- Scholarship activities, 5- Teaching methods (indicators have been expressed as descriptive expressions).

Table 7. Comparison of accreditation standards in the area of course evaluation based on the studied countries

The Studied Countries		The Seventh Area: Course Evaluation
National Standards of General Medicine in Iran		Course evaluation, including two criteria: 1- Course monitoring and evaluation system and 2- Students' and graduates' performance, which is evaluated by eight indicators.
World Federation for Medical Education		Course evaluation, including four criteria: 1- Course monitoring and evaluation system, 2- Professor-student feedback, 3- Students' and graduates' performance, and 4- Stakeholder participation, which is evaluated by 23 indicators.
Australia		Monitoring and evaluation, including three criteria: 1- Monitoring, 2- Evaluation of results, and 3- Evaluation feedback and quality report, which is evaluated by eight indicators.
Eurasia	Kazakhstan	Course evaluation, including four criteria: 1- Course monitoring and evaluation system, 2- Professor-student feedback, 3- Students' and graduates' performance, and 4- Stakeholder participation, which is evaluated by 19 indicators.

Table 8. Comparison of accreditation standards in the area of senior and executive management based on the studied countries

The Studied Countries		The Eighth Area: Senior and Executive Management
National Standards of General Medicine in Iran		Senior and executive management, including five criteria: 1- Senior management, 2- Education management, 3- Educational budget and resource allocation, 4- Management and implementation, and 5- Interaction with the health sector, which is evaluated by 13 indicators.
World Federation for Medical Education		Senior and executive management, including five criteria: 1- Senior management, 2- Educational leadership, 3- Educational budget and resource allocation, 4- Management and implementation, and 5- Interaction with the health sector, which is evaluated by 15 indicators.
Asia	The United Arab Emirates	Senior and executive management, including 10 criteria: 1- Perspective and mission, 2- Organization, 3- Executive management, 4- Policies and methods, 5- Organizational planning 6- Crisis management, 7- Organizational management and executive management, 8- University campuses in the United Arab Emirates, 9- University campuses of the United Arab Emirates in other countries, and 10- Campuses that are the branches of foreign institutions, which are evaluated by 59 indicators.
	Malaysia	Program management, including four criteria: 1- Program management, 2- Program leadership, 3- Administrative (executive) staff, 4- Academic backgrounds, which are evaluated by 16 indicators.
Eurasia	Kazakhstan	Senior and executive management, including five criteria: 1- Senior management, 2- Educational leadership, 3- Educational budget and resource allocation, 4- Management and implementation, and 5- Interaction with the health sector, which is evaluated by 13 indicators.
South Africa		The services of administrative programs, including four criteria: 1- Providing information, 2- Identifying inactive and at-risk students, 3- Addressing the needs of the diverse student population, 4- Ensuring the integrity of the certificate, which is evaluated by seven indicators.

criteria in the area of educational programs entitled teaching methods. In Malaysia, it is one of the criteria in the area of program development and presentation. In the WFME and Kazakhstan, it is one of the indicators of the program framework criterion of the area of the educational program. In Caribbean Community, it is one of the criteria in the area of the educational program entitled education and evaluation. According to Table 11:

- In Australian standards, there is an area called "program content" consisting of criteria such as senior management, staff (educational and administrative), and research and scholarship, which have been included in some programs as independent areas.

- The United Arab Emirates has 11 accreditation areas, of which five areas (educational program, students, faculty members, educational resources, senior and executive management) are shared with the areas of some studied programs, and the other six areas have not been included in other studied programs. These areas include quality assurance, scholarship and research activities, health, safety and environment, financial resources, financial management and budgeting, legal agreement, public transparency, and interaction with the community.

- In the standards of Caribbean Community and South Africa, an area regarding postgraduate education has been included, entitled "continuation of professional education" in Caribbean Community and "postgraduate policies, regulations, and procedures" in South Africa dealing with the conditions of continuing education and the rules and regulations of postgraduate courses.

- Out of 10 areas of the European Union, six areas, including educational program, student, faculty members,

Table 9. Comparison of accreditation standards in the area of continuous review based on the studied countries

The Studied Countries		The Ninth Area: Continuous Review
National Standards of General Medicine in Iran		Continuous review, which includes no sub-area or criteria and is evaluated by 14 indicators.
World Federation for Medical Education		Continuous review, which includes no sub-area or criteria and is evaluated by 15 indicators.
Asia	Malaysia	Program monitoring and continuous quality review and improvement, including one criterion: 1- Mechanisms of program monitoring, continuous quality review, and improvement, which is evaluated by 9 indicators.
Eurasia	Kazakhstan	Continuous review, which includes no sub-area or criteria and is evaluated by 15 indicators.
The European Union		Continuous monitoring and periodic review of programs, including eight criteria: 1- Evaluating program content, 2- Evaluating society changing needs, 3- Evaluating workload, progress, and completion of students, 4- Evaluating students (regarding program effectiveness), 5- Evaluating students' expectations, needs, and satisfaction with the program, 6- Evaluating learning environment and support services, 7- Participation of students and other stakeholders in reviewing the program, and 8- Publishing the specifications of the modified program (indicators have been expressed in descriptive terms).

Table 10. Comparison of accreditation standards in the area of teaching-learning based on the studied countries

The Studied Countries	The Tenth Area: teaching-learning
Australia	Teaching-learning, including seven criteria in the form of descriptive sentences and evaluation indicators have also been expressed in descriptive terms: 1- The provider of medical education that uses a wide range of teaching-learning methods to respond to the results of the medical program, 2- Encourages the students' medical program to self-assessment and learning responsibility and prepares them for lifelong learning, 3- The medical program enables students to develop core skills before using them in a clinical setting, 4- Students engage in adequate patient supervision to increase their clinical skills to the required level by enhancing participation in clinical care because they go through a medical program, 5- The medical program promotes the role model as a method of learning, especially in clinical practice and research, 6- Teaching-learning methods in the clinical setting promote the concepts of patient care and participatory interaction, and 7- The medical program ensures that students cooperate with and learn from other health professionals to learn and enhance work experience in inter-professional teams.
South Africa	Teaching-learning strategy, including five criteria: 1- The importance of students' learning progress, 2- Organizational model, presentation methods, and student combination, 3- Appropriate teaching-learning methods, 4- Improving teaching methods, and 5- Objectives, executive programs and monitoring methods, impact evaluation, and result improvement, which is evaluated by 11 indicators (33).
The European Union	Student-centered learning, teaching, and evaluation, including seven criteria in the field of teaching and learning: 1- Diversity and needs of students, 2- Teaching (education) methods, 3- Educational methods, 4- Modification and evaluation of educational methods, 5- Learner independence, 6- The relationship between learner and teacher, and 7- Students' complaints consisting of seven criteria in the evaluation section, including: (1) Evaluators' skills, (2) Evaluation criteria and methods, (3) Achievement of learning outcomes and feedback, (4) Number of evaluators, (5) Evaluation rules, (6) Evaluation conditions, and (7) Student requests (indicators have been expressed in descriptive terms) (34).

Table 11. Comparison of accreditation standards in other areas based on the studied countries

The Studied Countries	Other Areas
Australia	The content of the medical program, including nine criteria: 1- Senior management, 2- Leadership and authority, 3- Medical program management, 4- Educational proficiency, 5- Educational budget and resource allocation, 6- Interaction with the health sector and society, 7- Research and scholarship, 8- Staff resources, and 9- Staff appointment, promotion, and development, which are evaluated by 21 indicators.
The United Arab Emirates	Quality assurance, including three criteria: 1- Quality assurance system, 2- Continuous quality improvement, and 3- Quality assurance unit, which is evaluated by 13 indicators.
	Research activities and scholarship, including five criteria: 1- Strategies and policies, 2- Support for research activities and scholarship, 3- Participation in research and scholarship, 4- Expectations from research and scholarship, and 5- Outcomes of research and scholarship, which are evaluated by 10 indicators.
	The field of health, safety, and environment, including four criteria: 1- Occupational health and safety, 2- Facilities, 3- Dormitories, and 4- Technological infrastructure, which is evaluated by 35 indicators.
	Financial resources, financial management, and budget, including nine criteria: 1- Financial resources, 2- Student support plan/maintenance of education (course), 3- Organization and executive management, 4- Budgeting, 5- Cost, 6- Financial management, 7- Accounting and auditing, 8- Financial report to the Ministry of Education, and 9- Insurance, which is evaluated by 35 indicators.
	The area of legal agreements and public transparency, including five criteria: 1- The institution name and the program title, 2- Legal agreement and contracts, 3- General information, 4- Honesty and transparency, and 5- Communication with the Ministry of Education, which is evaluated by 25 indicators.
	The area of interaction with the community, including six criteria: 1- Community interaction strategy, 2- Relationships with employers, 3- Relationships with other education providers, 4- Relationships with graduates, 5- Continuous education, and 6- Evaluation, which is evaluated by five indicators.
Caribbean Community	Professional education continuance, which includes no criterion and is evaluated by five indicators.
South Africa	Postgraduate policies, regulations, and procedures, including three criteria: 1- Policies, regulations, and procedures, 2- Equality and accessibility, and 3- Students' readiness, which is evaluated by 11 indicators.
The European Union	Quality assurance policies, including five criteria: 1- Organization of quality assurance system, 2- Responsibility of departments, organizational units, managers, and stakeholders in quality assurance, 3- Scientific competence, autonomy, and vigilance against academic fraud, 4- Protection of students or staff against any kind of prejudice or discrimination, and 5- The participation of external stakeholders in quality assurance (indicators have been expressed in descriptive terms).
	Information management, including seven criteria: 1- Main performance indicators, 2- Student population characteristics, 3- Students' progress, success, and dropout, 4- Students' satisfaction with their programs, 5- Student learning resources and support, 6- Graduates' career paths, and 7- Methods of data collection and analysis (indicators have been expressed in descriptive terms).
	General information, including two criteria: 1- Information related to activities and 2- Information related to graduate employment (indicators have been expressed in descriptive terms).
	External periodic quality assurance, including one criterion: 1- External quality assurance framework (indicators have been expressed in descriptive terms).

educational resources, continuous review, and teaching-learning, are consistent with the areas used by some countries and programs, but areas of quality assurance policies, information management, public information, and quality assurance of external courses are not among the standards used by other studied countries.

Also, by studying each area and analyzing and comparing their similarities and differences, it was found that the program accreditation standards used in Iran, the WFME, and Kazakhstan have been codified in nine very similar areas (albeit with a slight difference in the number of criteria and indicators). These nine areas include mission and objectives, educational program, student evaluation, students, faculty members, educational resources, course evaluation, senior and executive management, and continuous review.

Discussion

According to the findings of the study, accreditation standards in the field of medical sciences, the areas of mission and objectives; senior and executive management; educational program; students; faculty members and technical and administrative staff; educational resources; teaching-learning; scholarship and research activities; financial resources, financial management, and budget; interaction with community; stakeholder satisfaction and expectations; continuous review, and quality assurance are proposed as a framework of program accreditation standards.

As noted, the first six areas are the standards used in most accreditation programs; therefore, these standards are among the main and basic areas of accreditation, and their existence in the standards used in Iran is one of the strengths of this program, which is consistent with the results of studies by Queto et al. (2006) and Allahdadian et al. (2008) (22, 23).

Although only a few of the programs studied in this study have used the standards of "continuous review" and "quality assurance", it seems that the importance of up-to-date and high-quality educational programs becomes clearer when special conditions govern the society, the educational system, and the health of countries and the world. For example, in times of civil and foreign wars or health crises that affect governments and the world, such as COVID-19 pandemic, which has affected our country and also all countries of the world and, subsequently, educational

systems, the necessity of revising educational programs to improve the quality of these programs to adapt to specific circumstances becomes even more noticeable. Therefore, a combination of these two standards as "continuous review and quality assurance" is recommended and, as can be seen, the findings of the studies by Blouin (2020) and Hamalinen et al. (2004) also confirm this finding (19, 21).

Distance learning, especially electronic learning (e-learning), challenges conventional knowledge of the nature of the teaching-learning process and the types of learning experiences that each learner must experience in higher education. Therefore, based on norms and rules, e-learning of conventional systems also challenges quality assurance and accreditation. Many features of distance learning are so different from traditional teaching modes that conventional quality evaluation standards and indicators can no longer be used. The learning (e-learning) experience is fundamentally different from face-to-face learning. Traditional concepts of learning can no longer be used in e-learning courses. There are no more university campuses. The role of faculty members and the separation of parts of educational activities; for example, the separation of face-to-face and actual education, face-to-face evaluation, and evaluation of the lesson plan, changed fundamentally (18). With this description, due to the importance and impact of the "teaching-learning processes" standard on the quality of the educational program and also given the world's current condition that is engaged with the coronavirus pandemic, education and face-to-face learning have impaired and as a result, have made educators inevitable to use new methods of teaching and learning and distant education compatible with these conditions. Therefore, it is suggested that this standard be considered an independent field with clear and measurable indicators. The results of Aliyari et al. (95), Dameh (2011), Naseri et al. (89), and Allahdadian et al.'s (87) studies are consistent with this finding (6, 18, 23, 24).

Also, considering the prominent role of areas such as "research and scholarship" and "budget and financial resources" in increasing the quality of education, as well as the effect of standards such as "interaction with community" and "stakeholder satisfaction and expectations" on awareness of the needs of the community and stakeholders and better communication between health and society, standards such as "scholarship and research activities", "financial resources, financial management, and budget", "interaction with the community", and "stakeholder satisfaction and expectations" are the standards that can significantly affect the credibility of an educational program if approved or not approved by the evaluation and accreditation team. Therefore, it is suggested that these standards be included in the accreditation program as main areas and with extensive and independent criteria and indicators. The findings of Blouin (2020), Allahdadian et al. (87), and Queto et al.'s (2006) studies confirm these findings (21-23).

The results of the present study can be made available to policy-makers, decision-makers, and staff of medical sciences education and accreditation of educational programs in the country to integrate accreditation standards of undergraduate degree educational programs, and ultimately it is hoped that it will lead to improving the quality of medical sciences education in the country.

Finally, it is suggested that more research be conducted on the localization of these standards and the development of a national model for accreditation standards of undergraduate degrees of medical sciences that is compatible with the country's social, cultural, and economic conditions, as well as facilities, resources, and infrastructure of medical sciences. Also, the accreditation organization in the field of medical sciences, apart from the Ministry of Health, should be established as an independent organization aiming at planning and implementing accreditation at all levels of accreditation, including institutional, program, and hospital accreditation.

Conclusion

In line with the results of this study, it seems necessary to develop a local framework for accreditation of medical programs in the undergraduate degree for Iran. Also, with a special look at this process, it is possible to develop an applied accreditation program consisting of appropriate and desirable areas and standards that has validity and reliability and be achievable and measurable at the same time and can desirably evaluate an educational program, which finally leads to the promotion and improvement of the quality of education in the undergraduate degree in medical sciences.

Supplementary material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgment

We would like to thank the esteemed professors and colleagues of Kerman University of Medical Sciences, especially Dr. Sara Shafian, who sincerely helped us carry out this research.

Conflict of Interests: The authors declared there was not conflict of interest.

Ethical Approvals: This study was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1399.455).

Funding/Support: N/A

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Strides Dev Med Educ. 2021 December; 18(1):e1080 doi 10.22062/sdme.2021.196657.1080

Research Article

Environmental and Occupational Health Students' Attitudes Toward Social Media in Online Learning During the COVID-19 Pandemic

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Received: 2021 September 20
Revised: 2021 November 28
Accepted: 2021 November 29
Published online: 2021 December 11

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Citation:
Ghazizadeh Ehsaei S, Haddad Narafshan M, Zeinali Nejad M. Environmental and Occupational Health Students' Attitudes Toward Social Media in Online Learning During the COVID-19 Pandemic. Strides Dev Med Educ. 2021 December; 18(1):e1080. doi: 10.22062/sdme.2021.196657.1080

Abstract

Background: Individuals engaged in education and health currently during the coronavirus disease 2019 (COVID-19) pandemic find it urgent to avail themselves of high-speed communication and information technology.

Objectives: This survey was conducted to investigate the attitudes of environmental and occupational health students toward Social Media (SM) use in online learning during the COVID-19 pandemic.

Methods: This was a cross-sectional study which its population consisted of 375 environmental and occupational health students studying at Kerman University of Medical Sciences, Kerman, Iran, in the academic year 2020-2021. The present study followed a quantitative design using the Social Media Attitude Scale designed by Otrar and Argin. The data were analyzed using SPSS software (version 26) and paired t-test.

Results: The participants were within the age range of 18-46 years, and 64.8% of them were female. Instagram was the most popular SM (frequency of use: 40%). Twitter (27%), Facebook (20%), and LinkedIn (13%) were placed in the next ranks. The need for sharing (61.4±14.93) was the most preferred dimension of SM. Social competence (54.23±5.17), social isolation (51.33±4.43), and relationship with teachers (40.63±9.7) were placed in the next ranks. Moreover, there was no significant difference between environmental and occupational health students' attitudes toward SM (P>0.01).

Conclusion: Medical universities can use SM for educational purposes by designing a forum for study or helping students with health skills. However, researchers should be aware of health science students' attitudes toward SM before developing such programs.

Keywords: COVID-19, Pandemics, Social Media, Medical Sciences, Students, Attitude

Background

With regards to the Coronavirus disease 2019 (COVID-19) pandemic lockdown, most forms of communication have changed from face-to-face to digital. Both teachers and students face a massive challenge with the transition to online instruction (1). Teachers must adapt to a new teaching process in virtual environments if they intend to continue teaching. The COVID-19 pandemic has been characterized by the widespread use of social media (SM) (2, 3). Individuals engaged in education and health currently find it urgent to avail themselves of high-speed communication and information technology. The World Web is most certainly of the highest speed and most feasibility in this regard. Millions of individuals worldwide use the World Web to get connected (4,5).

The SM, which use a significant volume of the World Web, greatly help individuals exchange and share information (6,7). The SM commonly refers to platforms, websites, and services that enable individuals to send and receive information, ideas, and what they pursue (8-10). In addition to forums, content blogs, microblogging services, social networks, and virtual reality sites (e.g., HumanSim and Second Life), SM make up the bulk of the World Wide Web, which also includes SM such as Facebook, Twitter, Myspace, Google Plus, and YouTube as well as Wikipedia and collaborative websites (8, 11-16). SM are growing more and more widespread in every corner of the world, facilitating individuals' lives in myriads of ways (17). The SM have altered our lives and occupations.

They have influenced the way we see, communicate, and express ourselves. Social networking sites encourage users to share their most positive characteristics (18) to get friends' virtual appraisals through likes and comments. Studies demonstrate various psychological impacts of social networking site use, such as self-expression, emotional support (19), and interpersonal communication (20). However, it involves several negative outcomes, such as degrading relationships and wasting time. The sharing of unofficial, inaccurate, or biased information also causes fake information to spread, as well as ethical and security issues arising from the display or sharing of personal information (16, 21, 22).

However, although Instagram stands as the fifth most SM platform used globally (Statista, 2020), it has not attained sufficient attention from education researchers yet. Instagram, developed in 2010, is a social networking service that lets individuals share videos and photos. The service is available to users through an application or a feature-limited web interface whose content they can edit with an array of filters. Up to 2200 text characters can go with individual posts. Instagram allows private messaging, the option to tag content with hashtags capable of being searched, the ability to carry several images or videos in a single post, and stories feature, which enables users to post content to a feed that is within reach of others for 24 hours. Posts, stories, and messages provide the opportunity to communicate with others in miscellaneous privacy and formality levels (23).

Instagram offers the chance to the users to express different dimensions of the self since the formation of one's identity is affected by reactions and feedback from others (24). Because we have the unprecedented ability to pounder upon who we are and the groups we are members of, categorization seems to be an indispensable part of living in a social world. It seemingly fulfills two psychological needs, how you belong *to* and are distinct *from* others. A shared identity paves the way for individuals to be accepted as legitimate members of a group. Meanwhile, we might try to stamp our individuality or distinctiveness inside the group or through our interaction with other groups. The impotence of belongingness or distinctiveness might differ from individual to individual, or they might be prioritized at different times and in different situations. While discussing identity, two major issues have to be taken into account, including a) how other individuals see or categorize us (and how we might categorize others) and b) how we choose to categorize or present ourselves to others (25).

Healthcare systems grow side by side with technological advancements, which leads to the appearance of applications, such as telemedicine (26). Telemedicine, belonging to telehealth, meaning "distant healing", is primarily concerned with the treatment and patient follow-up (World Health Organization, 2010). Telehealth gives healthcare services to individuals not close to health centers (27). The SM help individuals requiring healthcare services via the World Web and a host of websites (16). Educated individuals can make informed health choices and use online healthcare education to benefit their health (28). Little by little, mobile health services accompanied by SM sites will become wildly popular. Most of students studying health subjects utilize social media platforms in various ways (29-31). With the SM, students have the opportunity to share, express, and exchange knowledge and information with each other in an educational setting (32). The related literature provides studies investigating teenagers' (14, 33) and university students' SM habits (34) and outlooks toward SM (4, 11, 35-37). There are no studies examining the attitudes of environmental and occupational health students toward SM. Perhaps it is not surprising that the COVID-19 pandemic led to the increased use of social media and the incorporation of group media into students' learning activities (38).

Objectives

Medical universities and institutions can use SM for educational purposes by designing a forum for study or helping students with health skills using simulation videos and exercises. However, before developing such programs, researchers should be aware of how health science students currently use SM and their attitudes toward SM applications as helpful teaching tools. Therefore, the two following research objectives lead the present study:

1. To investigate the attitudes of environmental and occupational health students toward SM
2. To find out the most frequently used SM network among environmental and occupational health students

Methods

The present cross-sectional survey was conducted on 375 environmental and occupational health students studying at Kerman University of Medical Sciences, Kerman, Iran, in the academic year 2020-2021. The inclusion criteria were being a student in the environmental and occupational health departments and voluntarily participating in the study. The students were also assured that the data would be applied only for the study objectives.

Otrar and Argin's (39) Social Media Attitude Scale, designed in 2015, was used to investigate the participants' attitudes toward SM. The questionnaire has four dimensions and 23 items, including social competence (6 items), need for sharing (8 items), relationship with teachers (3 items), and social isolation (6 items). The participants were asked to mark whether they agreed with each of the questionnaire items on a 5-option Likert scale (Never: 1 to Always: 5). The scale dimension scores were converted to a score of 0 to 100. Since all the items referring to the social isolation dimension were reversed ones, while quantifying the total score of this dimension the items for this dimension were reversely coded (39).

A pilot testing was conducted to evaluate the validity and reliability of the instrument. After receiving feedback, the structure of some items were modified due to the vague structure. Therefore, these items were structurally simplified. The overall Cronbach alpha for the Persian

translated version of Otrar and Argin's (39) Social Media Attitude Scale was 0.81, which revealed good internal consistency. Additionally, the rates of using SM platforms (i.e., Facebook, LinkedIn, Twitter, and Instagram) were recorded.

The environmental and occupational students participating in the present study were briefed on the form and goal of the research with a voluntary participation. They were required to complete the form in 20 minutes. For data collection, the permission was obtained from the dean's office and the department head. Student names were not included on the data collection forms. Informed consent was obtained from all students. Data were analyzed using SPSS software (version 26) using frequencies, percentages, mean, standard deviation, and t-tests.

Results

Totally, 402 students in the environmental and occupational health departments were eligible of whom 375 (93.2%) students agreed to participate. 64.8% of the participating students were female with the age range 18-46 years.

Instagram was the most popular SM (frequency of use: 40%) among the environmental and occupational health students. Twitter (27%), Facebook (20%), and LinkedIn (13%) were placed in the next ranks. The need for sharing (61.4±14.93) was the most preferred dimension of SM. Social competence (54.23±5.17), social isolation (51.33±4.43), and relationship with teachers (40.63±9.7) were placed in the next ranks. Moreover, students' attitudes toward SM were not different regarding the field of study (P>0.01), gender (P>0.01), and age range (P>0.01) (Table1).

Discussion

The current study investigated the attitudes of the environmental and occupational health students toward SM in online learning during the COVID-19 pandemic. It was observed that the need for sharing was the most preferred dimension of SM, and relationship with teachers was the least preferred dimension of SM. Moreover, there was no significant difference between the environmental and occupational health students' attitudes toward SM. Some researchers reported findings different from those of the current study; Avcı et al.'s survey (40) revealed that motivating creativity, improving professional development, increasing communication with co-workers, gathering knowledge, and boosting the quality of health care were the preferred dimensions of SM among medical students. Hussaina et al. (41) showed that pharmacy students used SM more for learning purposes in comparison to medical students. Guraya (42) reported that only a minority (37%) of medical and health students used SM for academic purposes.

The environmental and occupational health students in the present study used Instagram the most, which is reported in Terzi et al.'s (43) study among nursery and midwifery students. Nevertheless, in another study, SM applications were in the following order concerning their frequency of use: Facebook (99%) (39), Twitter (5.8%), and Instagram (1.8%) (44). Instagram comes last according to this ranking. In other studies examining how frequently nursing students used SM, it was observed that Facebook was the most preferred platform of SM (30, 45). Several studies have shown that Facebook stands as the most frequently used SM platform (8, 10, 45). Using Facebook, the users can start new relations, share knowledge, opinions, and photos openly and freely (46). Moreover, it has been claimed that extroverts' tendency to share everything publicly is the reason of high frequency of Facebook use (8). On the other hand, Facebook can enhance students' field-related knowledge inside and out of the classroom contexts. Facebook provides students with the opportunity to receive and send field-related topics (47).

The current study demonstrated that environmental and occupational health students used SM for sharing, social competence, social isolation, and relationship with teachers (Table 1). In line with the present study, other studies examining students with different preferences also showed the positive attitudes of the students toward SM (14, 48, 49). SM provide a fruitful field for nursing requirements and nursing education (30, 45, 50, 51).

Table 1. Comparison of Attitudes toward Dimensions of Social Media Based on the Field of Study, Gender, and Age Range

Variables		Social competence Mean (SD)	Need for sharing Mean (SD)	Relationship with teachers Mean (SD)	Social isolation Mean (SD)
Field of study	Occupational health	26.53 (2)	32.73 (6.67)	20.67 (3.67)	26.48 (2.13)
	Environmental health	27.7 (3.17)	28.67 (8.27)	19.97 (6.03)	24.85 (2.3)
	P-value	0.59	0.48	0.55	0.62
Gender	Female	50.67 (24.83)	75 (18.2)	29.25 (15.75)	48.7 (17.7)
	Male	49.93 (25.73)	74.07 (21.93)	28.13 (13.63)	47.03 (16.6)
	P-value	0.48	0.39	0.31	0.52
Age group	18-30	52.2 (22.07)	68.3 (15.88)	44 (18.07)	48.67 (16.27)
	30-46	48.67 (20.33)	66.13 (14.45)	42.87 (16.73)	45.4 (15.27)
	P-value	0.69	0.09	0.20	0.27

SD, standard deviation

Humans are social beings, so the need for interpersonal sharing is a basic requirement among them. The SM help humans receive information, have access to a variety of materials, and share their experiences with others (12, 48).

Utilizing, asking questions of, and utilizing others› knowledge is how SMs assist individuals in developing problem-solving skills (36). The positive use of SM is the social interaction between teacher and students (52), which provides great opportunities to promote learning activities, new information, learning experiences, and academic outcomes. In line with the findings of the present study, a study carried out by Aküzüm and Saraçoğlu (53) confirmed students' unwillingness to use SM for having relationships with teachers. The findings of another study examining students' attitudes toward SM in a different way showed that nursing students viewed SM positively both professionally and academically (5). The application of SM was also pointed out to be positive by nursing students (50). Engaging students in active learning leads to more successful academic performance (54). Because of its effectiveness in engaging students, providing feedback, and enabling collaboration, the integration of SM with classroom teaching should be welcomed by medical education (32).

Conclusion

In brief, environmental and occupational health students studying at Kerman University of Medical Sciences used SM during the COVID-19 pandemic lockdown for sharing things, social competence, social isolation, and relationship with teachers. Side by side with technological developments, SM platforms are growing more wildly in healthcare services used for medical applications and education. The healthcare industry can take advantage of SM to teach health skills by developing a forum for study or using simulation videos and exercises for students. It is important for researchers, however, to understand the current uses of SM and attitudes toward it among health science students before developing such programs. Despite the limitations of this study, the results may add to the existing research in related literature. However, the results need to be interpreted with care. Qualitative methods such as focus groups could also be used to examine students› SM habits. In addition, the environmental and occupational students in the present study came from only one university, which limited the generalizability of its findings. It is therefore important to consider a broad spectrum of learners.

Acknowledgments

It is with great appreciation that the authors extend their thanks to the students, researchers, and faculty members of Kerman University of Medical Sciences who graciously agreed to participate in this study.

Conflict of Interests: All authors have declared that they have no competing interests.

Ethical Approval: This study was approved at Kerman Branch of Islamic Azad University by No.1399.17948.

Funding/Support: This study was suported by Kerman Branch of Islamic Azad University.

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Strides Dev Med Educ. 2021 December; 18(1):e1040 doi 10.22062/sdme.2021.195647.1040

Research Article

Evaluation of Medical University Deputies' and Managers' Perspectives on the Outcomes of Institutional Accreditation of Medical Universities from 2018-2019

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Received: 2020 September 28
Revised: 2021 September 18
Accepted: 2021 September 20
Published online: 2021 December 11

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Citation:
Mazroie S, Dehghani MR, Yamani N, Sabzevari S. Evaluation of Medical University Deputies' and Managers' Perspectives on the Outcomes of Institutional Accreditation of Medical Universities from 1997-98. Strides Dev Med Educ. 2021 December; 18(1):e1040. doi: 10.22062/sdme.2021.195647.1040

Abstract

Background: Accreditation is one of the most important ways of guaranteeing the quality of medical education.

Objectives: The aim of this study was to determine medical university deputies' and managers' perspectives on the outcomes of institutional accreditation in Iran.

Methods: This was a descriptive-analytical cross-sectional study conducted as a census to assess the views of the deputies and managers of 65 medical universities in Iran on the outcomes of institutional accreditation. The research tool was a questionnaire consisting of items about institutional accreditation standards in various fields, which was provided to deputies and managers via email or in person. After data collection, data analysis was performed using SPSS software version 22.

Results: The results showed that from the perspectives of medical university deputies and managers, the outcomes of institutional accreditation were satisfactory in the dimensions of mission, management and goals, resources and facilities, faculty members, and student and cultural activities. Also, the outcomes were reported relatively satisfactory in research and staff training dimensions. The dimensions of staff training and resources and facilities had the lowest (60.34 ±17.22), and highest (73.83 ±15.12) mean scores, respectively.

Conclusion: Deputies and managers believed that institutional accreditation had satisfactory impacts on some areas according to the available resources and facilities. Since these areas have a close relationship, the desirability of each area also boosts other dimensions, which ultimately upgrades university credit and qualification.

Keywords: Accreditation, Institutional Accreditation, Outcome, University of Medical Sciences

Background

The higher education system is a dynamic and purposeful network with both quantitative and qualitative dimensions. The coordinated growth of this system requires the parallel development of both quantitative and qualitative arms (1). Today, with the increasing expansion of universities worldwide, many experts argue about the appropriate quality of higher education to achieve high-quality education (2, 3). The trend of developments shows that experts have always been concerned with the quality improvement of universities and higher education institutions (4).

As the optimal performance of any organization requires a continuous monitoring system (5), and assessment is an indispensable component of any activity and executive work (6), the only way to nail the desired success seems to be a quality improvement (7). There are various assessment models to evaluate the quality of higher education, among which the accreditation model has been acknowledged as the most reliable and powerful method due to its maximum compliance with available standards (8). This method has been used as the evaluation model specific for higher education in many countries and universities (9). It can be said that accreditation

is an effective strategy with a wide and deep impact on educational quality improvement and quality assurance, and many experts regard this model as a symbol of quality and its continuous improvement (2, 10). In this regard, the accreditation model, as a comprehensive quality improvement strategy, has greatly contributed to and emphasized continual quality improvement, especially in the education and health sectors (11).

By summarizing the classic definitions of accreditation, this process can be described as the licensing or certification of an educational institution based on the discretion of experts in the field and predetermined instructions (12). Although the concepts of accreditation and certification are usually used interchangeably, credit only refers to organizations, while certification may apply to individuals, as well as organizations (13). From the perspective of medical education, accreditation is capable of simultaneously emphasizing the preservation and uninterrupted quality improvement of educational values and making the educational institution accountable towards social needs (14). Academic credibility is a quality assurance process during which an educational institution is evaluated by an accreditation institution based on predetermined criteria and plays an important role in innovation (15).

The accreditation process encompasses four steps: self-assessment, peer-assessment, issuing accreditation, and re-accreditation. The self-assessment step is a prerequisite and the starting point of the accreditation process (11). In the peer-assessment step, the declarations in the self-assessment report are verified, and the university space, facilities, and equipment are visited in person. In the third step, the accreditation organization sends the visit report to the university, announcing either accreditation or the need for amendments (16). It is noteworthy that accreditation with high quality confirms the comprehensive quality of the whole institution (17).

In recent years, measures have been taken to establish accreditation infrastructure in medical education in Iran, including the health system transformation plan, whose fourth step is concerned with transformation and innovation in education (enclosing 12 packages). One of these packages is related to accreditation that consists of four plans, three of which are required to be implemented by universities (18).

In the study by Yousefi *et al.* (2012) entitled "The development of institutional accreditation system in Iran's universities of medical sciences," the main goal of the institutional accreditation project was boosting medical education quality and trying to establish an accreditation system in the country. The authors believed that this project would improve and guarantee the quality of higher education institutions (14). Evaluation can be valuable if it leads to change in stakeholders, including program managers and implementers (19). According to the result of Frank and Chapman, empowering the managers and staff of the institution is a primary necessity for the successful implementation of the accreditation project in health centers (20).

An international survey on 44 global accreditation organizations showed that quality improvement was the main motivation for accreditation, according to more than 80% of the respondents (10). Pomey *et al.* (2010) also stated that accreditation was one of the factors influencing progress and change (21).

Managers, administrative staff and quality assurance professionals are expected to be those who understand the definitions, characteristics and principles of quality culture and introduce their strategies, policies and plans for effective quality implementation. (22). Accreditation processes focus on financial items (23), and some studies have declared accreditation as a time-consuming and bureaucratic event that increases the workload and stress of employees (8). Considering the above-mentioned issues, accreditation has a critical role in institutional quality improvement. On the other hand, the first institutional accreditation in Iran's universities of medical sciences dates back to 2016-17.

Objectives

Considering that institutional accreditation can have a positive role in cutting costs, saving time, and boosting the efficiency and productivity of an educational institution, the present study was conducted to investigate the perspectives of Iran's medical universities' deputies and managers towards the outcomes of institutional accreditation.

Methods

This was a descriptive-analytical cross-sectional study, in which six accreditation dimensions were assessed using six separate questionnaires. The accreditation of all universities of medical sciences has been implemented in Iran since 2016-17. The target population in this study included the deputies of universities, managers of universities of the executive units, resources, and facilities, those in charge of staff training, faculty members, students and cultural affairs, research units, the officials of institutional accreditation, and the secretariats of the health system transformation and innovation plan in all medical universities.

The study population included 130 vice-chancellors and managers in universities of medical sciences, who had responsibilities in resources and facilities, staff training, faculty members, students and cultural affairs, and research and technology. The questionnaires were provided to the vice-chancellors and managers through census; thus, they were able to fill the questionnaires if they were interested in participating. For the secretary of the medical education transformation plan office, primary information on the respondent in charge of the target field was obtained by a phone call, and after necessary coordination, the questionnaire was presented in person or sent via email.

Data collection tools were six separate questionnaires assessing the six studied dimensions, which were designed

based on the mandatory institutional accreditation standards. The validity of the data collection tool was verified by the content and face validity methods. The prepared tool was also provided to 20 experts, and after reviewing their opinions and introducing minor amendments, the reliability of the questionnaire was assessed by delivering it to 20 other experts, and a Cronbach's alpha coefficient of 0.89 was obtained.

The first part of the data collection tool addressed the respondent's demographic information, including age, gender, education, work experience, management experience, type of employment, and job status (employee or faculty member). The second part included specialized questions in each dimension, addressing the mandatory standards of institutional accreditation. The responses were provided on a 5-point Likert scale (very much, much, somehow, little, and too little). For data analysis, "very much" and "much" answers were considered satisfactory, the "somehow" answer was considered relatively satisfactory, and the options of "little" and "too little" were regarded as unsatisfactory. Also, an average score, ranging from 0 to 100, was calculated for each domain. The dimensions included mission, goals, and management (27 items), resources and facilities (40 items), staff training (7 items), faculty members (20 items), student and cultural affairs (11 items), and research (25 items). The questionnaire was provided to the target population either in-person or via email. We repeatedly called or met the participants in-person to gather the data through the self-administered questionnaire.

The data, which were kept completely anonymous and confidential, were finally analyzed. It is noteworthy that some questions related to the managers were referred to by them to be answered by the authorities of the relevant accreditation package or the transformation and innovation plan office. This study was approved under the ethics code of "1397. 437 IR.KMU.REC", received relevant permits, and was conducted after necessary arrangements. Data analysis was conducted using SPSS software version 22 and the Chi-square test.

Results

In this study, 104 vice-chancellors and managers responsible for different aspects of institutional accreditation from 65 universities of medical sciences completed the questionnaire. The response rate was 80%. Most of the respondents were males (68.3%), faculty members (65.4%), and owners of specialized degrees in clinical fields (46.2%) (Table 1).

Regarding mission, goals, and management, 53 managers responded to the questionnaire, of whom 28 cases (52.8%) reported a desirable outcome, and others acknowledged relatively desirable outcomes. Relatively desirable outcomes were related to the fields of assessment and evaluation, feedback, and budget allocation. Concerning resources and facilities, 56 cases responded to the questionnaire, of whom 40 cases (71.4%) reported satisfactory outcomes. Access to public transportation for staff and students was reported with relatively satisfactory outcomes. In the aspect of staff training, 29 (50%) out of 58 participants declared desirable outcomes. Relatively desirable outcomes were related to the annual budget allocated for staff training (based on per capita) and randomly evaluating at least 20% of programs (using appropriate models).

Regarding the dimension of faculty members, 32 (65%) out of 49 participants reported satisfactory outcomes for accreditation. The sub-dimensions with relatively satisfactory outcomes were the appropriate use of faculty member assessment results, seeking faculty members' participation in improving the process, and the workload of faculty members. For the dimension of students and cultural affairs, 51 participants responded to the questionnaire, and 36 cases (70.6%) declared favorable outcomes. Finally, regarding the dimension of research, 54 vice-chancellors and managers provided answers, of whom 24 cases (44.4%) declared satisfactory outcomes for institutional accreditation in this dimension, and 24 cases (44.4%) reported relatively desirable outcomes in terms of assigning research managers and authority delegation to them, the use of study opportunities and scientific trips, budget allocation, and the growth of scientific publications (Table 2).

The means and standard deviations of the scores of different areas based on managers' and deputies' responses were calculated. As it can be seen, the highest mean score was related to the dimension of resources and facilities, and the lowest score was recorded for the dimension of staff training.

Table 1. The Participants' Demographic Features

Demographic variables		N (%)
Gender	Male	71 (68.3)
	Female	32 (30.8)
	No response	1 (0.9)
Level of Education	Bachelor's degree	5 (4.8)
	Master's degree	26 (25.0)
	Ph.D.	48 (46.2)
	General practitioner	17 (16.3)
	No response	8 (7.7)
Employment Status	Clerk	31 (29.8)
	Faculty member	68 (65.4)
	No response	5 (4.8)

Table 2. The means (SD) and frequency of the perspectives of vice-chancellors and managers of medical universities towards the outcomes of institutional accreditation in various fields

Accreditation field	Score (0-100) Mean (SD)	Outcome N (%)		
		Satisfactory	Relatively satisfactory	Unsatisfactory
Mission / Goals	71.67 (16.14)	28 (52.8)	25 (47.2)	0 (0)
Resources / Facilities	73.83 (15.12)	40 (71.4)	12 (21.4)	4 (7.2)
Staff training	60.34 (17.22)	29 (50)	26 (45)	3 (5)
Faculty members	66.74 (15.58)	32 (65)	15 (31)	2 (4)
Students / Cultural affairs	62.01 (15.24)	36 (70.6)	14 (27.5)	1 (1.9)
Research	69.55 (17.07)	24 (44.4)	24 (44.4)	6 (11.2)

Based on the Chi-square test, demographic variables (gender, education, and employment status) were not significantly associated with the vice-chancellors' and managers' viewpoints regarding different dimensions of mission, goals and management, resources and facilities, staff training, faculty members, students and cultural affairs, and research (P>0.05).

Discussion

Our results showed that based on the participants' viewpoints in the dimensions of mission, goals, and management, 52.8% declared satisfactory outcomes, and 47.2% reported relatively satisfactory outcomes for institutional accreditation. Among the items of this dimension, satisfactory outcomes were obtained for the characterization, comprehensiveness, and clarity of the university mission and goals and performing assessment and reporting its results. On the other hand, relatively satisfactory outcomes were reported for the dimensions of the assessment process, receiving feedback, and budget allocation. According to these results, it can be said that universities are more focused on goals, statements, missions, and programs; however, there seems to be a long way ahead to reach a desirable status in the assessment of the rate of goal achievement. Gilavand and Maraghi (2017), in their research entitled "Assessing the quality of educational services of Iranian medical universities," stated that these universities could focus on the goals and fill the gaps by relying on their strengths and opportunities, reducing weaknesses, and avoiding risks and turning them into opportunities (24). The results of a study by Alani *et al.* (2015), entitled "The quality of services in higher education in Brunei," emphasized the role of university managers in the effective quality improvement of provided services, achievement of the goals of the university, and doing the employees' jobs more consciously and accurately (25). The results of this study also emphasized the role of managers' and employees' performance in achieving the desired outcome. On the other hand, Safavi *et al*. (2011) and Khodadadi et al. (2014), who studied the status of internal assessment in various departments of different faculties and universities, showed the strong position of the dimension of goals, mission, and management (26, 27). The findings of Ajam Zibod *et al*. (2011), Abedini *et al*. (2013), Ahmari *et al*. (2013), and Najafzadeh *et al.* (2014) revealed that the dimension of goals, mission, and management had a satisfactory level, which was consistent with the results of the present study (28-31). The results of studies by Mirzaei *et al.* (2012) and Rahimifard *et al.* (2013) on the internal assessment and that of Mosleh *et al*. (2016) on the external assessment of departments in different faculties and universities showed the relatively favorable status of the field of goals, mission, and management (32-34). According to the results of the present study, it can be said that managers pay more attention to issues, such as goals, statements, and missions, leading to the achievement of the desired level in this area. Thus, it is expected to reach the desired level in other areas as well by allocating budget, planning, cooperation, and paying more attention in the future. The results of another study by Baziar and Mohammadi (2016), who investigated the internal assessment of the Department of Statistics of the University of Science and Culture, showed the unsatisfactory status of organizational structure, facilities, and management (35). This was inconsistent with the results of the present study and may indicate the more attention of the Ministry of Health and Medical Education and its managers to accreditation and their steps towards universities' goals and missions according to institutional accreditation standards.

Regarding resources and facilities of medical universities across the country, desirable, relatively desirable, and undesirable outcomes were reported as 71.4%, 21.4%, and 7.2%, respectively. Among the standards of this aspect, the items related to space and physical facilities, safety standards, practical training facilities and equipment (laboratories, skill labs, and library), information systems, and facilities of student dormitories had desirable conditions. However, staff transportation had a relatively satisfactory outcome. It seems that despite financial shortages, the deputies of development and resource management in universities have paid good attention to the standards of this field. Asiyai and Okoro (2019) studied the management strategies used to improve higher education performance in Nigeria and declared that allocating adequate budget to higher education (for improving students' skills, equipping laboratories, subscribing to credible journals, purchasing textbooks, etc.) could upgrade the efficiency and quality of education (36). On the other hand, the results of studies by Khosravan *et al*. (2010) and Safavi *et al*. (2011) on the internal assessment of educational departments showed a strong rank for the dimension of resources and facilities (27, 37); the results of these studies were in line with those

of the present study. The results of another study by Salimi and Bagherzadeh (2015) on the external assessment of educational departments showed the satisfactory condition of resources and facilities (38), which was in parallel with the present study results. It seems that budget allocation and paying attention to institutional accreditation standards by universities' deputies and managers of development and resources have contributed to the favorable outcomes observed in this area. The desired status observed in this dimension is expected to increase the quality and efficiency of universities in terms of student learning, ultimately boosting university credibility.

According to the managers' perspectives regarding staff training, satisfactory, relatively satisfactory, and unsatisfactory outcomes were reported to be 50%, 45%, and 5%, respectively. Of the seven standards in this field, five had a desirable outcome, and two had a relatively desirable outcome. Therefore, it can be said that from the perspective of deputies and managers, the outcome of institutional accreditation has been satisfactory in the field of staff training. It seems that following institutional accreditation, activities in this field became systematic, leading to a satisfactory outcome. Managers are also expected to pay more attention to the annual budget allocated for staff training. Shariatmadari *et al.* (2014) appraised the effectiveness of in-service courses in boosting employees' performance and stated that training, if it is purposeful, planned, and continuous and encompasses different levels of the organization, can help increase staff's job skills and provide the opportunity to increase their knowledge and awareness (39). Therefore, it can be stated that universities should allocate a certain per capita budget to staff training to be able to hold necessary training courses to improve employees' knowledge and skills. Also, assessments should be conducted regularly and uninterrupted to upgrade the system.

In the dimension of faculty members, desirable, relatively desirable, and undesirable outcomes were reported to be 65%, 31%, and 4%, respectively. Regarding the standards of this field, a satisfactory outcome was observed for appropriate employment policy, distribution and number of faculty members, continuous training, assessment, feedback, and promotion of faculty members. On the other hand, the use of assessment results, faculty members' participation in process improvement, and the workload of faculty members received relatively satisfactory outcomes. It seems that the universities under the supervision of the Ministry of Health and Medical Education have met acceptable performance in this field and fulfilled institutional accreditation standards in this area. Taheri *et al*. (2017) explored the educational needs of the faculty members of Guilan University of Medical Sciences and concluded that participation in training courses could improve the faculty member's educational capabilities and, subsequently, education quality (40). This was consistent with the present study results, where the deputies and managers, who themselves were faculty members, declared a favorable outcome in this dimension. The results of Salimi & Bagherzadeh (2015) and Baziar & Mohammadi (1395) regarding the internal assessment of educational departments showed a relatively satisfactory status for the dimension of faculty members (35, 38). According to the results of the present study, in order to nail desired outcomes in this dimension, more attention should be paid to appropriately use the results of faculty member evaluation, motivating them to prevent scientific stagnation and reducing the high workload of faculty members.

Regarding students and cultural affairs, the outcomes in medical universities across the country were reported to be 70.6% satisfactory, 27.5% relatively satisfactory, and 1.9% unsatisfactory. Among the standards of this dimension, those with a satisfactory outcome included the provision of necessary services to students, presenting appropriate extracurricular programs, attracting students' participation in the affairs related to them, and handling disciplinary issues. Therefore, it can be concluded that universities' activities in this field were compatible with accreditation standards. Also, extracurricular programs held by the Ministry of Health, Treatment, and Medical Education, such as cultural festivals, Quran and Etrat festivals, etc., can be interesting for students and motivate them to participate in competitions for acquiring national rankings for universities, helping to achieve favorable outcomes in this field. Feizi *et al.* (2015) investigated Iran's medical universities' cultural infrastructure and performance from four perspectives of cultural affairs, facilities, the performance of organizations and centers, and the performance of cultural affairs deputies. According to the results of the recent study, in parallel with strengths (holding programs based on already scheduled annual plans, awarding the winners of competitions and festivals, etc.), there were clear weaknesses in some dimensions (41). According to the respondents in the present study, it seems that the dimension of students and cultural affairs has the highest capacity for the applicability of accreditation standards so that they have been implemented in all dimensions, leading to satisfactory and relatively satisfactory outcomes in most dimensions.

Regarding the dimension of research, satisfactory, relatively satisfactory, and unsatisfactory outcomes were reported to be 44.4%, 44.4%, and 11.2%, respectively. Short and long-term plans, holding regular meetings, and reviewing and supporting research projects and publications attained desirable outcomes in this dimension. Besides, the dimensions of criteria for enacting and delegating authority to research managers, the use of study opportunities and scientific trips, budget allocation, and increasing the number of publications obtained relatively desirable outcomes. Shoja & Darvish Motavali (2015) evaluated the efficiency of research activities of 14 branches of Islamic Azad University during three periods from 2010 to 2013 and demonstrated that only four branches achieved high efficiency in this dimension (42), which was in agreement with the results of the present study. It seems that the research deputies of Iran's

medical universities work in a completely systematic way. In addition, research activities are among mandatory institutional accreditation standards, and faculty members are required to obtain a minimum research score for promotion and obtaining annual ranks. This can be a leverage for boosting universities' research activities, creating competition between universities and, ultimately, satisfactory outcomes in this dimension.

In conclusion, according to the present study results, the following items are suggested. Regarding the great scope of institutional accreditation, the Ministry of Health, Treatment, and Medical Education is suggested to design a comprehensive database to designate the documents and results related to each accreditation area in every university; hence, access to these data would be facilitated for relevant experts. Considering that some medical schools in the country are operating as academic units, it is suggested to include them in institutional accreditation programs more seriously. During institutional accreditation meetings (national, regional, or at poles), it is recommended for internal and external evaluators to share their experiences of the process so that other centers can strengthen institutional accreditation standards and resolve their weaknesses. It is also recommended to use leading countries' experiences in the field of institutional accreditation.

Conclusion

According to the results of the present study and the perspectives of medical universities' deputies and managers on the outcomes of institutional accreditation, more satisfactory outcomes were reported in the dimensions of research, staff training, faculty members, students and cultural affairs, mission and goals, and resources and facilities, respectively. Since these dimensions are tightly related to each other, an improvement in each dimension can upgrade and strengthen other dimensions, which ultimately increases university credibility and quality. On the other hand, it seems that the executive plans and instructions issued by the Ministry of Health, Treatment, and Medical Education have a central role in achieving desirable institutional accreditation outcomes in universities.

Supplementary Material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments: This study resulted from a master's thesis (No. 3863). The authors appreciate all the vice-chancellors and managers, in the deputies of Development & Resources, Education, Research, and Student & Cultural affairs, who cooperated in completing research questionnaires.

Conflict of Interests: Authors have no conflict of interest.

Ethical Approvals: IR.KMU.REC.437.1397.

Funding/Support: No Funding.

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Strides Dev Med Educ. 2021 December; 18(1):e1061 doi 10.22062/SDME.2021.196172.1061

Research Article

Explaining the Status of Soft Skills Training in Dentistry Profession in Basic Sciences Courses and Identifying the Capabilities of These Courses for the Process-Oriented Integration of Soft Skills

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Received: 2021 May 22
Revised: 2021 October 16
Accepted: 2021 October 18
Published online: 2021 December 11

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Citation:
Valipour Khajeghyasi R, Liaghatdar MJ, Nili MR. Explaining the Status of Soft Skills Training in Dentistry Profession in Basic Sciences Courses and Identifying the Capabilities of These Courses for the Process-Oriented Integration of Soft Skills. Strides Dev Med Educ. 2021 December; 18(1):e1061. doi: 10.22062/sdme.2021.196172.1061.

Abstract

Background: The dentistry profession requires a high level of soft skills whose training seems necessary to respond to the community and increase the quality of specialized practice.

Objectives: The present study was conducted to examine the status of soft skills training in dentistry basic sciences courses and identify the capabilities of each basic sciences course for the process-oriented integration of soft skills in the dentistry profession.

Methods: The present qualitative study was conducted in 2018-2019.Semi-structured interviews were used to collect the data. The study's statistical population included the faculty members of the basic sciences of Isfahan and Mazandaran universities of medical sciences Iran, using purposive sampling. Moreover, the content analysis method was used to analyze the data.

Results: Soft skills training in the dentistry profession was not one of the educational objectives of basic sciences courses in this field, and teaching and evaluation methods used by professors had less capability to develop these skills. Additionally, the results showed that most of the identified soft skills in five domains had the integration capability in most basic sciences courses. Only some differences were observed in the integration of soft skills in the cognitive-intellectual domain.

Conclusion: It is suggested to include soft skills training in the objectives of dentistry basic sciences courses and consider the capabilities of each course and curricula to correct teaching and evaluation methods in this regard. Furthermore, it is recommended to strengthen the capabilities of basic sciences professors to integrate soft skills.

Keywords: Soft skills, Dentistry, Integration

Background

Education can deliver high-quality human capital to society for wise and skillful actions when it provides comprehensive development of personality, abilities, special skills, and intellectual, physical, and spiritual growth (1, 2). A responsive university is a university that pays attention to personal development and professional preparation together. Today, employers expect university graduates to have soft skills and specialized skills (3), and most organizations have introduced soft skills development as an international priority (4).

Soft skills are known as intrapersonal and interpersonal skills essential for personal development, social participation, and success in the workplace (5). In general, soft skills are a dynamic combination of cognitive and metacognitive, interpersonal, intellectual, and practical skills and moral values (6). Researchers have identified communication skills, analytical skills, interpersonal skills, positive attitude, work ethics, cultural competence, time management, partnership and teamwork, modesty and politeness, flexibility, professionalism, responsibility, critical thinking, problem-solving and decision-making, good judgment, trust, confidence, criticism management, initiation and creativity, and leadership as

soft skills (7-9). The aforementioned skills significantly increase self-confidence, professionalism, coordination, friendship, and optimism and provide positive energy for professional and personal success (10); therefore, the ability of graduates, including graduates of medical sciences, in soft skills is one of the key indicators of success and accountability to the community.

The dentistry profession, similar to other professions of medical sciences, requires a high level of soft skills and specialized skills to respond to the community and provide high-quality services. However, research results (11, 12) indicated that dentistry students have low abilities in some soft skills. Two strategies have been proposed for teaching soft skills in the university curriculum, namely the embedded or integration model and the stand-alone model (13). The stand-alone model has mainly been used for soft skills development (e.g., work ethics and communication skills) in the dentistry curriculum, which seems less effective due to students' low soft skills. The lack of attention to teaching soft skills in dentistry basic sciences courses is highly noticeable. However, the dentistry basic sciences course is an appropriate background and platform for soft skills development in clinical courses, and students can perform better in clinical courses using the soft skills they acquire in this course. Therefore, it will be apparently more effective if soft skills training starts as a longitudinal theme of basic sciences and is included and evaluated in all theoretical and practical courses.

Most researchers state that the most appropriate model for soft skills development is the embedded or integration model (14-17). Integration takes place in two forms Background, namely content-oriented integration and process-oriented integration. Content-oriented integration emphasizes the subject matter and breaks down the content boundaries of science; however, the process-oriented integration represents an integrated organization to strengthen process skills, such as critical thinking, communicating, and problem-solving. The integrated model of soft skills development has been somewhat neglected in the dentistry curriculum, and few studies have been conducted on the process-oriented integration of soft skills in the curriculum of basic sciences courses.

Objectives

The present study aimed to expand the idea of integrating soft skills into dentistry basic sciences courses based on the process-oriented integration by examining the status of soft skills training in dentistry basic sciences courses and identifying the capabilities of each basic sciences course for the process-oriented integration of soft skills in the dentistry profession.

Methods

The present qualitative content-analysis study was conducted in 2018-2019. The study's statistical population included the faculty members of the basic sciences of Isfahan and Mazandaran universities of medical sciences, Iran, using purposive sampling. During meeting with the directors of the Education Development Office of Medical School and explaining the research topic, faculty members interested in education with valuable expertise, experience, and information in this field were selected as a sample. Additionally, the chain sampling method was used to identify other faculty members of basic medical sciences interested in education with appropriate information on this subject. In this study, the actual sample size was determined by the quality and completeness of the collected data; if the collected data was a repetition of the previous data and no new data were obtained, the data saturation was performed and sampling was stopped.

Semi-structured interviews were used to collect the data. During meeting with the directors of the Education Development Office of Medical School and explaining the research topic, he was asked to introduce faculty members with a valuable educational experience and interest in the research topic for an interview. After the initial identification of the faculty members and obtaining informed consent from the participants, interviews were conducted in person at the appointed times in faculty members' offices. The interviewer first explained the research objectives to the participants. Then, the list of soft skills of the dentistry profession identified in Valiapour Khajeghyasi et al.'s (18) study was provided to the faculty members, and then the interviews were conducted (Table 1). Each interview lasted for 25-60 minutes. The chain sampling method was used during the interviews to identify other participants. The interviews were recorded by obtaining the permission of the participants to comply with ethical principles, and the interviewees were assured that all the information would remain confidential.

Qualitative data analysis was performed by content analysis method based on Krippendorff's opinion (19). For the achievement of this aim, the full text of each interview was recorded, transcribed, and typed to be encoded. Each interview text was considered a unit of analysis, and data analysis began with repeated reading of all textual data. After gaining an overview of each interview, the texts of the interviews were reviewed line by line, and meaningful sentences related to each research question were extracted as codes. In this study, for the accuracy and robustness, Goba and Lincoln's(20) approach, the study of strategies (e.g., continuous engagement with data content and continuous data review), sufficient time allocation and long-term participation in the research process, good communication with participants and emphasis on the confidentiality of information, benefiting from reviews by supervisor professors and peer reviews, information verification by participants, and provision of a complete description of the research report for readers were used.

Table 1. Most Important Soft Skills of Dentistry Profession

Main components	Subcomponents
Work ethics	Work conscience, responsibility, respect to the patient and his/her privacy, honesty, and truth
Cognitive skill	Reasoning and decision-making, visual thinking, and high precision
Personality traits	Stress management, self-confidence, and psychological intuition
Management skill	Time management
Artistic skill	Handicrafts
Communicational and interpersonal skills	Communication (i.e., verbal, nonverbal, and listening)
	Patience

Source: Valipour Khajeghyasi et al.' study (2021)

Results

In this study, the status of soft skills training in dentistry basic sciences courses was evaluated in three elements, including 1) curriculum, 2) the objectives of basic sciences courses, and 3) teaching and evaluation methods and identification of the capabilities of basic sciences courses for the process-oriented integration of soft skills, using semi-structured interviews from the perspectives of faculty members of dentistry basic sciences courses. A total of 34 faculty members participated in this study, 10 and 24 of whom were female and male, respectively. The academic ranks of 11, 17, and 6 participants were professor, associate professor, and assistant professor, respectively. Moreover, 20 and 14 participants were from Isfahan and Mazandaran universities of medical sciences, respectively. Four individuals participated in the study from each specialized field, and only three individuals participated in the study from medical physics and genetics. The results of the present study are presented in the following sections:

1. Status of Soft Skills Training in Dentistry Basic Sciences Courses

1.1. Is soft skills training among the objectives of dentistry basic sciences courses?

A review of the dentistry general doctoral curriculum shows that most soft skills have been mentioned in this field's general mission, values, beliefs, and objectives. However, the review of each basic sciences course shows that the training and development of these skills are not among educational objectives. The professors of this course also proceed with educational designing based on these headings. Most participants believed that soft skills were mentioned in the general mission and objectives of the dentistry curriculum; nevertheless, soft skills development was not among these objectives. "*Soft skills are not mentioned at all. We only teach parasites and fungi to students, and we have no headings on soft skills training*", said participant 29. Furthermore, participant 30 stated in this regard: "*These skills are not among the curriculum objectives, and the objectives are very general; the course headings are also very specialized. We do not have any heading in this regard.*" Of course, a small number of participants stated that soft skills have not explicitly been mentioned in the educational objectives of basic sciences courses; however, if professors are willing, they develop soft skills in students. Participant 24 stated: "*Soft skills are not mentioned in the headings ... If professors are willing to teach soft skills, they will do it. These skills have not been mentioned clearly.*" One of the participants believed that soft skills should have been clearly stated in the curriculum objectives: "*Soft skills are not clearly presented in the curriculum objectives. They need to be expressed in curriculum objectives.*" (Participant 25)

In addition, the participants believed that soft skills were among general educational objectives; nonetheless, since there were no executive privileges and guarantees for soft skills development in the education system, professors did not teach them seriously and in an organized manner.

1.2. What teaching methods do professors use most in teaching basic sciences courses? Can the used methods develop soft skills in students? Most participants stated that professors mainly used professor-oriented teaching methods in teaching basic sciences courses, and often the teaching method was giving a lecture. Some quotations are as follows:

"*Giving a lecture does not develop soft skills at all.*" (Participant 23)

"*We generally give lectures, and lectures are not usually reciprocal. In fact, we are just teaching.*" (Participant 6)

Participant 30 commented: "*Most professors use lectures and PowerPoint in an old-fashioned way. These methods do not develop these skills at all. Professors may be interested in discussing soft skills, but this is not among the objectives.*" However, a point made by one of the participants was that if the lecture method was appropriately implemented, it would have the ability to develop most soft skills; nevertheless, the problem was that the professors did not implement the lecture method properly.

1.3. What methods do professors use most in dentistry basic sciences courses to evaluate students?

Most participants stated that faculty members mostly used four-choice tests to evaluate students in basic sciences courses. Participant 25, emphasizing the large number of students in this field, said: "*We use the written and four-choice methods because the number of students is large ... These evaluation methods can only develop cognitive skills.*" In this regard, participant 20, also emphasizing the large number of students and the workload of faculty members regarding the evaluation methods in basic sciences courses, stated: "*Unfortunately, we use more than four options because the*

conditions are not standard; if the conditions are standard and the workload of the professors is low, the professors can use other methods as well." Participant 21, similar to other participants, pointed to the large number of students and believed that if the four-choice questions were well designed, in addition to superficial knowledge, they could assess some cognitive skills. This participant believed that professors could use other evaluation methods to develop soft skills if facilities, such as collaborating with graduate students, were provided for evaluation.

Summarizing the participants' opinions shows that soft skills development has not been included in the curriculum objectives of basic sciences courses. Moreover, the teaching methods used by faculty members in this course are mainly passive and one-way teaching methods that are less capable of developing soft skills. In addition, in this course, four-choice questions are often used to evaluate students, which in ideal conditions and in the case of standard design, they will have the ability to develop only some soft cognitive skills.

2. Identification of the Capabilities of Basic Sciences Courses for the Process-Oriented Integration of Soft Skills

For the identification of the capabilities of each basic sciences course for the process-oriented integration of soft skills of the dentistry profession, after transcribing and exploring the interview texts, the capabilities of each course were identified from the interviewees' viewpoints (Table 2).

Some viewpoints of the participants are as follows: Most participants believed that in all basic sciences courses, soft skills in five domains, including ethical-work values, aesthetic-artistic values, communication and interpersonal skills, personality traits, and management skills, have the capability of process-oriented integration. Professors can develop these skills in students through educational methods, assignment definition and design, and role models. For example, regarding the time management skill, participant 17 said: "*A professor can teach time management by attending and finishing the class on time.*" Participant 16 said regarding stress management training by role model: "*When the professor is calm and does not have stress, students also learn from him/her to be calm and pass this calmness to patients.*" Participant 23 said regarding changing teaching methods to improve students' communication and interpersonal skills: "*We need to change the teaching methods of our classrooms. Now, we often use the lecture method. If the colleagues of the basic sciences course can manage some of their meetings in the form of small groups and include communication and interpersonal skills in the education, students will learn to interact. In my opinion, these skills can be improved by changing the teaching methods.*" This participant also mentioned the role of designing the assignments and learning tasks to develop soft skills. Participant 25 commented on self-confidence and stress management: "*I think professors can develop self-confidence and stress management by exemplifying similar individuals and successful individuals, talking about the fact that everyone may be stressed and have problems, but they have now reached a very successful point.*" This participant also commented on the role model of professors regarding work ethics: "*In terms of work ethics, a professor can be very effective. The professor's way of dressing or respecting, etc., is under the student's magnifying glass. That is why I feel that a professor's personality is at the top of education.*"

However, the participants in this study discriminated in the capability of basic sciences courses to integrate soft skills in the cognitive-intellectual domain. In the following section, participants' views on the capabilities of each dentistry basic sciences course to integrate soft skills in the cognitive-intellectual domain are discussed:

Anatomical Sciences: Among the soft skills of the cognitive-intellectual domain, visual thinking can be further developed in anatomical sciences courses. Participant 23 stated in this regard: "*In the list of cognitive skills, only visual thinking can be taught in the anatomy science ... In anatomy, you see many two-dimensional images. Students try to establish a three-dimensional image of a two-dimensional image in their minds.*" In this regard, participant 14 stated: "*Teaching embryology requires three-dimensional visualization; it has to visualize the stages of evolution.*" Participant 32 also pointed out the existence of software that helps teach visual thinking: "*We have software at present that is three-dimensional and shows all layers of the body.*"

Mycology and Parasitology: Among the soft skills of the cognitive-intellectual domain, reasoning and decision-making ability and precision skill can be further developed in parasitology and mycology. Participant 17 said in this regard: "*In parasitology, we can teach mostly precision and reasoning and decision-making ability.*"

Pathology: Among the soft skills of the cognitive domain, the pathology course has the capability of developing three skills, including visual thinking, reasoning and decision-making ability, and precision. Participant 13 commented on visual thinking: "*When professors talk about cells, for example, we tell students that cells move like this and stick to the vessel wall and pass through in this way; germs are killed by the cells in this way; these cells secrete these substances. They must have visual thinking to understand these descriptions.*" The participants believed that the precision skill when working with a microscope could also be developed.

Immunology: Among the soft skills of the cognitive-intellectual domain, the immunology course can develop skills, such as reasoning and decision-making ability and visual thinking. Participant 16 stated regarding the ability to develop visual thinking in this course: "*In our field (i.e., immunology), the mechanisms can be explained so that the individual is forced to construct them in his/her mind, like animation.*" Concerning the capability of the immunology course in the reasoning skill, this participant stated: "*Immunology can help with cognitive skills in*

Table 2. Capabilities of Dentistry Basic Sciences Courses for the Process-oriented Integration of Soft Skills from Participants' Viewpoints

Medical physics	Virology	Bacteriology	Genetics	Biochemistry	Mycology and Parasitology	Pathology	Immunology	Physiology	Anatomical sciences
Visual thinking	Reasoning and decision-making	Reasoning and decision-making	Reasoning and decision-making	Reasoning and decision-making	Reasoning and decision-making	Visual thinking	Visual thinking	Visual thinking	Visual thinking
Handicrafts	High precision	High precision	Handicrafts	Handicrafts	High precision	Reasoning and decision-making	Reasoning and decision-making	Reasoning and decision-making	Handicrafts
Responsibility	Handicrafts	Handicrafts	Responsibility	Responsibility	Handicrafts	High precision	Handicrafts	Handicrafts	Responsibility
Work conscience	Responsibility	Responsibility	Work conscience	Work conscience	Responsibility	Handicrafts	Responsibility	Responsibility	Work conscience
Respect and privacy	Work conscience	Work conscience	Respect and privacy	Respect and privacy	Work conscience	Responsibility	Work conscience	Work conscience	Respect and privacy
Honesty and truth	Respect and privacy	Respect and privacy	Honesty and truth	Honesty and truth	Respect and privacy	Work conscience	Respect and privacy	Respect and privacy	Honesty and truth
Verbal/Nonverbal communication and listening	Honesty and truth	Honesty and truth	Verbal/Nonverbal communication and listening	Verbal/Nonverbal communication and listening	Honesty and truth	Respect and privacy	Honesty and truth	Honesty and truth	Verbal/Nonverbal communication and listening
Patience	Verbal/Nonverbal communication and listening	Verbal/Nonverbal communication and listening	Patience	Patience	Verbal/Nonverbal communication and listening	Honesty and truth	Verbal/Nonverbal communication and listening	Verbal/Nonverbal communication and listening	Patience
Self-confidence	Patience	Patience	Self-confidence	Self-confidence	Patience	Verbal/Nonverbal communication and listening	Patience	Patience	Self-confidence
Stress management	Self-confidence	Self-confidence	Stress management	Stress management	Self-confidence	Patience	Self-confidence	Self-confidence	Stress management
Time management	Stress management	Stress management	Time management	Time management	Stress management	Self-confidence	Stress management	Stress management	Time management
	Time management	Time management			Time management	Stress management	Time management	Time management	
						Time management			

clinical reasoning. Given that the immune system oversees all physical activities, immunology can greatly strengthen clinical reasoning."

Biochemistry: Among the soft skills of the cognitive-intellectual domain, the biochemistry course can develop reasoning and decision-making ability. Participant 2 stated: "*In some topics, the student has to reason. The biochemistry course can help with clinical reasoning. Any discipline that deals with living organisms must know biochemistry because biochemistry examines the chemical basis of living organisms, what a cell is made of, cells constitute every part of the body, and what compounds*

constitute a membrane; it must be reasoned why this is in this way."

Physiology: Among the soft skills of the cognitive-intellectual domain, the physiology course can develop reasoning, decision-making, and visual thinking. Participant 8 stated on the reasoning skill: "*The field of physiology can help in clinical reasoning. The physiology of functions of bodily systems teaches students clinical reasoning.*" Participant 28 stated: "*Many reactions in physiology can be taught through animation and modeling, which help develop visual thinking.*"

Bacteriology and Virology: Among the soft skills of the cognitive-intellectual domain, bacteriology and virology can develop the skills of reasoning and decision-making, visual thinking, and precision. Concerning visual thinking, participant 5 stated: "*Because we do practical work with students, such as putting the slide and seeing and doing culture, these activities can help teach visual thinking.*" Interviewee 37 stated: "*Precision can be developed in laboratory work.*"

Genetics: Among the soft skills of the cognitive domain, genetics can develop reasoning and decision-making ability. Participant 31 stated in this regard: "*We need to teach students to have an approach to clinical reasoning and decision-making ability. For example, if a patient refers with dental problems, the student should have a diagnostic approach to what the disease is in genetics and how it can be decided.*" Participant 15 stated in this regard: "*Sometimes it may be a simple disease, and it can be diagnosed with a single symptom, but often it is not. It means that most of these diseases have common phenotypes; then, the student should be able to evaluate and take the diagnosis toward one direction.*"

Medical Physics: Among the soft skills of the cognitive domain, medical physics can develop visual thinking. Participant 39 said in this regard: "*Since in the medical physics course students should be familiar with various phenomena and these phenomena are at the level of particles, they should have a visualization of particles and be able to visualize them in their minds in the form of animation. It means that the professor should teach in such a way that visual thinking is created in students, that is, illustration should be performed.*"

Discussion

The present study was designed to investigate the current status of soft skills training in basic sciences courses and identify the capabilities of basic sciences courses for the process-oriented integration of soft skills in the dentistry profession. The findings showed that soft skills development was not among the curriculum objectives of basic sciences courses. In this regard, Jones (2009) has suggested one of the key strategies for soft skills development as explicit inclusion in evaluation and feedback structures, which requires a clear definition of soft skills in curriculum objectives (21). The Malaysian Ministry of Higher Education has clearly defined seven soft skills as "what they should have and what is good to have" and has included them in the educational objectives. Accordingly, it is suggested to include the soft skills objectives of the dentistry profession in the educational objectives of the basic sciences curriculum similar to their specialized objectives based on the degree of learning necessity and importance as what should be learned and what is better to be learned.

Another finding of the present study showed that the faculty members used the lecture teaching method in basic sciences classrooms that is a passive and one-way teaching method. The evidence indicates that learning soft skills is less common in learning environments where teaching is performed traditionally. In this regard, Virtanen and Tynjälä (2018) reported in their study that traditional teaching forms, such as reading, lecturing, and only working, were negatively associated with learning soft skills. Most studies on soft skills teaching methods showed that active teaching methods are more capable of soft skills development (22). Esa et al. (2015) and Colak (2015) reported in their study that participatory learning was one of the most appropriate approaches for soft skills development in students. The participatory approach positively affects students' abilities for group work and communication skills (23, 24). Professors can develop soft skills in students by applying participatory strategy in the classroom. Virtanen and Tynjälä (2018) study also showed that participatory and interactive teaching methods, a constructivist learning environment, and an integrated learning pedagogy predict soft skills (e.g., decision-making skills), different forms of creativity, and problem-solving skills. In this regard, Redoli et al. (2013) introduced the use of the Delphi learning package in the higher education environment as one of the approaches to soft skills development. From their point of view, Delphi learning develops soft skills, such as critical thinking, the ability to combine, and the ability to judge (25).

In addition, Esa et al. (2015) showed that the lecture method could only be effective in developing communication skills (23). According to the research results, universities can take an effective step toward developing students' soft skills by changing teaching and learning approaches to learner-oriented learning. Another finding of the present study showed that the faculty members in the classrooms of basic sciences courses often used four-choice tests to evaluate dentistry students. Naturally, the evaluation methods used by professors to evaluate students are appropriate to their teaching methods; therefore, given the professors' teaching method, the lack of soft skills educational objectives and four-choice evaluation have taken basic sciences courses away from soft skills training.

Another finding of the present study regarding identifying the capabilities of each dentistry basic sciences course for soft skills integration of dentistry showed that the most important soft skills in all five domains of soft skills, work-ethical values, aesthetic-artistic skills, communication-interpersonal skills, personality traits, and management skills could be integrated into all basic

sciences courses. The study results on soft skills in the cognitive-intellectual domain showed that the courses of anatomy, immunology, pathology, and physiology had higher potential for the development of visual thinking. In this regard, Vorstenbosch et al. (2014) showed in their study that the students' visual thinking ability increased with the study of anatomy (26). Moreover, Guimarães et al. (2018) also reported that using a computer-based learning method in anatomy courses positively affected the students' visual ability. The reasoning and decision-making skills are more capable of being developed in courses, such as immunology, pathology, physiology, mycology and parasitology, virology, biochemistry, and bacteriology (27). In this regard, the results of Ma et al.'s (2018) study showed that the implementation of an application-based reverse classroom teaching model could improve students' problem-solving skills in the medical immunology course (28). Another finding of the current study showed that the precision skill in the courses of pathology, mycology and parasitology, virology, and bacteriology had the additional capability to be developed.

The findings showed that dentistry basic sciences courses could develop students' soft skills by three methods. The first method is the content capability of basic sciences courses. Each basic sciences course can develop particular skills in students according to its content (e.g., the same cognitive skills described by medical professionals of basic sciences for each basic sciences course). The second method is to use active and appropriate teaching methods in classrooms. For the achievement of the aforementioned goal, professors should change their teaching process from a teaching-oriented to a learning-oriented approach and, by playing the facilitator role, design learning assignments and activities appropriate to the development of each soft skill in students. Of course, the prerequisite for this issue is the inclusion of soft skills in the educational objectives of each course and the development of knowledge and skills of faculty members of basic medical sciences in this regard. The third method is the role model of basic medical sciences faculty members. Professors can develop numerous soft skills with a role model in students, the prerequisite of which is the existence of inspiring professors in dentistry basic sciences courses. Therefore, it is suggested to carry out interventional studies on appropriate methods of teaching soft skills in the dentistry profession in each basic sciences course and studies on the methods of development and improvement of inspiring professors in medical universities. One of the limitations of the present study was the wide range of soft skills; therefore, it was not possible for the authors to examine each soft skill in depth.

Acknowledgments

The authors would like to express their gratitude to all the esteemed faculty members of the basic sciences of Isfahan and Mazandaran universities of medical sciences and other loved ones who helped carry out this research project.

Supplementary material(s): is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Ethical Approvals: This study has been extracted from a doctoral dissertation in the Faculty of Educational Sciences, University of Isfahan, Iran (code: 97/4264).

Conflicts of interest: The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial or nonfinancial in this article.

Funding/Support: This study was supported by University of Isfahan.

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Strides Dev Med Educ. 2021 December; 18(1):e1076 doi 10.22062/sdme.2021.196535.1076

Brief Report

Development of Medical Etiquette from New Strategies by Art in Education: A Case Study during and before COVID-19

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Received: 2021 August 19
Revised: 2021 October 22
Accepted: 2021 October 25
Published online: 2021 October 27

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Citation:
Mosalanejad L, Dastpak M. Development of medical etiquette from new strategies by art in education: A case study during and before COVID-19. Strides Dev Med Educ. 2021 December; 18(1): e1076. doi: 10.22062/sdme.2021.196535.1076

Abstract

Background: Medical education professionally requires the development of analytical and diagnostic thinking skills, not just accumulation. It used to help the student from exposure to real estate problems by developing analytical skills.

Objectives: This case study reports the process of design and educational outcome of teaching medical etiquette from new student–center strategies by art.

Methods: In this experience, the educational process started during the two courses of medical etiquette courses and is performed every semester from 2018. Combination case-based/scenario-based teaching with art in education in traditional and virtual conditions during three concurrent years was a unique experience to teaching medical etiquette courses.

Results: As a result, this program created fun, engagement, different teaching of lessons in interaction with teamwork, rethinking in performance, and student's excitement and motivation in presenting the students' learning products.

Conclusion: This process is an active cycle of reflection on performance and program and can be used as a model by medical etiquette teachers. We suggest more research should be developed by researchers to access all aspects of program in students' learning and indicators.

Keywords: Medical, Ethics, Teaching, Active learning, Learning, Strategies, Professionalism

Background

What can be seen in teacher-centered education is the transfer of knowledge from teacher to student without enhancing their contribution to learning. Studies show that in traditional teaching methods, the material memorized by the student will be forgotten as soon as possible. Also, teaching lectures is not equivalent to learning because learning is, in fact, the acquisition of knowledge and skills and its application in practice, and should be continued for a long time. The human mind needs simultaneous involvement in emotional and cognitive processes to promote learning. Recently, the impact of art on human performance has attracted much attention of researchers. One of the important goals is to increase the efficiency of the students' mental performance while studying. This improves concentration and attention and provides more effective learning and memorization chance for the student by affecting memory (1).

Art has instrumental and non-instrumental uses in education, which means that it is educated in the future job and plays a role in his personal development. Art is at the center of new ideas for educational restructuring. Given the current situation, the goal of medical education is to empower learners to think and discuss new knowledge, complexities, and uncertainties in a rapidly changing medical world skillfully (2). It seems that the category of art and medical education is integrated with the concept of medicine in humanities. However, it should be kept in mind that the breadth of the humanities of medicine differs from that of art and literature in matters such as therapy. University College London, one of the leading centers in the medical humanities, has provided a definition of the

medical humanities, which is an interdisciplinary activity influenced by the creative and intellectual foundations of various disciplines such as art, literature, and philosophy. Anthropology, etc. pursue educational goals in medicine (3).

The use of art in the teaching and learning of medical sciences has been considered. One of the important goals is to increase the efficiency of students' mental performance while studying, which in this regard affects the improvement of concentration, attention, and memory. The simplest and most common application of art is to increase motivation and create a positive reaction, which is made possible by the limbic reward system. The effects of art education on memory, selective attention, spatial abilities, mathematics, and reading in children are also well known. In addition, art has significant effects on children's ability to deal with social issues (social skills). It has also been reported in a study that the use of art improves the academic performance of individuals in the university (4, 5).

Since 2015, the Deputy Minister of Education of the Ministry of Health has paid special attention to the category of "art and health" and has assigned "promoting knowledge of art and health" as a special mission in the major region nine of educational arrangement. Therefore, using this approach alongside conventional education is a new method in teaching medical sciences. Some experts have noted the artistic interest of learners as a necessary artistic component in the content of the curriculum (6). Research has also shown that combining teaching with emotion is an important way to improve the effectiveness of lessons. Practical attention to artistic education in the medical education system is a wise thing and causes growth in scientific, economic, social, and moral dimensions. Today, maintaining high educational standards depends on placing art and aesthetics at the center, and as the mainstay of the educational system (7).

Studies on the application of art in education have shown that art in education has several advantages, such as sufficient space to provide different solutions to a problem, providing the situation for active participation of learners, increasing and cultivating creativity, nurturing creativity, and improving creative and active learning and teaching. Researches have been designed to facilitate the teaching and learning process, so the integration of art into the curriculum of many disciplines has been suggested (8). This method concludes visual thinking strategies (VTS) and artful thinking. Using these methods is the specific and unique approach to developing a student-center approach (9,10). In new methods of education, such as student-centered strategies, students acquire knowledge and skills themselves, and in these strategies, think about how to rely on themselves in learning and take responsibility for their own learning. This experience expresses the designing art in education of medical etiquette using art elements (paint, role play, and make a video from performance) in a teamwork course.

Objectives

This case study reports the process of design and educational outcome of teaching medical etiquette from new student–center strategies by art.

Methods

This experimental study conducted at Jahrom University of Medical Sciences. The population was all medical students who had medical etiquette from 2018. In this experience, the educational process started during the two courses of medical etiquette courses and was performed every semester. Etiquette course was set with 50 to 59 students in each semester. The course of medical etiquette was based on the new medical curriculum, in the first two years of medicine and during four semesters with different topics.

After the transformation of the medical curriculum in Iran in 2017, medical etiquette is one of the courses that has been provided during the first two years in basic sciences courses the various topics in this course are in the form of psychological, ethical, educational, and professional that are generally taught by different topics. In the field of psychology, which interacts with the field of ethics and professionalism, topics such as effective communication, interpersonal communication, empathy, stress and anger management skills, are covered. In another section, topics such as ethics in cyberspace and cognitive errors are taught in parallel. Overall, at first, lessons with different topics were included in Navid learning management system (LMS). The intervention was performed by presenting the lesson in the form of offline videos and explaining the principles of the lesson using clinical scenarios and cases. These included three topics: anger management, stress management, and ethics in cyberspace. The next step was to provide the assignments. Students were divided into groups of two or three to do their assignments until the end of the semester.

In the first two lectures, students in their groups chose a scenario from a teacher presentation or a content-related topic. After the discussion in the group, they proceeded to prepare a video in the style of role-playing and showed the various correct and incorrect skills in the form of role-playing. The films were prepared and their correct performance and their analysis were uploaded in Navid (LMS of the university). In another part, students were asked to investigate the factors affecting the moral error in virtual environment and causes and explain it in the form of an error tree. The error tree is a graphical model of a combination of series and parallel defects that cause the final event to occur. This model tracks errors from an unfavorable and predetermined event or situation called the top event to the achievement of errors or defects called causal factors. The students drew the error tree after agreeing on the branches of the tree and were then uploaded in Navid (LMS of the university).

The set of student activities assigned the overall score of their performance in the course of medical etiquette in related section.

In the time before COVID-19, the set of activities in the classroom was performed in the form of class groups and team activities and its analysis was done by peers and teachers. After a change in education during COVID-19 crisis, activity shifted to group activities and students' assignments in LMS. Finally, the effect of this teaching method on the components and indicators of learning, team learning, and learning environment were examined in the form of open-ended questions two weeks later in two stages of traditional and virtual classes. Students criticized the learning method at the end of the semester. The student viewpoint was analyzed by contents. Also, the review of team activities in the classroom and group assignments were observed and analyzed by the researchers through field note-taking and class assessment in traditional classroom (observation of class activity, group dynamic, of the quality of the assignment, group activity). During COVID-19 crisis, analysis was specified from students' assignments in LMS (video contents) and open-ended questions which was providing at Navid about the effects of the educational intervention at the end of the course.

Results

The analysis of this course in the students has been performed from one to three consecutive years. All 330 medical students participated in the study of whom 54.3 % were female and 45.7 % were male with the age range between 19-22 years.

The first part of the analysis was the analysis of open-ended questions about courses, qualities and effect of teaching on students' learning. This part was assessed by an online questionnaire or students' written opinions in LMS. All students' responses were assessed in content expression. The results of the study provoked a fun and attractive environment in teaching and learning in groups which included:

- Creating a fun and engaging learning environment (87%).
- Involvement of students in real learning environment (37%).
- Diversity and uniqueness of learning methods (83%).
- The attractiveness of the teaching method and the presentation of the assignments (75%).
- Deep learning (69%).
- Different teaching of lessons in interaction with teamwork (37%).

Examining the observation of group processes in performing assignments and role-playing revealed the following:

- Efficient students' interactions in learning and promotion of their contribution in teaching and learning.
- The dynamics of the group in face-to-face classes and the students' cooperation in preparing assignments and playing roles and preparing videos.
- Excitement and motivation of the student in drawing the error tree and playing the roles(Variety in painting and sending group assignments with colors and variety of ideas expressed).
- Students rethinking in performing the scenarios and playing the roles in the classroom and then the interest in doing homework without withdrawal.
- All students submitted the assignments with a variety of videos, and the interesting analysis and variety of role-playing revealed their mental involvement with the basics of the lesson.
- Other hidden or implicit results expressed the involving family members in performing problematic and correct roles and capturing videos during COVID-19 crisis, which in itself showed the student's excitement and motivation in presenting the student's learning products.
- More than half of the role-playing in COVID-19 time had been done by the individuals with the help of a family member.

All the above mentioned were explained by teachers' assessment in LMS assignment or group activity observation in the classroom through field note-taking and class assessment.

Discussion

The effects of the game on the memory of its indicators showed that this method has a great impact on creating a fun and dynamic environment. The positive effect of art on the functioning of the human brain and its uses is not new (11). The use of music has been mentioned in some studies and its effect on learning has been revealed. However, in the present study, music was not used as an artistic method (12). In some studies, the effect of art on education in deep and objective learning has been considered very appropriate by students. In this study, this index was considered by the students and they expressed it in the educational outcome of using art.

Medical students can also learn practical skills from film and art; for example, oral communication skills from the performing arts or the ability to analyze philosophy. The use of art in teaching communication skills such as role-playing was used in this study, and the submitted films showed students' mastery of applied principles (13).

In the studies conducted, factors such as the combination of art with other courses have been emphasized (14). In some sources, the use of poetry and stories to teach and pay attention to the artistic interest of learners is one of the necessary artistic components in the content of the curriculum (6). Research has also shown that combining teaching with emotion is an important way to improve the effectiveness of lessons. Students' involvement in their own learning using a variety of ideas and its conflict is a good way in deep learning that was also addressed in the present study (15).

Conclusions

Due to the infancy of this educational method and also the need for further study on its effects on students' learning and performance, it is suggested to implement the method in other medical sciences courses to provide the situation for its application. Also, the variety of artistic elements and their different roles in learning can be a good context for teaching and learning so that we can help students to learn effectively by implementing and reviewing it.

- Students rethinking in performing the scenarios and playing the roles in the classroom and then the interest in doing homework without withdrawal.
- All students submitted the assignments with a variety of videos, and the interesting analysis and variety of role and help study its effects on learning and its indicators.

Acknowledgment: We appreciate all students who participated in this study.

Conflict of interest: The authors declare no conflict of interest.

Ethical Approvals: IR.JUMS.REC.1400.066.

Funding/Support: Jahrom University of Medical Sciences

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Strides Dev Med Educ. 2021 December; 18(1): e1042 doi 10.22062/sdme.2021.195720.1042

Brief report

Effect of Simulation-Based Debriefing on Nursing Students' Competence in Medication Administration: An Experimental Study

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Received: 2021 February 10
Revised: 2021 September 20
Accepted: 2021 September 22
Published online: 2021 November 14

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Citation:
Rezaee S, Bagheri Saveh MI, Nouri B, Valiee S. Effect of Simulation-Based Debriefing on Nursing Students' Competence in Medication Administration: An Experimental Study. 2021 December; 18(1): e1042. doi: 10.22062/sdme.2021.195720.1042

Abstract

Background: Medication error represents one of the parameters of patient safety.
Objectives: The aim of present study was to investigate the effect of the effect of simulation-based debriefing on adherence to correct principles and medication administration competence in nursing students.
Methods: Internship nursing students entered this experimental study using the census method. Afterward, the participants were assigned to intervention (n=18) and control (n=17) groups. Two methods were employed for data collection, namely observation and self-report questionnaires. The collected data were analyzed using STATA software (version 12) and non-parametric statistical tests.
Results: A significant statistical difference was found between the mean scores of adherence to correct principles of medication administration and medication administration competence before, 2, and 5 weeks after the simulation in the intervention group (P=0.0001).
Conclusion: The results revealed that the simulation-based debriefing improved the nursing students' competence in medication administration. Therefore, this method in various groups of students and a clinical and practical environment is highly recommended for other students in clinical settings.
Keywords: Students, Nursing, Medication Errors, Simulation Training

Background

Nurses allocate more than 40% of their working hours to medication administration (1). Nursing students are likely to commit medication errors due to a lack of adequate experience in clinical settings (2). The findings of studies indicated that 16.4-58.1% of nursing students committed medication errors (1, 3). Therefore, medication administration is part of the training program and different sections of the nursing curriculum (4). Currently, due to numerous educational topics and limited time, professors are more inclined to teach in the traditional way, especially lecturing (5). However, it is a complicated process, a combination of skills in pathophysiology, pharmacology, and pharmaceutical calculations (6).

Simulation can be characterized as the pilot experience of learning, which ameliorates training programs (7). Simulation-based debriefing lets the learners get immediate feedback relevant to their specific learning needs (8). For ensuring a successful simulation process and learning experiences, the educator is to provide a situation in which learners would be supported (9) and allowed to share their experiences (7).

Objectives

Accordingly, considering the likelihood of medication errors made by nursing students and the necessity to raise adherence to correct principles of medication administration, this study was designed and conducted.

Methods

This experimental study was carried out on 43 internship nursing students of Kurdistan University of Medical Sciences, Kurdistan, Iran, within September 2019 to February 2020. The study subjects were selected through the census method and then allocated to the intervention or control groups, randomly. The inclusion criteria were passing theoretical and practical pharmacology courses, lack of experience of attending individual simulation about medication errors, and informed consent. The exclusion criteria were reluctance to continue participating, failure to cooperate in simulation-based debriefing, and failure to answer all Tthe questionnaire's items. wo methods of observation and self-report questionnaires were employed for data collection. The observation method included a 10-item checklist designed based on previous studies (10, 11). The self-report questionnaire of medication administration competence in clinical practice, designed by Johansson et al., contains 37 items scored according to the Likert scale (1=strongly disagree to 5=strongly agree) (12).

First, the nursing students completed the self-report questionnaire; then, the researcher completed the checklist observing the students administrating medicine in the skill laboratory and 2 and 5 weeks after the initial completion in clinical practice course. The face and content validity of the checklist and questionnaire was confirmed. The Cronbach's alpha coefficient of the questionnaire was 0.71, and the intraclass correlation coefficient of the checklist was 0.75.

In the control group, the students were required to administer the medication according to a scenario. Meanwhile, the researcher completed the checklist. In the intervention group, the students were required to do the medication administration according to the same scenario. Meanwhile, the researcher completed the checklist; then, the intervention occurred. At each step of the simulation-based debriefing, the student completed each medication administration step, and if it was wrong, the lecturer posed some questions and led the student to do the correct way. Debriefing was continued until the student's learning was completed. The participants in the control group had the opportunity to benefit from a similar intervention at the end of the study.

The collected data were analyzed by STATA software (version 12) using the Mann-Whitney U test, repeated measures analysis of variance, Chi-square test, and Fisher's test.

Results

The mean age of participants was was 23.9±2.79 years in the intervention and 22.47±0.71 years in the control group. Most participants were female (66.67% and 58.82% in the intervention and control groups, respectively). The study results indicated that the two groups were homogenous in terms of demographic characteristics (e.g., age, gender, and marital status) and medication administration competence before the intervention. (P>0.05).

After the intervention, a significant difference was found between the two groups in the mean score of medication administration competence in the self-report method after 2 (P=0.0001) and 5 (P=0.0001) weeks (Table 1). After the simulation-based debriefing in the observation method, there was a statistically significant difference regarding adherence to the correct principles of medication administration between the two groups in 2 (P=0.0001) and 5 (P=0.0001) weeks (Table 2).

Table 1. Comparison of Adherence to Correct Medication Administration Principles in Self-report Method and Its Dimensions in Intervention and Control Groups

Variable	Time / Group	Before Mean(SD)	2 weeks Mean(SD)	5 weeks Mean(SD)	P*
Theoretical knowledge	Intervention	28.38(4.25)	34.22(3.70)	34.50(3.56)	0.001
	Control	27.35(4.49)	26.58(4.56)	26.58(4.56)	0.04
	P**	0.42	0.001	0.001	
Assessment and decision-making	Intervention	38.00(16.37)	47.05(4.06)	47.83(4.09)	0.001
	Control	37.70(6.86)	36.76(6.51)	36.76(6.51)	0.04
	P**	0.94	0.001	0.001	
Practical skills	Intervention	19.00(3.34)	25.50(12.96)	22.83(1.38)	0.01
	Control	18.00(4.38)	17.41(4.13)	17.41(4.13)	0.004
	P**	0.58	0.001	0.001	
Medication safety	Intervention	21.44(5.74)	35.00(5.15)	40.11(4.57)	0.001
	Control	23.47(12.28)	23.05(11.98)	23.35(12.92)	0.36
	P**	0.71	0.003	0.001	
Medication competence in clinical practice	Control	106.52(14)	103.82(13.33)	104.11(13.69)	0.008
	Intervention	106.83(15.22)	141.77(15.72)	145.27(9.27)	0.001
	P**	0.76	0.001	0.001	

SD, standard deviation
* Repeated measures analysis of variance
** Mann-Whitney U test

Table 2. Comparison of Adherence to Correct Medication Administration Principles in Observation Method in Intervention and Control Groups

Variable	Time / Group	Before Mean (SD)	2 weeks Mean (SD)	5 weeks Mean (SD)	P*
Correct principles of medication administration	Control	17.47(1.58)	18.88(6.14)	18.64(5.20)	0.31
	Intervention	16.77(2.12)	10.05(0.23)	10.00(0.00)	0.001
	P**	0.346	0.001	0.001	

SD, standard deviation
* Repeated measures analysis of variance
** Mann-Whitney U test

Discussion

The current study results revealed that the simulation-based debriefing was effective in improving the evaluation and decision-making aspects of medication administration competence. The effectiveness leads to higher self-confidence of students, improvement in clinical judgment, problem-solving ability, and correct decision-making (13). Simulation-based debriefing has been effective by providing an opportunity for discussion. Poor practical skills are among the causes of medication errors (14). In the simulation method, by taking care of a model or a simulator, the students receive feedback, and they observe it directly while experiencing it (15). Accordingly, students will be provided with an opportunity to practice a procedure several times (16). The fact that simulation-based debriefing contains questions and answers and instructs correct performance to the students causes a rise in patient safety and medical side effects reporting.

In a study conducted by Marvell et al., 59.5% of participants in the intervention group had a higher rate of medication administration competence (10). In comparison to traditional methods, simulation equips students with more realistic practices (17). Moreover, the properties of simulation-based debriefing have positive effects on students' skills and provide a conducive environment for learning the correct principles of medication administration.

Study Limitations

Receiving education from other ways except simulation-based debriefing is one of the limitations of this study. Furthermore, the current study was carried out on only intern students of one class.

Conclusion

The findings of the current indicated the effects of education using simulation-based debriefing on adherence to correct principles and medication administrative competence as the students who have been taught by this method achieved higher scores in comparison to the students who have been taught by the routine method.

Acknowledgments: The current study grew out of the first author`s dissertation in Medical-Surgical Nursing. This project is approved by Kurdistan University of Medical Sciences no. IR.MUK.REC.1398.056. Special thanks to the Education section at the Faculty of Nursing and Midwifery for their cooperation and providing us with the necessary information. In the end, our sincere gratitude would go for the intern nursing students participating in this study.

Conflict of Interests: The Authors declares that there is no conflict of interest.

Ethical Approvals: This study is adapted from the first author's master's dissertation that was approved by Kurdistan University of Medical Sciences ethics board under the no.IR.MUK.REC.1398.056, with the informed consent obtained from the participants.

Funding/Support: This study was supported by the research fund of the Kurdistan University of Medical Sciences.

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