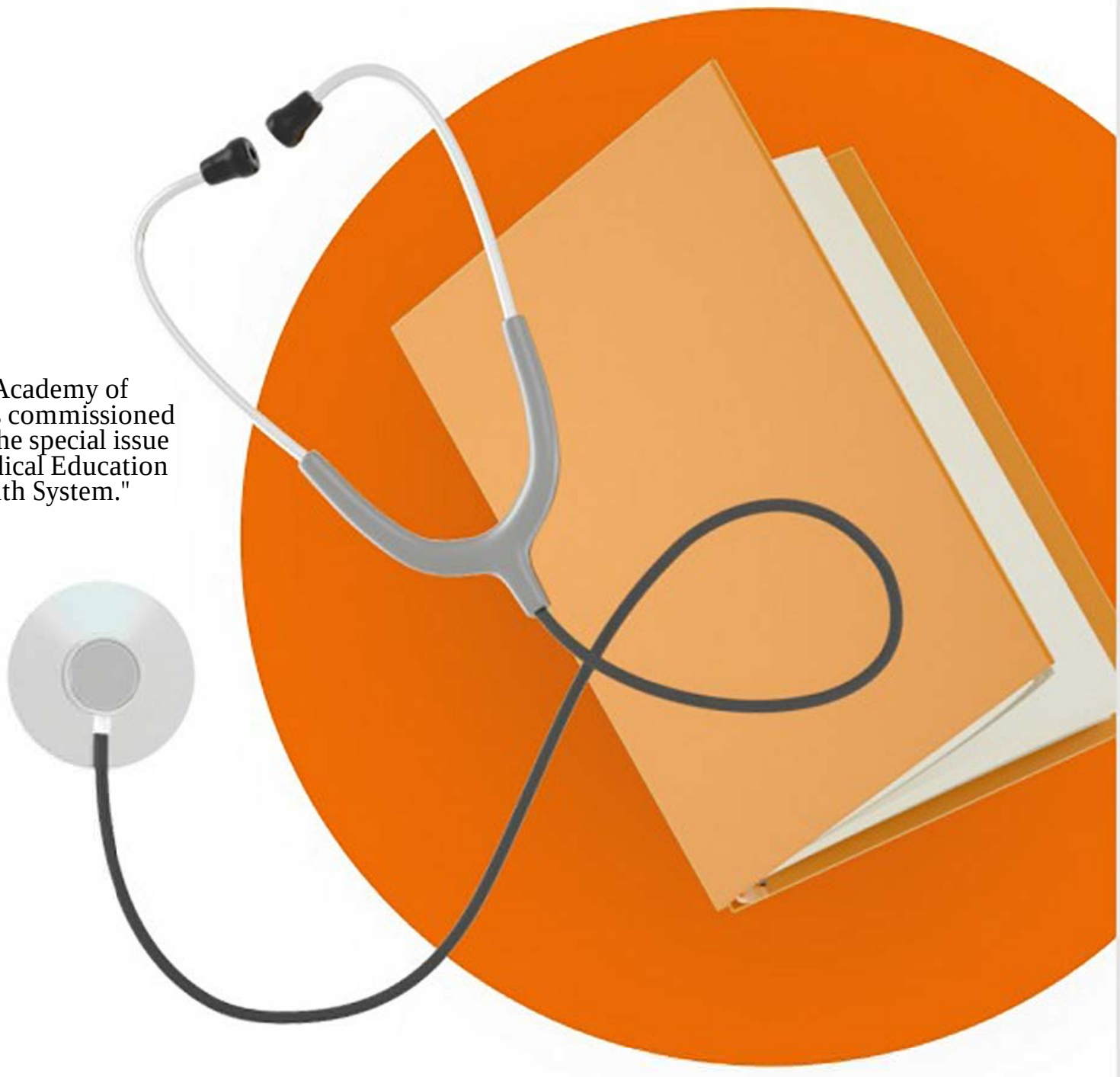
STRIDES in DEVELOPMENT of MEDICAL EDUCATION

Kerman University of Medical Sciences



The Iranian Academy of Medical Sciences commissioned and supported the special issue "Integrating Medical Education into the Health System."

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Strides in Development of Medical Education

VOLUME 21, Supplement (Integration of Medical Education in the Health System), 2024

The Iranian Academy of Medical Sciences commissioned and supported the special issue "Integrating Medical Education into the Health System."

The special issue "Integration of Medical Science Education in the Health System"

Strides in the Development of Medical Education Journal invited all researchers and experts to upload and submit their articles on integrating medical science education in the health system until September 6, 2023, on the Journal site (https://sdme.kmu.ac.ir). The purpose of publishing this special issue was an objective analysis based on empirical evidence regarding integrating medical science education in the health system to make correct policies and continue the path with more beneficial effects. Articles that are aimed at improving effective policies in this matter are prioritized. This special issue was published through the efforts of this journal and the cooperation of the Academy of Medical Sciences.

A) Types of works that could be sent:

The scientific research paper
Review articles
Short report
Letter to the editor
Expression of opinion

B) The scope of work:

The views of experts and researchers regarding integrating medical science education in the health system. Expressing successful experiences regarding integrating medical science education in the health system. Foresight (future studies) the integration of medical science education in the health system. September 6, 2023

JOURNAL INFORMATION

AIM AND SCOPE

The Strides in Development of Medical Education Journal (SDME) is an Online Open Access, a free of charge and double-blind peer-reviewed with a continuous publication model journal. The aim of publishing the SDME is to promote the quality of education and inform via publishing research in all topics related to medical and health professions education. The SDME adopts a Platinum Open Access model, which entails no publication fees for the authors and also readers. Manuscripts are reviewed by at least 2 reviewers and the Editor-in-Chief. This journal provides reports of innovation and research such topics may include:

- Curriculum development and evaluation
- Designing educational courses
- Teaching and learning issues
- Social accountability
- Faculty development
- E-Learning
- Management and leadership
- Assessment and evaluation
- Educational research methodologies
- and other related issue in medical and health professions education. However, the SDME welcomes any subjects causing communication between the health professions experts, faculty member and policy makers

CONTENT COVERAGE

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

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Review Article

Impact of Integration of Medical Education in the Health System of the Islamic Republic of Iran

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Abstract

Background: Following the Iranian Islamic revolution in 1979, two major reforms were implemented in the nationwide health system: Establishment of the Ministry of Health and Medical Education and the development of Primary Health Care Networks.

Objectives: This article aims to review the impact of integration of medical education in the health system.

Methods: We review here the birth and growth of the integration of the health care system and medical education, the successes, the aspirations and some of the obstacles and challenges found along this path, as well as the vision and strategies for the future. All articles on this issue published in international Journal and in Iranian medical Journals were reviewed.

Results: Health care and medical education in the I.R. Iran have undergone profound reform in the last four decades after integration of the Ministry of Health and all related schools and institutions of medical education. The newly formed Ministry of Health and Medical Education is responsible for every aspect of policy making, planning, leadership, stewardship, supervision and evaluation of health services, in addition to the training and educating of human resources for health, within the "Comprehensive Health Care Delivery System" that makes up Iran's health infrastructure. From 1979 to 2020, the number of medical, dentistry and pharmacy schools have increased from 7 to 47, 3 to 35 and 3 to 22, respectively, with a rise in student yearly admissions in all programs of medical sciences from 1387 to 48120. There were no PhD or clinical subspecialty programs in 1979, whereas in 2020, annual student admission rates for such programs were 1038 and 219, respectively; these have been accompanied by marked improvements in the quality of education, clinical care and major health indicators such as increase in life expectancy, access to PHC in rural area, access to clean water, total number of rural health houses and vaccination coverage, on the other hand decrease in maternal, neonatal and under 5years mortality rates, decline in the number of patients sent abroad for treatment and also the number of foreign general physicians practicing in Iran. As a result of significant rise in research activities the number of scientific medical publications have increased from less than 2000 to over 70,000 yearly and Iran has achieved rank of 16 among all countries of the world in this regard.

Conclusion: Integration of medical education into the health care system has been an appropriate and economical strategy for achieving health promotion and the key point for the improvement of medical education for better social accountability in the Islamic Republic of Iran.

Keywords: Education, Health, Integration, Iran, Research, Social accountability

Background

The Islamic Republic of Iran, with an area of 1,648,195 km^2 is the sixteenth largest country in the world. It has a population of over 85 million, with approximately 70% residents in urban areas. According to major development indicators, it is a typical country in the lower- to middle-income group.

Health care in the Islamic Republic of Iran has undergone major reform in the last four decades. Prior to the Islamic Revolution, there was barely a health care "system" in Iran. Preventive health care was limited, and fairly acceptable curative care could only be found in Tehran and in a few large cities where the vast majority of approximately fourteen thousand Iranian physicians were practicing. People living in small towns and villages had to seek the advice of foreign physicians speaking a different language. Residents of over 65,000 villages, in particular, had virtually minimal access to medical care. Following the Islamic Revolution in 1979, the imposed war began in 1980 leading to heavy daily civilian casualties and more difficulties in programing for an ideal health care system.

To achieve "Health for All", the Ministry of Health launched an initiative to establish a primary health care system throughout the country, the main problem however was inadequate health manpower (1). Therefore, the most important intervention in the evolution of a national health system was the formation of the Ministry of Health and Medical Education (MOH and ME). Since the integration of medical education into the Ministry of Health in March 1986, the numbers of universities and university graduate have increased over ten folds, causing a surge in health manpower development. In addition, the training of local health personnel (Behvarz) enhanced the affectivity of rural health houses and the national mass campaign for children's health facilitated community participation, making intersectoral coordination easier and more feasible (2).

We review here the birth and growth of this integration, the successes, the aspirations and some of the obstacles and challenges found along the path as well as at the vision and strategies for the future, all of which may help readers to obtain a deeper insight into the fundamental role of the integration at medical education in health care delivery with the aim of promoting excellence in both fields of health care system and medical education

Iranian medicine in Islamic Era: Medicine achieved its paramount magnificence in the 10th to 15th centuries, with the works of Mohammad Zechariah Razi (Rhazes 865-925 AD), Ali ebne Abbas Majusi (Haly Abbas, 930-994AD), Ebne Sina (Avicenna, 980–1036 AD) and hundreds of renowned physicians and pharmacists. Avicenna's Canon of Medicine, the first comprehensive textbook of medicine in the world, greatly influenced western European medicine; it was translated into Latin and printed and disseminated throughout Europe (3, 4). During the 15th and 16th centuries the Canon of Medicine was published over 35 times and taught to medical students in many European cities (5). Between 16th to 19th centuries, due to Mogul occupation of Iran and lack of proper programming, Iranian medicine stopped its progress.

Evolution of medical education in Iran: The history of the establishment of western style academic universities in Iran dates back to 1849 with the establishment of the school of Darolfonoon, which was founded by Mirza Taghi Khan Amir Kabir and aimed at training and teaching Iranian experts in many fields of science and technology (1).

The School of Medicine was established as a part of the University of Tehran in 1938 and Professor Oberlin from the University of Paris was invited to update the structure of medical education in Iran. The ministry of Health was established in 1941. In 1979, prior to the Islamic Revolution, there were nine medical schools in Iran, two of them fairly newly established. Two schools were located in Tehran, and the rest in the larger cities of Iran. Other health-related schools such as dentistry, pharmacy, nursing and midwifery were even fewer in number, again located mainly in Tehran and a few larger cities of Iran. The total number of health-related faculty members were 2552 (6).

The curricula and quality of medical education at the time was not sufficiently related to the health status and the needs of the community. Considering that medical students were being trained mainly in sophisticated university hospitals, they were not capable of responding to the everyday health needs of the country. The medical schools did not feel responsible toward health promotion, prevention and ambulatory care. The number of graduates from different schools of medical sciences could not meet the health manpower needed throughout the country (7).

The Health Care System Prior to 1979: Before the Islamic Revolution, there was barely a health care "system" in Iran. Preventive health care was very limited and services were not accessible to everyone, particularly the poor and underprivileged. A fairly decent curative care system could only be found in the capital city of Tehran and, to a lesser extent, in a few large cities where a great majority of the fourteen thousand Iranian physicians were practicing. A large number of Iranian physicians had migrated to the United States and European countries.

People living in small towns and large villages had to seek the advice of foreign physicians, who did not speak

Farsi and most of them held only MBBS degree. On the whole, poor people in general and the residents of over 65,000 villages, in particular, had very limited access to health care facilities. At that time the mean ratio of physicians to the population was 1/2800; median ratio was 1/4000, and in some areas, it was as low as 1/18000. A number of provinces did not even have a single practicing obstetrician, anesthesiologist, and some other specialists (2, 7). To achieve Health for all, despite a severe shortage of health manpower the Ministry of Health started to establish a primary health care network throughout the country.

Integration of Medical Education and Health Care Services: In 1979, among the major problems of the health system was the lack of an adequate work force and low-quality medical care. There was no collaboration between university hospital and health system of Ministry of Health (1). In 1981 the Medical Division of the Supreme Council of the Cultural Revolution Council headed by F. Azizi meticulously reviewed successful programs of medical education and health care delivery systems in the world. Following discussions with health authorities and faculty members of various schools of medicine, dentistry, pharmacy and allied paramedical schools nationwide, in 1983, the Medical Division of the Supreme Council of the Cultural Revolution proposed the integration of the Ministry of Health with all health-related schools and institutions which were under the ministry of higher education at that time (6, 7). The objectives of this proposal were to:

1. Improve the quality of health care delivery;
2. Increase the number of admissions in all branches and subdivisions of medicine, dentistry, pharmacy nursing and paramedical services using institutions of the Ministry of Health for education;
3. Involve and mobilize students in daily health care delivery in rural and urban areas;
4. Make schools of medical sciences responsible to the community.

These aims could only be achieved with unified organization, as many previous attempts for collaboration between the two systems had failed (8). The proposal which was first approved by the High Council of Cultural Revolution and then it was approved by cabinet, finally approved by the Iranian Parliament and in March 1986 and the new Ministry of Health and Medical Education (MOH and ME) was established. Thereafter, the chancellor of each provincial university became responsible for public health, preventive and curative medicine along with medical education, as well as research in the provincial capital and in all urban and rural regions (2).

Universities of Medical Sciences and Health Services: There were nine medical, 4 dentistry and three pharmacy schools in Iran in 1979, before the Islamic Revolution. By the end of 1994, the number of schools increased to 34 schools of medicine, 14 dentistry and 9 pharmacy (7). Table 1 shows the number of various medical and health related schools from 1969 to 2021. A significant rise in the number of student admissions to universities occurred in 1986, following the establishment of the new Ministry (9).

Table 1. The number of the schools of medicine, dentistry and pharmacy in the I.R. Iran in the last 5 decades

Year	Medicine	Dentistry	Pharmacy
1969	7	3	3
1974	9	4	3
1989	28	7	7
1994	34	14	9
1997	35	15	9
2008	36	15	11
2015	42	19	21
2020	47	35	22

Table 2 shows the increase in student admissions to the universities of medical sciences and health services from 1970 to 2021.

Table 2. The number of the student admissions to of the universities of medical sciences and health services in the years 1970-2021, in the I.R of Iran

Year	Medicine	Dentistry	Pharmacy	Others	All
1969	632	132	219*	404	1387
1974	1207	159	117	2880	4363
1989	1287	240	203	3883	5613
1994	2049	311	255	6423	9038
1997	3515	425	550	8949	13439
2008	3630	753	459	13299	18141
2015	6177	850	590	19352	26969
2020	6670	2023	1507	33840	44040
2021	8182	2190	1580	36168	48120

The rise in the number of admissions in medical schools and health related schools clearly emphasizes that the rise, which occurred in the mid-80s and 90s, has continued through recent years (10). The percentages of female students range from 52% (medicine) to 100% (midwifery).

The number of teaching staff has increased approximately nine-fold over the last thirty years (Table 3) whereas the ratio of students to faculty members has declined in the last 3 decades from 22:1 to approximately 8:1.

Table 3. The number of teaching staff in the universities of medical sciences and health services in the I.R of Iran: In1993 and 2021

Scientific Grade	1993 No (%)	2021 No (%)
Distinguished professor	0 (0)	21 (0.1)
Professor	26 (2.1)	2552 (12.1)
Associate professor	200 (4.9)	4485 (21.2)
Assistant professor	1030 (48.4)	12164 (57.4)
Instructor	866 (40.6)	1954 (9.2)
All	2122 (100)	21176 (100)

The council of the community- oriented medical education had designated a curriculum for each discipline in 1980, based on the general objectives and health needs of the country, placing more emphasis on preventive and community medicine with two months of field training, and at least 50% of the clinical training hours being spent in ambulatory care services (11).

Number of Physicians: There has been a rapid rise in the number of graduates of all schools of medical sciences in the last four decades. The number of registered physicians increased from less than twenty thousand in 1981 to 130616 in 2020 (Figure 1). Similar rises have occurred in the number of other health related manpower training resulted in having adequate manpower, which led to self-sufficiency in the number of health member (12).

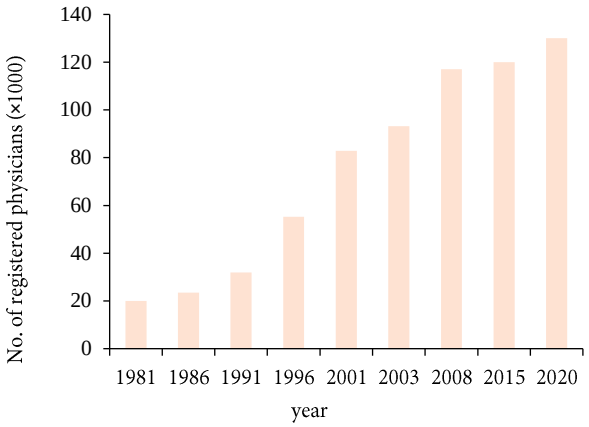

Figure 1. Physician registration number in I.R. Iran, 1981-2020

Postgraduate Training: There were no PhD or subspecialty programs in this field of medicine before the Islamic Revolution. The subspecialty programs were introduced in 1987 and training in all subspecialty fields of internal medicine, pediatrics, and surgery are currently being offered in many of the universities of medical sciences and health services. The number of yearly MSc and PhD admissions have increased in the last four decades from 110 to 3150 and from zero to 1038, respectively. Concomitantly, as shown in Figure 2, there has been an increase in yearly admissions of subspecialty fellows from zero to 219 and of various clinical specialty residents from 401 to 2830 between 1975 to 2020 (10, 12).

Continuing Medical Education: A law was passed in 1990 by the parliament of the Islamic Republic of Iran, which they made continuing medical education (CME) at compulsory.

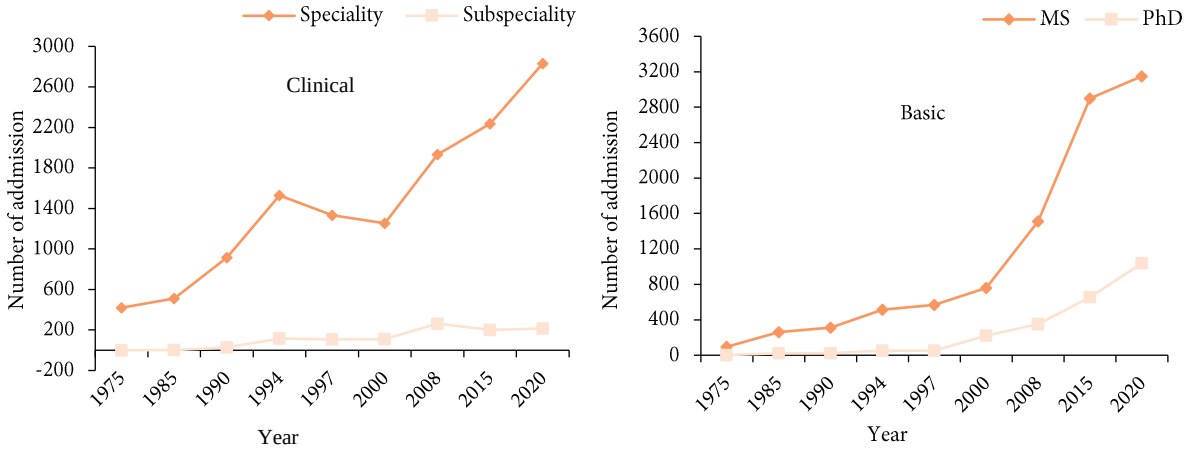

Figure 2. Number of admissions in post graduate levels in faculties of medical sciences in Iran, 1975-2020

In 1997, the continuing medical education act was revised, requiring all physicians to undergo courses in continuing medical education, in order to continue practicing in the I.R of Iran (1).

Research: There has been a rapid rise in scientific publications in the last 3 decades (Figure 3).

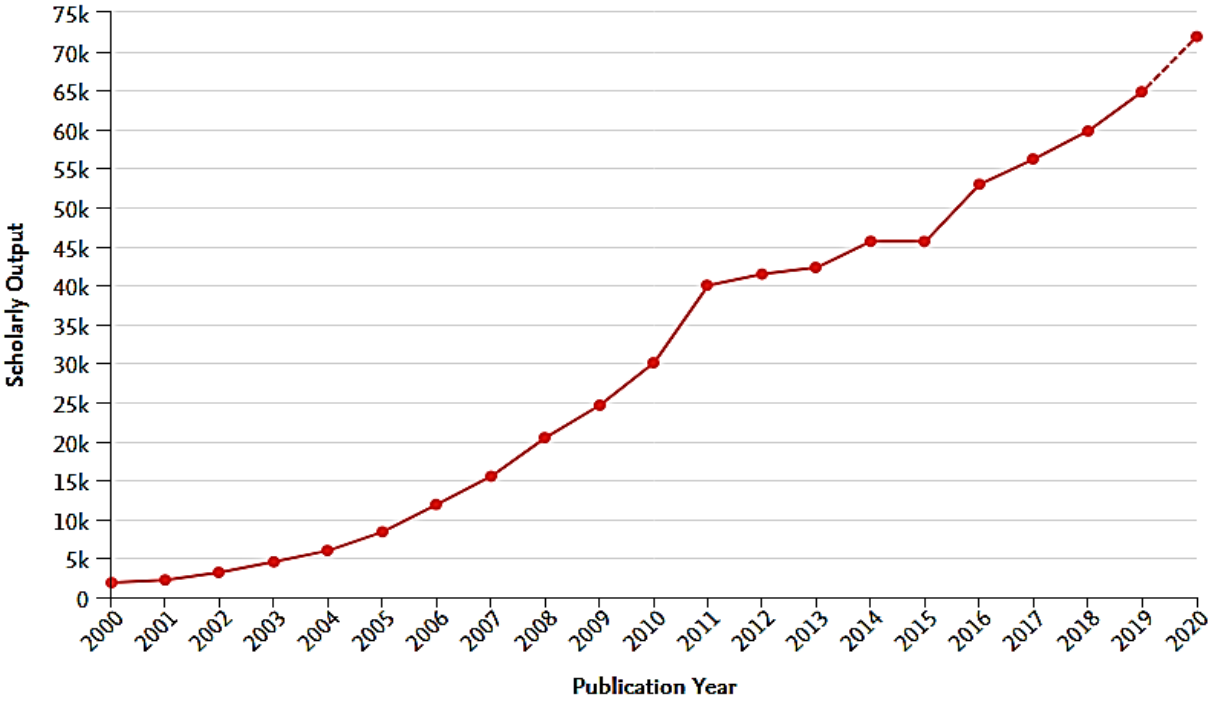

Figure 3. The trend of increase in scientific medical publications (2000-2020, SCOPUS)

Table 4 shows a rapid rise in the numbers of research centers, and scientific journals from 1979 to 2020 (12, 13). Increases have occurred in the number of peer reviewed journals published in Iran. In fact, the Islamic Republic of Iran achieved global rankings between 15 and 16 in the Web of Science for the number of published medical articles, indicating an increasing trend of publishing papers in journals with higher impact factors in the last decade (14, 15).

Health Care and Management

As faculty members became more knowledgeable and more aware of the national health situation and its challenges, MOH and ME developed many different scientific committees related to a variety of health-related issues. The faculty members were invited to become members of these committees, making the committees more sound, scientific, and decisive in their discussions and decision-making. Different health-related departments in the MOH and ME benefited from the active participation of faculty members. In this process, faculty members became more supportive, advocating health-related programs and interventions at the national level; the very successful program of family planning and population control is a good example of cooperation between faculty members and health care providers. The integration of medical education in the health system has made decision-making and coordination in the areas of health care and health manpower training much easier and has led to many achievements such as adequacy in health manpower, increase in social accountability, community leadership, intersectional collaboration, and partnership building for health improvement (12, 16), also improvement in all health indicators and the elimination of endemic disorders such as iodine deficiency and some other endemic diseases (17).

Table 4 shows the main achievements of the integration of medical education into the health care delivery system.

Table 4. Trend of self-sufficiency in medical education in Iran, 1979-2020

	1979	1985	2000	2008	2015	2020
Medical university (No)	0	28	36	41	42	69
Faculty of medicine	9	28	35	36	42	47
Faculty of dentistry	4	7	15	18	19	35
Faculty of Pharmacy	3	7	9	20	21	22
Hospital beds (No)	50760	-	105716	-	118829	150281
Educational hospital beds (No)	9558	10759	52089	-	59414	-
Faculty members	2908 (26)	3153 (33)	8396 (36)	12500 (41)	13621 (42)	20080 (42)
Female %						
Students in medical sciences (No)	25848	32604	94280	124500	188859	233836
Graduated residents (No/year)	420	510	1332	1760	2237	2832
Subspecialty graduates (No/year)	0	2	106	190	203	219
PhD graduates (No/year)	2	21	51	250	656	1038
Research centers (No)	3	5	100	315	684	737
Center of excellences (No)	0	0	18	26	50	61
Scientific journals (No)	5	14	80	120	387	71
Total number of physicians	12000	14000	86000	100000	119459	130616
Physician / population/ ratio (1/1000)	2998	2915	955	760	657	643

These include an increase in the number of medical universities, an increase in numbers of the health workforces, curriculum development through education development centers, initiatives like community oriented medical education, the decentralization of health management system, improvement in PHC coverage and health outcomes, promotion of research on PHC, population health labs, improvement in the referral system, technical support to PHC and medical guidelines, as well as self-sufficiency in postgraduate training and development of research institutions and centers of excellence (12).

Table 5 shows trends of major health indicators over a 30-year period (1985-2020). The integration also sought to provide a better response to the health needs of the community while broadening learning, teaching and research activities. These include increase in life expectancy, access to PHC in rural area, access to clean water, total number of rural health houses and vaccination coverage, on other hand decrease in mortality rates in neonatal and under 5-years, decline maternal mortality ratio, number of patients sent abroad for treatment and foreign general physicians practicing in Iran (18, 19).

Evaluation and Monitoring of the Integration

As happens with many major reform programs, the integration was very controversial from the very beginning. Its opponents tried more than once to disintegrate the MOH and ME through the parliament, but with no success. By and large, the main arguments voiced by the opponents of the integrations seem to be unscientific and often based on rumor. Some of those opposing the integration, believe that if health manpower training be moves back to the Ministry of Higher Education, then all financial, managerial, and educational problems will be solved. In 1997 a newly appointed minister of health and medical education who was one of the major opponents of the integration conducted three different evaluations regarding this issue, and the results of all three were very convincingly in favor of continuing the integration.

In 2002, MOH and ME requested the WHO Eastern Mediterranean Regional Office (EMRO) to carry out a comprehensive and impartial evaluation of the integration. An evaluation team was formed, including a national advisory team and a group of international consultants, with the aim of assessing the following:

- Health services governance, delivery, resources and partnership
- Medical education governance, process-output-outcomes, resource management, and partnership
- Interests and expectations of major stakeholders

Over 200 major stakeholders, including opponents and supporters participated in this evaluation, which entailed the use of different methods, including open discussions, focus group discussions, site visits, individual approaches and questionnaires. At the end of the evaluation, the concluding statements by the international team was that the strengthening of the existing system along with performance improvements will more likely benefit the country and population at large. They also stated that "the separation of medical

education from health services will exert a huge negative impact in strategic, technical, financial and logistic terms" (20), and strongly recommended that the government support the system of integrated health services and medical education, and urgently review and upgrade the current curriculum through the introduction of community oriented, problem-based and other effective learning strategies".

Table 5. Trends of major health indicators in Iran, 1985-2020

Variable	1985	2000	2008	2015	2020
Mortality rates					
Neonatal	51	19.3	13.9	10	8.3
Under-5	60	37	22	17	13
Maternal Mortality Ratio (death per 100000 live births)	140	44	33	20	22
Life expectancy					
Male	67.7	70.7	71.1	74	76
Female	71	73.4	74.2	77.0	79
Access to PHC in rural area (%)	20	90	95	98	94
Clean Water Access (%)	71	95	98	98	98
Annual population growth rate (%)	3.59	1.34	1.28	1.32	0.84
Total number of rural health houses	11000	16281	22000	24500	27200
Vaccination coverage (%)	20	95	98.8	99.1	99
Patient sent abroad for treatment (No)	11000	200	0	0	0
Foreign General physicians (No)	3153*	0	0	0	0

*In 1979, number of foreign general physicians in Iran was 6000 and there was no rural health house.

Iran's Ministry of Health and Medical Education has drawn considerable attention worldwide and has been cited by the WHO, UNICEF, UNESCO, the World Bank, the World Federation of Medical Education (WFME) as a model appropriate for the 21st century; many leading academics and international figures have spoken highly of the integration of medical education and health services.

Discussion

History has repeatedly acknowledged the contributions of Iranian scientists to mankind. Between the seventh and the fifteenth centuries A.D, the advent of Islam and its teachings underscored the vitality of knowledge to progress and fostered advances in various fields of sciences. In the first half of the 20th century, with the return of Iranian graduates from Europe much progress was made along modern lines in the development of modern medicine and the availability of trained manpower and specialized faculties of medicine (21).

Reforms in medical education have been ongoing over the past four decades. After the integration of the health sector and medical education, which resulted in the establishment of the Ministry of Health and Medical Education in 1985, there was a notable rise in the number of medical and other health-related schools in the last three decades. The quality of medical education was improved, using new teaching methods and tools based on student centered problem-based learning, community medical education, faculty development, the extension of ambulatory care teaching, new methods of evaluation, establishment of education development centers, emphasis on teaching preventive medicine and the development of postgraduate courses (2, 7, 12). Further development of postgraduate education played a main role in the extension of research in various fields of basic sciences, epidemiological and clinical sciences.

As defined by the World Health Organization. "Health is a state of optimal physical, mental, social and spiritual well-being, and not merely the absence of diseases and infirmity." According to this definition, health personnel are responsible for health protection, prevention and health promotion along with the promotion of health for the individuals as well as the community. However, graduates of medical schools traditionally see themselves as only responsible for curative medicine. This is not necessarily an individual choice, but is largely related to how medical doctors are trained. Usually the trend is, the sicker the patient, the more sophisticated the equipment, and the more unusual the circumstances, the higher the pride and prestige for the physician. The main reason for this is that almost the entire training program for medical

students and residents takes place at the bedside in the hospitals. Very little, if any, takes place at appropriate ambulatory care facilities and none at the community level. After being cured, patients regularly return to the same conditions they faced before their illness. They are ill-informed as to how to take care of themselves, and unprepared on how to prevent similar situations in future, let alone how to live and enjoy a better life and how to promote their health along with that of their families and the community. Under such circumstances, mental social and spiritual aspects of health are neglected to a large extent, and social well-being is not seriously considered.

If this global picture is to be changed, among other important steps, the curricular of health-related education in general, and that of medical students in particular should be revised, and training should take place under different settings. To bring about such a major change, universities and health services must work together in harmony.

The experience of the I.R. of Iran shows that the integration of medical education and health services has not only made the country self-sufficient in health human resources, but it is also an appropriate, durable and at the same time economical method of promoting community health to the highest level. It is worth mentioning that before the revolution, the main number of health manpower, particularly, the physicians were expatriate, MBBS and M.Ds. therefore, the government had to pay for all expenses of medical and surgical management of huge number of patients who required those types of health care, which were not offered in the country, such as organ transplantations, infertility, some kinds of cardiac surgeries and many of complicated cases which required high number of foreign currencies. As the number of health manpower and, particularly the physicians, specialties, subspecialties increased, and the quality of healthcare improved, not only there is no need for any patient to travel abroad for any kind of health care, but a large number of Iranians living outside of the country and also foreign patients are traveling to I.R of Iran for their own health care. Although integration has not yet evolved completely, especially in the periphery, and the situation is still far from perfect (22, 23), results are very encouraging. Even limited exposure so far has helped faculty members and students to become more familiar with the state of health in the community; their realistic understanding of the environment, culture, traditions, problems, needs and potential has created an environment for better management and opportunities for solving health-related issues. It is therefore anticipated that longer and better-structured exposure of the students as well as faculty members to community needs, revision of the curricula, along with the creation of proper motivation for full-time faculty members, will bring about more progressive changes in incentives among faculty members as well as students, which, in turn will lead to a more community oriented medical education, and help resolve a multitude of the country's health problems.

A comprehensive review of evolution in medical education and research in the last 4 decades show that the Islamic Republic of Iran has achieved successful progress in medical education and research. In the first 20 years (1980-2000), there had been a remarkable rise in quantity and quality of medical education and also a rapid improvement in all health indices throughout all 31 states of the country. Number of universities and their student admission, both undergraduate and postgraduate, including PhD courses and clinical residency programs increased and many new clinical subspecialty programs were established. Research centers and institutes in various fields of medicine were developed (10).

In the second 20 years (2001-2020), research output increased extraordinary, leading to fastest growing number of articles amongst countries of the world in 2010, with concomitant increase in the number of citations of Iranian medical articles despite embargoes (15, 24). For the next 20 years, efforts should be focused toward directing medical research to resolve many issues in the health sector. Promotion of young, talented and distinguished researchers (25), appropriate support and evaluation of scientific output, impact and effectiveness, rise in the research share of GDP for enhancement of targeted research programs (26-28). All those helps to reach strategic objectives of Iranian medical research activities (29).

Conclusion

To conclude the I.R. Iran has been successful in its reform program of medical education over the last three decades. Adequate medical training, the upgrading of postgraduate education and the development of health-related research and publications, with simultaneous improvement in numerous health indicators demonstrate the success and benefits of the integration model of the health system and medical education. Needless to say, it is vital that effective monitoring and evaluation be a continuous and integral part of the system.

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Original Article

An Exploration of Stakeholders' Perspectives in the Seventh National Conference on the Integration of Medical Education into the Healthcare System in Iran

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Abstract

Background: Integrating medical education and healthcare services in Iran represents a unique model that has achieved considerable success but continues to face challenges.

Objectives: This study conducted a content analysis of the 7th National Integration Conference to identify indicators, achievements, challenges, and solutions from stakeholders' perspectives.

Methods: This qualitative study analyzed speeches from the 7th National Integration Conference in Iran using purposive sampling of 13 experts. Data were gathered from recorded presentations and analyzed inductively through qualitative methods to identify codes, categories, and themes. The study followed rigorous quality criteria and ethical principles, including informed consent, anonymity, confidentiality, and voluntary participation.

Results: The study identified three themes, eleven categories, thirty-four subcategories, and 310 initial codes. Discourse analysis highlighted achievements in education, research, services, social outcomes, and economics, as well as challenges at strategic, operational, and influential levels. Proposed strategies included improving public health, implementing organizational solutions, making educational recommendations, and pursuing research-focused actions. Key findings emphasized transitioning to functional integration, maintaining curricula relevancy to societal priorities, and aligning research with public health needs.

Conclusion: The conference facilitated knowledge sharing and networking among participants on integrating medical education and healthcare systems. Challenges and opportunities related to convergence were discussed, emphasizing the need for future research to evaluate integration models, enable coordination, and provide data-driven recommendations. Effective collaboration between educators and providers is essential to improve education quality and patient outcomes. A comprehensive assessment of integration strategies is crucial to ensuring the approach's efficacy and sustainability.

Keywords: Content Analysis; Stakeholders; Integration; Healthcare System

Background

Medical sciences and healthcare services are interconnected fields that significantly improve society's health and overall quality of life. Medical education focuses on training competent healthcare professionals across various disciplines, while healthcare services aim to deliver therapeutic and preventive care to individuals and communities. Together, these domains form fundamental pillars of the healthcare system (1).

Integrating medical education and healthcare services involves coordinating and collaborating on the theoretical and practical aspects of these two fields to

enhance efficiency, effectiveness, and quality in both sectors. The specific form of integration varies across countries, shaped by their cultural, structural, political, and economic contexts. In Iran, the integration process began with the establishment of the Ministry of Health and Medical Education (MoHME) in 1985 and was further solidified by the enactment of the law establishing medical universities in 1988 (2).

As the most revolutionary organizational movement, integrating medical education and healthcare services has significantly transformed the decision-making, management, responsibilities, and operations of these two entities over the years (3).

Integrating medical education and healthcare services in Iran is considered a unique and successful model worldwide. The evaluation of this integration extends beyond national boundaries, with respected international medical education authorities, including the World Federation of Medical Education and the World Health Organization, acknowledging and recognizing its merits (4-6).

The World Health Organization Regional Office for the Eastern Mediterranean has recognized the Iranian national health system as an unparalleled model for regional health ministries and authorities. Consequently, some countries in the region, such as Saudi Arabia, have established medical universities affiliated with their Ministries of Health, inspired by the Iranian integration model (7).

Positive achievements of this integration include balancing knowledge production with its application, strengthening the active role of medical universities in high-level health system decision-making, achieving equitable access to healthcare services, rapidly absorbing medical graduates into the healthcare workforce, making significant advancements in medical education, conducting practical research, enhancing technological innovations, and elevating the scientific and international rankings of these universities (2, 8).

However, despite these achievements, the integration of medical education and healthcare services in Iran continues to face several challenges, including a lack of focus and clarity in policy-making and planning, inadequate coordination and interaction among various levels of authorities within the healthcare system, the absence of common standards and quality criteria for evaluating medical universities and healthcare centers, an imbalance between the demand for and production of healthcare professionals in diverse medical fields, insufficient consideration of community opinions and needs in designing educational curricula, and the inability to effectively address emerging challenges such as infectious disease pandemics, demographic changes, and technological advancements (3).

Therefore, a comprehensive analysis of these challenges through content analysis can contribute to a better understanding of the indicators, achievements, challenges, and opportunities associated with integrating medical education and healthcare services in Iran. Qualitative content analysis involves extracting specific codes from texts or speeches by categorizing words and identifying similarities, differences, and relationships.

Objectives

This study aimed to conduct a content analysis of the 7th National Conference on the Integration of Medical Education in the Healthcare System in Iran to identify the indicators, achievements, challenges, and proposed solutions from the stakeholders' perspectives.

Methods

Study Design: The present qualitative study was conducted in 2022. Qualitative content analysis was used to scrutinize the speeches delivered at the 7th National Conference on Scientific Authority, themed "Integration of Medical Education in the Healthcare System: Achievements and Manifestation of the Scientific Authority of the Islamic Republic of Iran." The study adopted a purposive sampling approach, commonly used in qualitative research.

Participants: The inclusion criterion for participation was a background in either implementing or policymaking in the integration of medical education within the healthcare system of the Islamic Republic of Iran. A comprehensive analysis was conducted on the speeches presented by 13 prominent thought leaders and contributors in the field of integrating medical education into the healthcare system. Table 1 presents the characteristics of the participants in detail. The study data were meticulously gathered directly from the experiences shared by the conference speakers. To unearth the insights, an inductive approach was adopted by our research team, culminating in the identification of codes, categories, subcategories, and overarching themes. These findings encapsulate the tangible experiences and perspectives of the individuals involved in this study. The data collection process unfolded throughout 2022.

Table 1. Characteristics of Participants

Code	Gender	Scientific Degree	Position
1	Male	Professor	Minister of Health and Medical Education
2	Male	Professor	Deputy for Education of Ministry of Health and Medical Education
3	Male	Professor	Secretary of the Supreme Council of Medical Education Planning
4	Male	Professor	Member of Academy of Medical Sciences
5	Female	Professor	Member of Academy of Medical Sciences
6	Male	Professor	Member of Academy of Medical Sciences
7	Male	Professor	Member of Academy of Medical Sciences
8	Male	Professor	Member of Academy of Medical Sciences
9	Female	Professor	Member of Academy of Medical Sciences
10	Male	Professor	Member of Academy of Medical Sciences
11	Male	Professor	Dean of University of Medical Sciences
12	Male	Professor	Dean of University of Medical Sciences
13	Male	Professor	Dean of University of Medical Sciences

Data Collection: Our data collection strategy encompassed the execution of semi-structured and in-depth individual interviews from the outset, supplemented by the diligent maintenance of extensive field notes. The interview process continued until data saturation was reached, ensuring that all pertinent information for the conceptual framework under examination had been captured.

The duration of each presentation varied, ranging from 20 to 40 minutes, depending on contextual factors. Prior to each lecture, explicit consent was obtained from each presenter to record their speech, and subsequently, the presentations were transcribed onto paper at the end of each session. At this stage, the speech transcripts underwent multiple thorough reviews to allow the research team to develop a comprehensive grasp of the content. The primary researchers diligently listened to the speeches until they achieved a nuanced understanding of the central themes and primary concepts conveyed. Any uncertainties or ambiguities were promptly addressed through direct communication with the speaker immediately following the presentation.

Data Analysis: To analyze the data obtained from our study, the qualitative content analysis method was employed, following the framework outlined by Graneheim et al. (9). Initially, specific units were identified. In the context of our research, each lecture served as the primary unit of analysis. Subsequently, we defined meaningful units, which comprised expressions drawn from the speakers' statements concerning various aspects of the core concept. We then further synthesized related meaningful units, leading to the development of research codes (10). Through an examination of the semantic distinctions and commonalities among the extracted codes, as well as quantifying them, the content of the interviews was systematically categorized into multiple levels of themes and subthemes. These categories underwent iterative reviews and were consolidated into overarching themes expressed through generalizable phrases and concepts (11).

Trustworthiness: The Lincoln and Guba criteria were employed to ensure the robustness of our data. These criteria encompass credibility, dependability, confirmability, and transferability, all crucial for rigorous research in the field of medical education. To bolster the credibility of our findings, our sampling strategy was meticulously designed to maximize diversity. During the lectures, several measures were implemented, including allocating ample time for data collection, maintaining a strong rapport with the speakers, and documenting notes while recording the data throughout the research process. In pursuit of data credibility, a three-fold triangulation approach was adopted. This involved engaging a seasoned team of qualitative researchers who diligently interacted with the emerging concepts over an extensive five-month period. The dependability of our data was assured through both peer reviews and external assessments conducted by our supervisors (12). We presented initial findings in the form of codes and categories to selected speakers, incorporating their valuable feedback. Furthermore, segments of the lectures were independently analyzed by colleagues not directly involved in the study, adding an extra layer of validation (12).

To ensure conformability, external evidence from other relevant studies was documented and integrated with the perspectives and insights of fellow researchers, reinforcing the credibility of our study's findings. Finally, to enhance the transferability of our results, a comprehensive exposition of the concepts, the profiles

of the speakers, the methodologies employed in data collection and analysis, and the inherent study limitations was provided. This information is intended to facilitate the replication of our research process by other scholars in the field of medical education.

In adherence to ethical principles, study participants were extensively briefed on the data collection procedures, research objectives, and the study's nature. Participants were granted the autonomy to participate voluntarily or withdraw as they saw fit. We stringently upheld the confidentiality of information in a secure environment, preserving the anonymity of all involved. Consent for audio recording was obtained from the speakers, further reinforcing our commitment to ethical standards.

Results

Based on the discourse analysis of speeches delivered by 13 experts and practitioners in the field of integrating medical education into the healthcare system of the Islamic Republic of Iran, three primary themes emerged: achievements and opportunities, challenges and obstacles, and strategies for enhancing the integration plan. In the following sections, these themes will be elaborated upon in detail. In this study, three themes, eleven categories, thirty-four subcategories, and 310 initial codes were extracted (Table 2).

1. Achievements and Opportunities of the Integration Plan

Based on the analyzed speeches, the achievements and benefits of the integration plan can be categorized into five domains: educational, research, service, social, and economic:

1.1 Educational Achievements: According to the discourse analysis, the educational achievements of medical education integration include the following:

- Enhancement of the quality and quantity of medical education aligned with societal needs and health indicators:

"Today, we observe that among the countries sending the most medical students to our country are Pakistan, India, and Iraq. Currently, we have international students from 5 continents and 54 countries in our country." (Speaker 1)

"In terms of quality, our medical education is now internationally endorsed. The World Federation of Medical Education has entrusted the accreditation of the medicine programs in the country to the MoHME. Consequently, when our medical students graduate, their qualifications are globally recognized for their quality." (Speaker 4)

- Building self-confidence and scientific authority:

"The scientific authority they talk about is real, and today our physicians are accepted worldwide, and many of our professors who used to work in Tehran and major cities are now also considered university professors in the United States, doing the same job." (Speaker 2)

- Addressing the shortage of faculty members and expanding medical universities across the country:

"We have 21,000 faculty members in various fields of basic and clinical sciences." (Speaker 4)

Table 2. Themes, Categories, Sub-categories, and Codes Extracted from Interviews

Theme	Category	Subcategory	Code
1. Achievements and opportunities of the integration plan	Educational achievements	Quality and quantity enhancement	International recognition and increased student enrollment
		Building self-confidence	Global acceptance of Iranian physicians
		Addressing faculty shortage	Increase in faculty members across medical fields
	Research achievements	Increased research output	Growth in scientific production from medical universities
		Innovative services	Development of advanced medical technologies
		Inventions and medical services	Production of COVID-19 vaccines
	Service achievements	Improved access to healthcare	Training specialists for underserved regions
		Eliminating need for foreign doctors	Self-sufficiency in medical education
		Collaboration in healthcare	Attracting patients from neighboring countries
		Patient satisfaction	Increased satisfaction with healthcare services
		Workplace skills	Graduates familiar with work environment
		International student attraction	Establishment of international branches of universities
		Increased life expectancy	Improvement in average life span
	Economic achievements	Reduction of patient outflow expenses	Decreased need for foreign medical travel
		Diminished costs with foreign professionals	Less financial burden from foreign doctors

2. Challenges and barriers to successful integration implementation	Strategic level	Absence of a well-defined roadmap	Lack of clear guidance for integration
		Fragmented policy implementation	Disjointed efforts among departments
		Resistance to evidence-based policy	Challenges in adopting data-driven policies
	Operational level	Limited access to accurate data	Data confidentiality hindering policy-making
		Ritualistic practices	Superficial approaches to healthcare
		Self-centeredness danger	Need for continuous progress awareness
		Inadequate resource allocation	Budgetary constraints affecting integration
	Influential level	Lack of awareness among parliament representatives	Limited understanding of MoHME's role
		Insufficient scientific resources	Need for valuable scholarly work
3. Strategies for enhancing integration	Strategies for improving public health	Elevating public health initiatives	Focus on non-communicable diseases
		Amplifying attention on rural healthcare	Emphasis on rural healthcare services
	Organizational solutions	Transition to functional integration	Moving towards functional integration
		Fostering interdisciplinary collaboration	Importance of collaborative discourse
		Attraction of elite talent	Creating an inspiring environment for students
	Educational solutions	Keeping professors up-to-date	Regular updates to address societal needs
		Curriculum alignment	Frequent revisions to align with societal requirements
	Research solutions	Integration of projects	Comprehensive approach to healthcare projects
		Engagement of research centers	Community engagement and responsiveness
		Research aligned with societal needs	Research topics tailored to healthcare needs

1.2 Research Achievements: The research achievements of the integration plan include the following:

- Increased quantity and quality of research projects, publications, books, and research theses:

"In 2018, 34.6% of the country's indexed scientific production was from medical universities, which have reached 39.7% in 2022." (Speaker 3)

- Enhanced quantity and quality of projects, products, technologies, and innovative services:

"Robotic and surgical achievement include the single-photon emission computerized tomography (SPECT) heart device at Tehran Heart Hospital. We also have a domestically produced preclinical positron emission tomography (PET) scan device that Germany has sought to purchase, and shortly, a clinical PET scan device will also be produced." (Speaker 5)

- Increased research activities, inventions, and preventive and corrective medical services:

"Shortly, six COVID-19 vaccines were produced in the country." (Speaker 4)

1.3 Service Achievements: Service achievements of the integration plan encompass:

- Improved access to healthcare services in remote areas, especially underserved regions:

"Training female specialists in obstetrics and gynecology or general surgery and their appropriate distribution throughout the country for better care of women's health." (Speaker 6)

- Eliminating the need for foreign doctors and introducing the Islamic Republic of Iran as a model in the integration field:

"Before the revolution in Iran in 1979, many Pakistani and Indian doctors were active in the country and could not communicate properly with patients. However, now we have over 250,000 students studying in various fields of medical sciences in 68 medical universities. We also have 150 specialized and subspecialty fields; thus, there is no need for anyone to go abroad to study, especially in clinical fields." (Speaker 4)

- Increased collaboration with domestic and international organizations and institutions in healthcare services:

"In terms of treatment, the quality is such that patients from neighboring countries come to our country for their treatment." (Speaker 4)

1.4 Social Achievements: Social achievements of the integration plan include:

- Enhanced patient and healthcare worker satisfaction:

"The high-quality services provided in educational hospitals attract more people to these hospitals." (Speaker 8)

- Acquisition of necessary workplace skills and familiarity with its challenges:

"Through integration, we were able to turn degrees into skills. Many non-medical universities only issue degrees. If someone wants to work, they must take additional courses to learn the necessary skills. We are pleased that all pharmacy, nursing, dentistry, and all other students are employed after graduation and are familiar with the work environment and its challenges." (Speaker 9)

- Attraction of international students and the establishment of Al-Sibtain University in Iraq:

"We established the international branch of the Tehran University of Medical Sciences in Iraq under the name of Al-Sibtain University, and it was a great honor that our education progressed so much that neighboring countries requested it." (Speaker 10)

- Increased life expectancy:

"Increased life expectancy in Iranian people, from under 50 years old before 1979 to over 75 years old after today." (Speaker 7)

1.5 Economic Achievements: Economic achievements stemming from the integration plan encompass:

- Reduction of patient outflow expenses:

"Our younger generation may be unaware of the post-integration landscape. Previously, patients frequently sought treatment abroad, necessitating the involvement of the MoHME in facilitating foreign medical travel. Patients received foreign currency for treatment abroad." (Speaker 2)

- Diminished costs associated with hosting foreign medical professionals:

"Foreign doctors often remitted their earnings to their home countries once a year, depleting valuable foreign exchange reserves. Also, the Iranian government provided their expenses, accommodation, and other living costs." (Speaker 2)

2. Challenges and Barriers to Successful Integration Implementation

2.1 Strategic Level

- Absence of a well-defined roadmap:

"Integration has endowed us with significant capabilities, enabling evidence-based policy-making. This synergistic bond between researchers and policymakers, often elusive in other domains, is distinctly delineated within the integration framework and warrants increased attention." (Speaker 3)

- Fragmented policy implementation:

"Currently, our actions predominantly exhibit organizational tendencies. We have yet to attain optimal operational efficiency, and the complete integration of the MoHME, encompassing healthcare networks, education, and research, remains an unfulfilled aspiration. Collaboration and unity between ministry departments, perhaps even the university deputy, are essential for directing efforts harmoniously." (Speaker 11)

- Resistance to evidence-based policy:

"Evidence-based policy-making confronts significant challenges within our nation. Establishing widespread acceptance for such policies remains an unfortunate impediment, as policy-making procedures remain arbitrary. This underutilized potential within the integration system warrants intensified attention." (Speaker 3)

2.2 Operational Level

- Limited access to accurate data:

"While respecting data confidentiality, our nation should not forfeit the ability to engage in evidence-based policy-making. Research must be accorded greater relevance in policy-making, embracing a holistic approach encompassing priority setting, documentation preparation, knowledge translation, implementation, and impact assessment." (Speaker 3)

- Ritualistic practices:

"Our approach must eschew superficiality and ritualism. Drawing inspiration from authentic teachings, we should prioritize concepts such as health equity and human dignity." (Speaker 3)

- Self-centeredness danger:

"While celebrating our achievements, it is crucial to acknowledge that complacency can impede progress. Vigilance is key to maintaining momentum." (Speaker 3)

- Inadequate, sustainable resource allocation:

"The MoHME has perennially faced budgetary shortfalls and assorted obstacles, impairing its ability to fully harness the stable resources outlined in legislation. The budget allocation remains suboptimal." (Speaker 12)

2.3 Influential Level

- Lack of awareness and justification among parliamentary representatives:

"Parliament representatives' limited exposure to the MoHME's operations contributes to abstraction in policy discussions. I invite officials, experts, and medical science professors to enlighten parliament representatives about the Ministry's work." (Speaker 12)

- Insufficient scientific resources and knowledge generation:

"Encouraging our professors to produce valuable scholarly work, rather than simply amassing articles, is vital. Many articles produced may lack practical utility, reflecting a disconnect between research and its application." (Speaker 3)

3. Strategies for Enhancing Integration

3.1 Strategies for Improving Public Health

- Elevating public health initiatives:

"Prioritizing non-communicable diseases, such as cancer, stroke, heart diseases, diabetes, high blood pressure, and obesity, is paramount in advancing medical education integration into the healthcare system. Advances in healthcare have reduced the prevalence of communicable diseases, necessitating a stronger focus on non-communicable ailments by the MoHME." (Speaker 11)

- Amplifying attention on rural healthcare services and health promoters:

"Sustaining the integration plan's success mandates increased emphasis on rural healthcare services and the training of health promoters." (Speaker 11)

3.2 Organizational Solutions

- Transition from structural integration to functional integration:

"While structural integration between education, research, and service delivery has made headway, further strides should be made towards functional integration. Educational institutions should take on greater responsibility for service provision." (Speaker 8)

- Fostering interdisciplinary collaboration:

"Interdisciplinary discourse is imperative. The MoHME must collaborate with external entities in various fields for mutual benefit." (Speaker 10)

- Attraction of elite talent:

"The MoHME should inspire and create an environment that fosters hope among students. Attracting and retaining elite individuals within the Ministry is crucial to harnessing their expertise to improve the nation's healthcare system." (Speaker 3)

3.3 Educational Solutions

- Keeping professors scientifically up-to-date based on societal needs:

"Expectations have evolved; professors should regularly update their knowledge to address societal needs. Static teaching methods must give way to dynamic, adaptable approaches." (Speaker 10)

- Curriculum alignment with societal needs:

"Frequent curriculum revisions that align with societal requirements are essential. Outdated materials, which omit common domestic diseases, should be replaced with updated, context-specific content." (Speaker 10)

3.4 Research Solutions

- Integration of medical, educational, and research projects:

"The integration plan should permeate projects, including the design of healthcare facilities. Infrastructure planning should embrace an all-encompassing, network-oriented approach incorporating education and research." (Speaker 10)

- Engagement of research centers with society:

"Research centers' value lies in their community engagement and responsiveness to societal needs. For example, dental schools should extend their services beyond their walls, addressing preventive and oral health within the community." (Speaker 10)

- Research aligned with societal needs:

"Fundamental transformations demand research topics tailored to healthcare needs. Research initiatives must be responsive to society's evolving requirements." (Speaker 13)

Discussion

The 7th National Conference on Scientific Authority, themed "Integration of Medical Education in the Healthcare System: Achievements and Manifestations of the Scientific Authority of the Islamic Republic of Iran," marked a significant milestone in showcasing both a source of national pride and the scientific prowess of the Islamic Republic of Iran. Diverse professionals from the fields of medical education and healthcare convened at this conference to deliberate on and assess the challenges, opportunities, and strategies to bolster the integration of medical education within the healthcare system.

When delving into the subject of medical education integration, it is imperative to consider prior research efforts in this pivotal area. Curriculum studies have consistently emphasized the alignment of medical education curricula with the exigencies of the healthcare system. Learners must acquire practical experience within healthcare settings and possess the ability to apply their knowledge in real-world scenarios. This underscores the need for robust collaboration between medical educators and healthcare providers to ensure comprehensive and relevant medical education. For example, a study by Boulet and Van Zanten in 2014 emphasized the significance of credible medical school programs, specialized medical certifications, and licenses in upholding the quality of healthcare services (13). These processes should be meticulously designed to promote continuous professional development and lifelong learning.

In this context, the imperative is to harmonize medical education curricula with the healthcare system's requirements, thus producing proficient healthcare

professionals who can adeptly address the multifaceted challenges of healthcare delivery within their communities. Cooke and colleagues contend that revising medical education is paramount to equipping physicians with the competencies necessary to provide high-quality, patient-centered care in a rapidly evolving healthcare landscape (14).

Gonzalo and colleagues provide valuable insights into a systemic framework that underscores the pivotal role of integrating basic and clinical sciences into the education of 21st-century healthcare providers (15). This framework is considered indispensable in preparing healthcare professionals for effective engagement within a complex and dynamically evolving healthcare environment.

During the conference, Bagherifard introduced the concept of integration as the simultaneous fusion of education and empowerment (16). Zali construed integration as the intermingling of education, research, and services (17). Furthermore, Pezeshkian underscored the importance of establishing third, fourth, and fifth-generation universities, emphasizing the fusion of these three core elements and active engagement with society to gain a profound understanding of its future requirements (17). Hence, a university detached from society and lacking interaction cannot comprehensively and effectively serve the community. The integration of medical education and healthcare services has been shown to yield enhanced patient outcomes, offering holistic benefits in terms of healthcare delivery, patient satisfaction, and disease management. It also underscores the significance of interprofessional education in augmenting collaboration among diverse healthcare professionals.

Batalden and Davidoff posit that healthcare professionals should receive instruction in healthcare system enhancement, infectious disease prevention, and treatment, while fostering collaborative efforts to improve healthcare quality (18). Mohammadifard maintains that integration can elevate community health literacy in lifestyle modification, risk factor control, postponement of cardiovascular disease onset, disability reduction, and mortality delay (17).

From Vaziri's perspective, integration is exemplified through community-based programs and the establishment of counseling, prevention, and treatment centers for infectious diseases, such as acquired immunodeficiency syndrome (AIDS), involving specialists from various medical disciplines (17). Einollahi contends that acquiring knowledge about innovative treatments, such as cell therapy, stem cells, regenerative medicine, and the production of knowledge-based products, can only be achieved through the integration of medical education and healthcare services (17).

Furthermore, Nasca et al. delve into the rationale and advantages of the Accreditation Council for Graduate Medical Education system for graduate medical education (19). Their research highlights that the next GME system seamlessly integrates medical education and healthcare by emphasizing outcomes and quality improvement (19). This underscores the role of the new system in ensuring that healthcare providers receive comprehensive training to deliver high-quality care, ultimately leading to improved patient outcomes.

According to Wartman and Combs, the transition of medical education from the Information Age to the Artificial Intelligence Age is imperative for facilitating the effective integration of medical education and healthcare systems (20). The incorporation of artificial intelligence holds the potential to augment patient care through personalized interventions and predictive analytics, ultimately leading to improved patient outcomes. Consequently, medical education should prioritize teaching skills related to harnessing artificial intelligence to advance patient care.

In this context, Nafar has highlighted several noteworthy achievements associated with integration, including technological advancements, novel pedagogical approaches, and the utilization of resources such as virtual healthcare facilities to enrich students' learning experiences (17). Nevertheless, a thorough examination of the barriers' impeding integration is essential, encompassing fiscal constraints, deficient infrastructure, resistance to transformative change, and reluctance to embrace emerging technologies (21). Research indicates that innovative technologies, interprofessional education, and enhanced communication mechanisms can fortify integration. For instance, Bridges and colleagues have introduced three models for enhancing Interprofessional Education: The Collaborative Learning Model, the Clinical Education Model, and the Service-Learning Model (22). Their findings underscore the pivotal role of interprofessional education in preparing healthcare professionals for collaborative engagement within the intricate healthcare environment.

A systematic review by Reeves et al. revealed a clear association between interprofessional education and significant improvements in healthcare outcomes, particularly in patient safety, communication, and teamwork (23). Nonetheless, contemporary

investigations suggest that the integration process has yet to reach its full potential or adapt to prevailing demands. Bagheri Lankarani attributes this to the absence of a coherent roadmap and a lack of comprehensive, policy-driven momentum (24). He aptly remarks,

"In Iran, we encounter substantial challenges in evidence-based policy-making, a lamentable situation since policy-making here often remains rooted in personal predilections. Integration endows us with indispensable capacities to be harnessed for formulating evidence-based policies. The symbiotic relationship between researchers and policymakers, frequently elusive elsewhere, is meticulously delineated within the integration framework, an oft-overlooked facet that merits heightened attention" (17).

Finally, the evaluation facet assumes paramount significance in ensuring the success of integration initiatives. A meaningful evaluation of the impact of integration on patient outcomes and the quality of care delivered is a pivotal determinant for future developments in this domain. It also highlights the importance of continual professional development and training for healthcare providers and educators to foster successful integration. A study conducted by on the consequences of integrating medical education into the healthcare system in Iran emphasizes that a comprehensive examination of the economic, social, developmental, and scientific ramifications of integration remains conspicuously absent (25). Current investigations predominantly rely on surveys and general assessments, with limited use of modeling and economic analyses.

Consequently, a precise assessment of the actual effects of integration remains elusive. In this context, Marandi conducted a study to assess the status of medical education integration within Iran's public health framework (26). The findings revealed significant improvements in Iran's healthcare landscape, particularly in remote and rural areas, attributed to integration efforts. Key achievements included the strengthening of healthcare networks, expanded access to potable water, better organization of health indicators, extension of vaccination programs, reductions in neonatal, maternal, and child mortality rates, increased population growth rates, and improvements in life expectancy (26, 27).

Ultimately, a comprehensive review of the literature highlighted a substantial research gap in evaluating the impact of integration on patient outcomes. Consequently, further investigations are crucial to assess the efficacy of various integration models, promote seamless coordination, and provide data-driven recommendations. This is essential to ensure effective collaboration between healthcare providers and educators.

Conclusion

The conference served as a platform for disseminating knowledge and facilitating professional networking among participants. Throughout the conference, significant emphasis was placed on the imperative of integrating medical education with healthcare systems within the realm of scholarly inquiry. This integration necessitates a concerted effort involving collaboration between healthcare providers and educators to enhance the quality of medical education and improve clinical performance. Moreover, during the conference, the challenges and opportunities inherent in merging medical education with healthcare systems were carefully considered. This comprehensive examination addressed a range of issues, including financial considerations, strategic planning, communicative intricacies, and cooperative initiatives among diverse stakeholders. A thorough analysis of these challenges is paramount, underscoring their importance in guiding further research endeavors. Such investigations are essential to ensure the long-term sustainability and efficacy of integrating medical education and healthcare services.

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Original Article

Analysis the Integration of Medical Education with the Provision of Healthcare Services in Iran with a SWOT Approach

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Abstract

Background: The integration policy was designed and to enhance the bilateral interaction and accountability between the medical education system and the national health system, culminating in the establishment of the Ministry of Health and Medical Education.

Objectives: The present research aims to critically examine the integration of medical education into healthcare service delivery using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework.

Methods: This qualitative study was conducted in 2023. Participants included 22 health system policymakers and managers in the country with a managerial background in universities of medical sciences in the country's District 1. Data were collected using semi-structured interviews through purposive and snowball sampling methods until data saturation was reached. Questions were asked about the experience of integration and the SWOT of the program. Subsequently, the interviews were transcribed, semantic units were determined, and the themes' coding, categorization, and identification were conducted. Finally, the data were analyzed using content analysis.

Results: The analysis of experiences yielded 14 main themes and 42 subthemes. The main themes encompassed "self-sufficiency in health human resources, expansion of educational fields, enhancement of social accountability, growth of educational and health indicators, improvement of the connection between education and services, development of applied research (strengths), weakened interdisciplinary convergence, deviation from the educational and research mission, conflict of interest (weaknesses), support of laws and regulations for integration, expansion of international interactions (opportunities), incomplete understanding of integration, emergence of new educational approaches, political and social pressures (threats)."

Conclusion: The integration of the medical education system and the health system is a complex process. This plan has not performed successfully in providing qualified human resources, improving service indicators, and expanding the scope of medical education in the country. It is recommended to select appropriate strategies to maximize the program's strengths and opportunities and minimize its weaknesses and threats.

Keywords: Medical Education; Integration; Healthcare Service Delivery; Health System

Background

The health system faces numerous challenges in different countries, including the provision of a qualified human resources, efficient use of health resources, and facilitating people's access to health services (1). Providing the necessary human resources for the health sector is considered one of the responsibilities of the health system, alongside the three responsibilities of financing, governance, and service delivery, according to the World Health Organization (WHO) (2). In Iran, the training of healthcare professionals underwent significant transformations. Following a report by the

Cultural Revolution Headquarters, tasked with reviewing and developing university programs, on quantitative and qualitative issues in the country's medical education, the Iranian Parliament passed a law of integrating education and research into Iran's former Ministry of Health in 1985, leaing to the establishment of the Ministry of Health, Treatment, and Medical Education. According to this law, all the authorities of the Minister of Health and Welfare, as well as a portion of the duties and authorities of the Minister of Culture and Higher Education related to health, treatment, and medical education and research, were transferred to the minister of this ministry (3,4), and a unified structure was established under the title of University of Medical Sciences and Health Services, which was responsible for service delivery in the fields of health, treatment, education, and research in medical sciences (5).

Some of the primary reasons for the adoption of the plan of integrating medical education and healthcare services, as well as the establishment of the Ministry of Health, Treatment, and Medical Education, include the shortage of physicians relative to the population, the risks to individuals' health, particularly in deprived and underserved areas, and the shortage of educational facilities in the Ministry of Higher Education to train the required number of physicians (6). Increasing the number of qualified healthcare professionals (7), optimal utilization of the country's medical facilities for the provision of healthcare, medical education and research, expansion of universities, utilization of more clinical and educational facilities in medical education, and the alignment of medical education with the real problems and needs of society, as well as the collaborative management between the education and service delivery sectors, are among the goals of this plan (8,9).

There is disagreement about the success of this plan, and its implementation has both supporters and opponents (10). Education in the Ministry of Health is distinct due to the importance of the health services issue and the close integration of educators with service providers in health service delivery centers. Moreover, the presence of faculty members in healthcare service centers enables them to become familiar with the challenges of these centers and to provide more practical education to students. Separating medical education and research from the Ministry of Health would deprive the health system of this opportunity (11). On the other hand, the excessive involvement of faculty members in the care process, neglecting medical education, and the influence of healthcare policymaking on educational programs (12) have culminated in a weak interaction between the educational system and the service delivery system during students' internships (13).

Some studies have indicated a gap between the plan's practical implementation and its intended goals (10). Despite the integration of education and service delivery at the deputy level, complete integration across all educational, healthcare, and managerial levels has yet to be achieved, and many processes in these two areas are still developed and implemented without considering each other's needs (7). On the other hand, some studies have highlighted the numerous benefits of the integration plan. Proponents of the plan believe that it will lead to more research in the fields of public health and community-based medical education, improve the country's health status, particularly in rural areas, remote regions, and less developed provinces (14), increase the number of admissions in all medical fields, improve the physician-to-population ratio (15), enhance utilization of specialized faculty members in treatment and education, and consequently, cause a more equitable distribution of human resources and medical equipment across the country (12).

Given the uniqueness of this experience worldwide, limited research has been conducted to investigate and report on the outcomes of implementing the integration plan in Iran, and the various dimensions of integration have not been thoroughly analyzed (7, 16, 17). Additionally, in the analysis of any plan or program, all internal and external aspects must be taken into account. One model that can be used to evaluate the implementation and performance of such a plan is the Strengths, Weaknesses, Opportunities, Threats (SWOT) approach. Accordingly, an appropriate strategy maximizes the strengths and opportunities of a program while minimizing its weaknesses and threats (18). Therefore, the current study aims to investigate the integration of medical education and healthcare services using the SWOT approach. It is hoped that the findings of this research will provide policymakers and senior managers of the health system with valuable information to reform the governance structure of the Iranian health system.

Objectives

The present research aims to critically examine the integration of medical education into healthcare service delivery using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) framework.

Methods

This study was conducted using a qualitative approach and content analysis. The study population consisted of policymakers and managers of universities of medical sciences in the country's District 1 in 2023. The inclusion criteria for the study included policymakers and managers of universities of medical sciences in the country's District 1 with at least five years of managerial experience and a willingness to participate in the research. To this end, key individuals were purposively identified based on the research objectives and for the purpose of collecting viewpoints. Subsequently, a snowball sampling method was employed whereby additional experts were identified based on the recommendations of the initial individuals who met the inclusion criteria and were purposefully selected. In total, interviews continued until data saturation was reached.

In-depth, semi-structured interviews were conducted to gather expert viewpoints. An interview guide was developed to facilitate the interviews. In designing this guide, a comprehensive literature review was conducted, and several experts in this field were consulted. Subsequently, to determine the validity and ensure the meaningfulness of the questions from the respondents' perspectives, multiple experts were interviewed; based on their feedback, the required modifications were made to address any shortcomings. The questions focused on the experience of integration and the SWOT of the law. In the interviews, participants were allowed to freely explore the medical education integration plan. They were asked: "What comes to your mind regarding the strengths and weaknesses of the medical education integration plan?" "What concepts (examples) can contribute to increasing the opportunities of the medical education integration plan?" "Please state the threats to the medical education integration plan." and "Please share your experiences with the medical education integration plan." During the interview, the focus was on guiding the participant toward a critical analysis of the medical education integration plan. When clarification was required on specific topics, more targeted questions were employed. Follow-up and exploratory questions were posed based on the data provided by the participants to elucidate concepts and delve deeper into the interview process.

Interview times were scheduled in advance and coordinated with the participants either by phone or in person. Additionally, while providing explanations about the purpose of the interviews, participants were assured that their data and statements would be kept completely confidential. Furthermore, they were informed that despite their initial consent, they could withdraw from the interview at any time they wished. Subsequently, a written informed consent form was sent to all individuals who had voluntarily agreed to participate. In order to enhance issues related to the validity, accuracy, and confidentiality of the interview content, an attempt was made to provide a quiet and secluded place away from the workplace noise for conducting the interviews. Moreover, the mean duration of each interview was considered 45 minutes with a standard deviation of 10 minutes.

Immediately following each interview, the data were summarized (summaries encompassed the interviewer's interpretation of the key ideas discussed in the interview). The recordings were then listened to and their content was transcribed. At the end, the handwritten notes were examined for checkbook content. For the content analysis, the qualitative approach developed by Graneheim and Lundman (19) was employed.

Data Reliability and Validity: In order to ensure the accuracy and robustness of the study, the criteria proposed by Guba and Lincoln (20) were used. Through long-term engagement and sufficient interaction with participants, the researcher sought to enhance the credibility of the research by collecting reliable data and obtaining participants' confirmation. A step-by-step iterative process was employed, along with data collection and analysis, and rigorous review by the supervisor, advisor, and experts to enhance data reliability. The faculty members' confirmation and their additional comments were utilized to enhance the data credibility. Data transferability was examined by striving to provide a rich description of the research report, as well as direct quotes from participants exactly as stated.

Results

In the qualitative section, the opinions of 22 policymakers, managers, and health system experts with managerial experience in the Ministry of Health or universities of medical sciences in the country's District 1 were used. Seventy-seven percent of the participants were male and 23% were female. Most participants (91%) held a doctoral degree, while the rest (9%) held a master's degree (Table 1).

Table 1. Participants' demographic characteristics in the analysis of the integration of medical education and health service delivery

Component		Frequency (%)
Gender	Male	17 (77.0)
	Female	5 (23.0)
Education	Doctoral	20 (91.0)
	Master	2 (9.0)
	Bachelor	0 (0)
Age (year)	Over 50	18 (81.8)
	40-50	3 (13.7)
	30-40	1 (4.5)
	20-30	0 (0)
Work experience (year)	Over 20	12 (54.5)
	20-25	6 (27.3)
	15-20	3 (13.7)
	10-15	1 (4.5)
	Under 10	0 (0)

The participants' rich and deep descriptions yielded 320 primary codes. Through the analysis of participants' experiences, 14 main themes and 42 subthemes were also extracted. Six themes were identified as strengths: "Self-sufficiency in health human resources, expansion of educational fields, enhancement of social accountability, growth of educational and health indicators, improvement of the connection between education and services, and development of applied research." Three themes were identified as weaknesses: "Weakened interdisciplinary convergence, deviation from the educational and research mission, conflict of interest." Three themes were identified as opportunities: "Support of laws and regulations for integration, a positive view of integration, and expansion of international interactions." Finally, three themes were identified as threats: Incomplete understanding of integration, emergence of new educational approaches, and political and social pressures" (Table 2). Additionally, all the identified themes were illustrated through a SWOT diagram to better understand the topic (Figure 1).

Strengths

Self-Sufficiency in Health Human Resources: According to most participants, the responsibility of the Ministry of Health in the education and training of medical science human resources resulted in a genuine understanding of the shortages of human resources in the healthcare field. Self-sufficiency in health human resources was one of the obtained themes, encompassing three categories: "Increased capacity for human resources training, independence from foreign manpower, and provision of the necessary workforce for deprived areas."

Increased Capacity for Human Resource Training: Nearly all participants identified the increased number of medical science graduates as a strength of the medical education and service delivery integration plan. From a participant's perspectives, "*Following the integration, the number of student admissions increased significantly. Subsequently, educational institutions for medical education expanded rapidly, facilitating the expansion of disciplines in various programs. As a result, the country achieved self-sufficiency in its health human resources*" (Participant 14). Another participant stated, "*Since the Ministry of Health is itself responsible for service delivery and education, we have witnessed a positive intersectoral effort to utilize all its facilities and centers in order to increase the training of medical and nursing students*" (Participant 6).

Independence from Foreign Manpower: Most participants cited independence from foreign manpower as one of the strengths of the integration plan.

One participant stated, "*This increase in the number of medical staff and disciplines has made us independent of foreign physicians*" (Participant 18). Another participant stated, "*Perhaps the younger generation does not remember, but not so long ago, I remember that we had many Pakistani, Indian, and Bangladeshi doctors in the country; fortunately, we do not need them anymore*" (Participant 14).

Provision of the Necessary Workforce for Deprived Areas: Most participants stated that the presence of healthcare professionals, such as physicians, nurses, midwives, and others, in all regions of the country is currently one of the achievements of the health system. As one participant stated, "*Until three or four decades ago, physicians were only located in large cities and capital cities. People had to endure significant time, expense, and travel difficulties to seek treatment for themselves or their loved ones*" (Participant 7). Another participant stated, "*In all cities, even the most remote ones, we have specialized workforce, and this is a great blessing*" (Participant 1).

Expansion and Ownership of Educational Fields: Participants believed that with the integration of the educational system and health service delivery, the educational system could potentially take owner of as many educational fields as there are healthcare facilities in the country. Expansion and ownership of educational fields was another theme that emerged, comprising

three categories: "Establishment of educational fields in the country's healthcare networks, increased number of educational hospitals and beds, and the possibility of using more paraclinical spaces."

Establishment of Educational Fields in the Country's Healthcare Networks: Participants believed that the integration law culminated in an increase in the educational infrastructure of the country's medical sciences, such that with the increase in this infrastructure, a chain of growth in student admissions and diversity of educational cases was experienced. One participant stated, "*The integration provided a platform where health centers, whether rural or urban, and even local healthcare centers, could be viewed as educational fields*" (Participant 8). Another participant stated, "*Perhaps if the integration had not happened, this golden opportunity would not have arisen*" (Participant 5).

Increased Number of Educational Hospitals and Beds: Participants stated, "*After the integration, we had a lot of good treatment hospitals that could potentially be converted into educational centers and were under the ownership of a unified system that could utilize them as needed*" (Participant 10). "*The possibility of medical students' presence in a greater number of educational centers enables them to benefit from more cases, which in turn improves the quality of clinical training*" (Participant 2).

The Possibility of Using More Paraclinical Spaces: Most participants identified the integration law as a turning point for the expansion of paraclinical spaces, such as pharmacies, laboratories, and imaging centers, at the level of networks and hospitals. For instance, one participant stated, "*Perhaps what is really important is to provide a space for other medical science students, such as students of various health sciences, who require their own specific spaces within the healthcare networks, and integration can help expand the scope of education to the entire health system and beyond, even to the entire country*" (Participant 12).

Enhancement of Social Accountability: Participants believed that the integration law incorporated social accountability into medical professional education and made them more responsible toward patients. The enhancement of social accountability was another obtained theme, consisting of three categories: "Breaking down the barriers of medical schools, accountability to societal expectations in the health sector, and the possibility of student presence at all levels of service delivery."

Breaking Down the Barriers of Medical Schools: From the participants' perspectives, "*When education was integrated with healthcare service delivery, the medical school was no longer solely responsible for education. Instead, they, along with their faculty members, provided services in educational centers. In essence, the medical school was no longer separate from society*" (Participant 14). "*When a faculty considers itself a stakeholder in the health system, it feels a greater sense of responsibility toward patients, and this feeling is also transmitted to other departments*" (Participant 17).

Accountability to Societal Expectations in the Health Sector: Many participants acknowledged, "*Universities of medical sciences in the country have a suitable geographic distribution, and each is working to address the specific problems of the intended region*" (Participant 17). In this regard, one of the participants stated, "*Given that there is now at least one university of medical sciences in each province responsible for the people's health affairs, it is certain that all research and education will be directed toward meeting the needs of the community*" (Participant 22).

The Possibility of Student Presence at All Levels of Service Delivery: Most participants considered the breadth of the educational field and planning for their presence at various levels to be important. They suggested, "*Integration has made it possible for students to be present at all levels of service delivery, including primary, secondary, and tertiary care, rather than solely in hospitals. This has fostered a sense of accountability among them*" (Participant 3). "*The fact that the student is present in a local healthcare center or health center allows them to become intimately familiar with the broadest and most primary level of the country's healthcare network, where they are also expected to work in the future*" (Participant 19).

Growth of Educational and Health Indicators: One of the findings obtained from the analysis of the interview data was the growth of educational and health indicators, comprising three categories: "Increased number of medical science education programs, increased number of educational and therapeutic institutions and centers, and development of primary healthcare services."

Increased Number of Medical Science Education Programs: According to the participants, "*Following the integration, we observed a significant increase in the number of academic programs offered*" (Participant 1). "*I remember when we were studying, only a few universities*

in the country offered specialized or PhD programs" (Participant 7). "*Since each province must now have at least one university of medical sciences, these universities are training health professionals at least in the main health system fields, such as medicine, nursing, and midwifery, which in itself means an increased number of fields in the country*" (Participant 5).

Increased Number of Educational and Therapeutic Institutions and Centers: Participants stated, "*One of the significant achievements of the integration law can be considered the expansion of educational infrastructure and facilities, such as educational centers and training beds*" (Participant 22). "*While before the integration, there were only a few medical schools in the country (just 9 medical schools, 4 dental schools, and 3 pharmacy schools), the integration resulted in at least one university of medical sciences in each province and multiple universities of medical sciences in most provinces*" (Participant 14).

Development of Primary Healthcare Services: One of the participants stated, "*The integration law, along with human resource training, has led to the development of the country's healthcare network*" (Participant 5). Another participant remarked,

Integration improved healthcare human resource planning, such that by increasing student admission capacity requested by the health system, it resulted in the development of human resources in the primary healthcare sector. This, in turn, led to the expansion of healthcare services, such as vaccination, mortality control, and control of communicable diseases, in the country (Participant 15).

Improvement of the Connection between Education and Services: Participants believed that integration led to establishing a close connection between the service delivery and medical education sectors. Improvement of the connection between education and services was another emerged theme, encompassing three categories: "Using healthcare service facilities for educational purposes, using the capacity of faculties to meet the health workforce needs, and proximity and communication between faculty members and health managers."

Using Healthcare Service Facilities for Educational Purposes: Participants stated, "*The integration of the education system and the service delivery system has brought two separate entities together as a unified whole, facilitating mutual growth*" (Participant 16). Many participants believed, "*Integration has provided an opportunity for education to benefit from the healthcare facilities of the service delivery system, utilizing beds, equipment, physical space, and even personnel for educational purposes*" (Participant 1).

Using the Capacity of Faculties to Meet the Health Workforce Needs: Participants believed, "*The education-service delivery relationship was mutual: As much as education benefited from this integration, so too did service delivery in such a way that the presence of professors and students in healthcare centers created a dynamic and vibrant atmosphere and ensured that the knowledge of healthcare staff was always up-to-date*" (Participant 11). Another participant stated, "*When our country faced a shortage of medical, nursing, and paramedical professionals, the educational system made every effort to meet the healthcare sector's needs by increasing the admission and training of students*" (Participant 21).

Proximity and Communication between Faculty Members and Health Managers: One participant suggested, "*The university president and some vice-presidents are faculty members of the same university. In various meetings, a group of academic and healthcare service delivery managers come together to make decisions. The decisions they make will benefit both departments the most and minimize challenges and conflicts*" (Participant 1). Another participant also noted, "*Integration provided the opportunity and possibility for collective thinking between the education system and the service delivery system, and for joint decision-making toward a common goal, i.e., the community health*" (Participant 13).

Development of Applied Research: One of the findings obtained from data analysis was the development of applied research, comprising three categories: "Easier access to health system information, establishment of an interactive environment between researchers and executive managers, and increased selection of health system applied topics."

Easier Access to Health System Information: Participants believed, "*The most important achievement in this area was the easy access of researchers and students to the vast data of the country's health system*" (Participant 11). "*At present, with a simple intersectoral coordination, researchers can access information from various hospital, university, and health-related databases of their own university and even at the national level*" (Participant 1). A different participant mentioned, "*Researchers themselves are part of this system, which in turn facilitates their awareness of information details and*

sources and, most importantly, coordination to access it" (Participant 21).

Establishment of an Interactive Environment between Researchers and Executive Managers: One participant believed, "*Integration led executive managers in universities to recommend their problems to their colleagues in research centers for further study*" (Participant 8). Another participant noted, "*A research committee was formed in various vice-chancellors' offices at the universities, with members including the vice-chancellor for research and the director of the relevant research center, resulting in good interaction between them*" (Participant 11).

Increased Selection of Health System Applied Topics: One participant stated, "*The connection between these two sections has led to a better understanding and recognition of societal needs. As a result of this collaboration, research has become more aligned with the societal needs*" (Participant 8). Another participant remarked,

Medical research has shifted from purely theoretical and impractical investigations toward health issues and problems. Researchers in each region, in collaboration with the service delivery system, have conducted numerous applied and field-based studies. A prime example of this can be observed in the coronavirus disease 2019 (COVID-19) pandemic, the Health System Transformation Plan, education, etc. (Participant 21).

Weaknesses

Weakened Interdisciplinary Convergence: Most participants emphasized the convergence between different disciplines to strengthen concepts such as socialization and social accountability of medical sciences. Metaphors, such as the unity of disciplines, rethinking the medical sciences-social sciences relationship, artificial intelligence, and the entry of basic mathematical sciences into medical sciences, indicate the importance of interdisciplinary convergence. Weakened interdisciplinary convergence was one of the obtained themes, encompassing three categories: "Weakened interdisciplinary convergence within the Ministry of Health, weakened interdisciplinary convergence between ministries (Ministry of Health and Ministry of Science), and weak university-industry relationship."

Weakened Interdisciplinary Convergence within the Ministry of Health: Participants stated, "*Research in medical sciences is still conducted within educational groups. Although there have been significant efforts in recent years to foster interdisciplinary convergence within the Ministry of Health, there is still a long way before it can be fully implemented*" (Participant 16). Many participants believed, "*There remains a substantial barrier between clinical and basic science departments within the Ministry of Health. This can be seen in clinical rounds, journal clubs, and research activities*" (Participant 1).

Weakened Interdisciplinary Convergence between Ministries (Ministry of Health and Ministry of Science): One participant remarked,

There is currently limited interaction between the Ministry of Science and the Ministry of Health, despite the fact that many of the sciences within the Ministry of Health require serious interaction with departments in the Ministry of Science, such as disciplines related to the Faculty of New Technologies, disciplines related to the Faculty of Rehabilitation, and various disciplines of health, basic medical sciences, etc. (Participant 8).

Another participant stated, "Now that artificial intelligence has emerged and serious discussions about its use in medical sciences are taking place every day, the Ministry of Health should establish constructive communication and interaction with the Ministry of Science's disciplines, such as computer engineering and its related fields'" (Participant 21).

Weak University-Industry Relationship: Participants believed, "*The problem of weak industry-university relationship began when industry introduced technology without considering the country's existing knowledge, viewing itself as independent of universities, and on the other hand, universities received their funding from the government and turned their backs on industry*" (Participant 11). "*Unfortunately, the industry-university relationship in our country is weak and unstable, and there are very few domestically produced products that can be attributed to research and development processes*" (Participant 1).

Deviation from the Educational and Research Mission: One of the findings obtained from the data analysis was deviation from the educational and research mission, consisting of four categories: "Expansion of university responsibilities, involvement of university management teams in executive affairs and service delivery, excessive involvement of faculty members in service delivery, and underdevelopment of interdisciplinary research."

Expansion of University Responsibilities: Participants expressed, "*When a university's*

responsibilities extend beyond education and research to include service delivery, it not only doubles but multiplies the university's responsibilities" (Participant 16). Many participants believed, "*The areas of treatment, health, food, and drugs, as service sectors of the Ministry of Health, are so diverse and extensive that, alongside research and education, they have made the responsibilities of universities of medical sciences as heavy and cumbersome as several ministries*" (Participant 1).

Involvement of University Management Teams in Executive Affairs and Service Delivery: Participants believed, "*Due to its nature, the healthcare field has so many executive challenges that it consumes the entire university president's time and focus*" (Participant 11). "*Since the treatment and its resultant problems, such as drug or medical equipment shortages or bed shortages, etc., are so visible, it inadvertently leads to a deviation from its educational and research mission*" (Participant 1).

Excessive Involvement of Faculty Members in Service Delivery: Participants suggested, "*Although the integration law provided a golden opportunity to utilize skilled physicians as faculty members, we have witnessed their involvement in therapeutic processes, which could be a double-edged sword. If a university cannot manage this, it may cause harm*" (Participant 16).

Underdevelopment of Interdisciplinary Research: Participants believed, "*The nature of the interdisciplinary convergence and the necessity of interdisciplinary collaborations are more evident in research than in education*" (Participant 14). Another participant noted, "*Interdisciplinary research is currently underrepresented*" (Participant 21). One of the participants stated, "*With the advent of new technologies and advanced equipment, there is a pressing need for serious scientific research in the fields of basic mathematics, humanities, and experimental sciences*" (Participant 1).

Conflict of Interest: This theme was one of the findings extracted from the data analysis, involving three categories: "Conflict of interest in the accreditation of educational and therapeutic institutions and centers, conflict of interest in the balanced development of medical education, and managerial conflict of interest (law-making)."

Conflict of Interest in the Accreditation of Educational and Therapeutic Institutions and Centers: Participants stated, "*Until the Ministry of Health itself both develops and conducts accreditation with its own scientific and executive team, we cannot expect to witness an improvement in its quality*" (Participant 16). "*When the institution providing a service is also the same one accrediting or evaluating that service, due to the direct correlation between the accreditation results and the hospital's revenue, neutrality is difficult to achieve. This can significantly compromise improvements in the quality of education and service delivery*" (Participant 11).

Conflict of Interest in the Balanced Development of Medical Education: Participants stated, "*When the Ministry of Health itself both trains personnel and determines the need for each specialty in the country to provide services, the policies determining the number of admissions in each may be influenced by the power of the disciplines' scientific and specialized boards*" (Participant 11). A different participant mentioned, "*In some disciplines, we have seen resistance from the Ministry of Health to increase capacity*" (Participant 21).

Managerial Conflict of Interest (law-making): Participants suggested, "*The implementation and regulatory domains should be separated to minimize the creation of monopolies*" (Participant 6). "*For instance, the determination of tariffs by the Ministry of Health results in conflict of interest, which should be separated and conducted by an impartial lawmaker*" (Participant 9). "*The licensing of new physicians is solely in the hands of current healthcare providers, which can create conflict of interest in the licensing process*" (Participant 22).

Opportunities

Support of Laws and Regulations for Integration: This theme included three categories: "Approval of the integration plan by the Supreme Council of the Cultural Revolution, approval of the integration plan by the Islamic Consultative Assembly, and approval of the integration plan by the country's scientific documents."

Approval of the Integration Plan by the Supreme Council of the Cultural Revolution: Participants stated, "*The Cultural Revolution Headquarters was responsible for reviewing university programs and, after several years of investigations, proposed the plan of medical education separation from the Ministry of Science and the establishment of the Ministry of Health, Treatment, and Medical Education*" (Participant 8).

Approval of the Integration Plan by the Islamic Consultative Assembly: Participants mentioned, "*One of the main backings of the medical education integration law is its approval by the Islamic Consultative Assembly in 1985*" (Participant 6). "*Given the immense problems in the health sector and after much debate, it was approved by the*

Islamic Consultative Assembly to ensure enforceability" (Participant 9).

Approval of the Integration Plan by the Country's Scientific Documents: Participants stated, "One of the backings of this law is emphasis on it in high-level documents, such as the health policies announced by the Supreme Leader, which have been emphasized that medical education should be implemented under the supervision of the Ministry of Health and within the health system" (Participant 11).

Expansion of International Interactions: One of the findings obtained from data analysis was the expansion of international interactions, encompassing three categories: "Expansion of health tourism, development of foreign student recruitment, and development of international research."

Expansion of Health Tourism: Participants acknowledged, "*The government's approach to developing international relations can open up new horizons for the Ministry of Health, Treatment, and Medical Education, while simultaneously strengthening both the educational and service delivery structures*" (Participant 1). "*Attracting foreign patients requires up-to-date facilities, advanced technologies, and skilled and knowledgeable physicians. The educational nature of the health system provides more opportunities for growth and staying updated, as education is inherently dynamic*" (Participant 12).

Development of Foreign Student Recruitment: Most participants emphasized the opportunity created for international student recruitment to develop and strengthen the integration plan. One of the participants stated, "*It is not possible to recruit foreign students with the country's limited clinical capacities, as foreign students expect adequate clinical facilities, and the overcrowded clinical spaces may lead to dissatisfaction. Therefore, the integration capacity should be utilized to develop clinical spaces*" (Participant 18).

Development of International Research: A participant stated, "*International research activities are easier than other activities because they require fewer infrastructures*" (Participant 6). Another participant mentioned, "*Success in international research areas largely depends on the presence of competent and interested professors. Success and excellence in this field can contribute to the success of both service delivery and education*" (Participant 2).

Threats

Incomplete Understanding of Integration: This theme included three categories: "Neglect of functional integration, lack of budgeting aligned with integration goals, and misalignment of laws and regulations with integration goals."

Neglect of Functional Integration: Some participants noted, "*It is worth considering whether the integration achieved the goals and expectations that were set for it*" (Participant 2). "*Although the integration was carried out within a structure and we now have a centralized Ministry of Health, Treatment, and Medical Education, the question is whether integration occurred in the functions of these sectors?*" (Participant 3). "Functional integration in the areas of service delivery and education has not occurred to the extent that the integration plan had predicted..." (Participant 20).

Lack of Budgeting Aligned with Integration Goals: Participants suggestd, "*When we say integration, we should not only mean a formal integration, but our behavior, our policies, and the budget we approve should be based on an integration perspective*" (Participant 17). "*Now, in the budget, we have two separate chapters for the education sector budget and the health sector budget, and this means separation, not integration...*" (Participant 3).

Misalignment of Laws and Regulations with Integration Goals: One participant stated, "*The current understanding of integration is not comprehensive... We have formally achieved integration, but our laws are not aligned with integration*" (Participant 4). Another participant mentioned, "*The rules for promotion and advancement of faculty members are similar to the Ministry of Science... The spirit of integration is not observed in promotion and advancement*" (Participant 2).

Emergence of New Educational Approaches: This theme included two categories: "Development of artificial intelligence and development of virtual learning."

Development of Artificial Intelligence: In the majority of participants' discussions, the changing global technology was considered a threat to the future of integration. They stated, "*When artificial intelligence can improve the quality of clinical education, the philosophy of integration, which was to use clinical fields for treatment, might become meaningless*" (Participant 11). "*Artificial intelligence once again raises the concept of the unity of sciences and requires an interaction between sciences, particularly basic mathematics, humanities, and experimental sciences*" (Participant 2).

Development of Virtual Learning: A participant stated, "After COVID-19, teaching methods changed... While the COVID-19 pandemic cautiously brought education into the virtual realm within the clinical setting, a portion of courses were inevitably conducted virtually" (Participant 12). Another participant stated, "We could also use methods like augmented reality or other virtual tools, such as simulators, telemedicine, etc." (Participant 21).

Political and Social Pressures: This theme included three categories: "Excessive increase in student capacity despite the lack of infrastructure, excessive increase in independent medical schools, and university's involvement in challenges beyond its scope of responsibility."

Excessive Increase in Student Capacity despite the Lack of Infrastructure: Participants stated, "*The infrastructure was supposed to be developed during the integration process to provide the necessary conditions for increasing the number of students. Although the increase has exceeded compared to what was initially planned, the infrastructure is still below standard*" (Participant 2). "*Due to Parliament's pressure and environmental factors, the number of students has now increased, but the infrastructure is not really ready and may lead to reduced quality of education, and people may also be dissatisfied with hospital services. This means a loss for both sides...*" (Participant 19).

Excessive Increase in Independent Medical Schools: Participants identified the excessive increase in independent universities of medical sciences/ medical schools as a threat, stating, "*Many of the universities of medical sciences and independent medical schools that have been established are under the influence of political and social pressures. There is no expert-based need for this much expansion*" (Participant 18). "*The philosophy of integration assigned the responsibility of health, treatment, and medical education in each province to one university of medical sciences, but now we see that in some provinces, there are two or even three independent medical schools and universities of medical sciences*" (Participant 1).

University's Involvement in Challenges beyond its Scope of Responsibility: Participants mentioned, "*Integration has forced university presidents and even deans to confront non-academic, more executive challenges*" (Participant 14). "*When the COVID-19 pandemic emerged, university presidents and even the Ministry of Health were more focused on treatment and vaccines than on education; of course, this approach is natural... I mean they did not benefit from the integration, and education injured here.*" (Participant 3).

Discussion

Based on the findings of the current study, the strengths of the integration plan, as perceived by the study population, include "self-sufficiency in health human resources, expansion of educational fields, enhancement of social accountability, growth of educational and health indicators, improvement of the connection between education and services, and development of applied research." Ebrahimnia et al. identified "downsizing the administrative structure and increasing efficiency" as additional strengths of the integration plan (21). Numerous studies have emphasized self-sufficiency in training specialized human resources in the health sector as one of the most critical strengths of the integration plan (9, 10, 22, 23), which is consistent with the findings of the present research. Majdzadeh et al. attributed this to the increased capacity of universities of medical sciences in the country (22). However, some studies have cited an increase in the number of admissions in all medical fields, an improved physician-to-population ratio, complementary training and subspecialty programs (15), the utilization of faculty members specialized in treatment and education, and consequently, a more equitable distribution of human resources (12), and increased efficiency in the number of human resources (21) as reasons for such self-sufficiency.

One of the global challenges in medical education is the inability to social accountability (24), while the fundamental philosophy of universities of medical sciences is accountability to the community needs and expectations (7). Enhancement of social accountability as an inherent element of universities of medical sciences is considered one of the strengths of the integration plan. Research results have demonstrated that the integration plan is an effective approach to addressing the real and important needs of society (9, 25-27) because by bringing together the education system and the service delivery system, an appropriate platform is provided for accountability, and the education system facilitates this accountability (28). Improvement of service indicators have also been identified as a strength and positive impact of integration in other studies (23, 29). According to Shakibaee et al.'s research, the highest level of success in this plan was achieved in the health services and indicators sector, including increased coverage of health

services, vaccination coverage rates, ease of access to healthcare facilities and hospitals, and improved mortality rates (10). This important outcome has been achieved through an increase in skilled human resources and medical equipment across the country, particularly in underserved areas.

Growth in educational indicators, improvement of connection between education and services, and expansion of educational fields were among the other strengths of the integration plan reported in the current study. In Rahnavard's research, the learning dimension ranked highest among the dimensions of integration function (30), and this growth and development was also observed in educational indicators (10), as well as increased number of admissions in all medical science disciplines and postgraduate and subspecialty training programs in other studies (15). Some studies have regarded the significant increase in domestic researchers' publications in recent years to be linked with the implementation of the integration plan (4, 22, 31, 32). This can be due to the creation of a link between research and service, the development of applied research considering the necessity of providing services based on evidence and findings obtained in the medical field, as well as the interaction between researchers and decision-makers.

According to the present study results, weakened interdisciplinary convergence, deviation from the educational and research mission, and conflict of interest were among the weaknesses of the integration plan. Ebrahimnia et al., in their study, identified the inability to be effective and the interference between the headquarters and the front line as weaknesses of the integration plan (21). Other studies have also alluded to the lack of convergence and the creation of interdisciplinary discourse within universities of medical sciences and the Ministry of Science (4). The weakening of the education sector and the decline in the quality of education have been identified as weaknesses of the integration plan in several studies (4, 21, 23, 29). Factors such as the increased number of universities, the increased medical student admission capacity, the decreased medical education budget, the autonomy of educational hospitals, and the deficiencies in the professor and student selection law have been cited as reasons for this decline. Deviation from the research mission is a point identified as a weakness in Majdzadeh et al.'s study, and the focus on service delivery has been the reason for such a deviation and neglect of knowledge production (22). Their research also highlighted weakened interdisciplinary convergence and the link between research and practice, being categorized as one of the hindrances arising from managerial weaknesses. They argued that even when this link is established, it is often ad-hoc rather than systematic. Furthermore, the management of processes does not define the relationship between academics and the executive sector (22). Rahnavard's research emphasizes the importance of conflict and the management of dispute in successful integration (30), which aligns with the findings of the present study. Fostering interdisciplinary relationships within the Ministry of Health through culture-building and mindset change is one of the solutions.

As shown by the results of the current research, the opportunities of the integration plan include support of laws and regulations for integration, a positive outlook on the integration of education and service delivery, and expansion of international interactions. With the approval of the integration plan by the Supreme Council of the Cultural Revolution and the Islamic Consultative Assembly, as well as the appointment of representatives from the Ministry of Health by the Cultural Revolution Council, legal support for this plan has been secured. On the other hand, this plan has not been given special attention in five-year plans, and faculty members' promotion regulations and the budgeting model are not aligned with this plan (32).

Additionally, the findings of this research demonstrated that incomplete understanding of integration, emergence of new educational approaches, and political and social pressures were considered threats to the integration plan. Incomplete understanding of integration has been identified as a barrier to successful implementation of integration in various studies (13, 32). However, the concept analysis of integration can clarify its dimensions, characteristics, applications, influencing factors, consequences, and practical applications (33). Faculty members' focus on clinical responsibilities and less time spent on education and research, reduced quality of education, redused illness spectrum in educational centers, weakened medical ethics due to professors' materialism of and students' imitation of them, and limited educational space were mentioned as negative aspects and threats of medical education integration (32).

Conclusion

The analysis of participants' experiences yielded 14 main themes and 42 subthemes in the form of SWOT. The integration of medical education and the health system is a complex process, and there is a consensus regarding the success of this plan in providing skilled human resources, improving social accountability, enhancing service indicators, and expanding medical education fields in the country. It seems necessary to select appropriate strategies to maximize the strengths and opportunities of the plan while minimizing weaknesses and threats, and to develop potential solutions. It is recommended to conduct foresight studies, design various scenarios, and formulate complementary and alternative models, structures, and processes, as well as conduct economic evaluation research.

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

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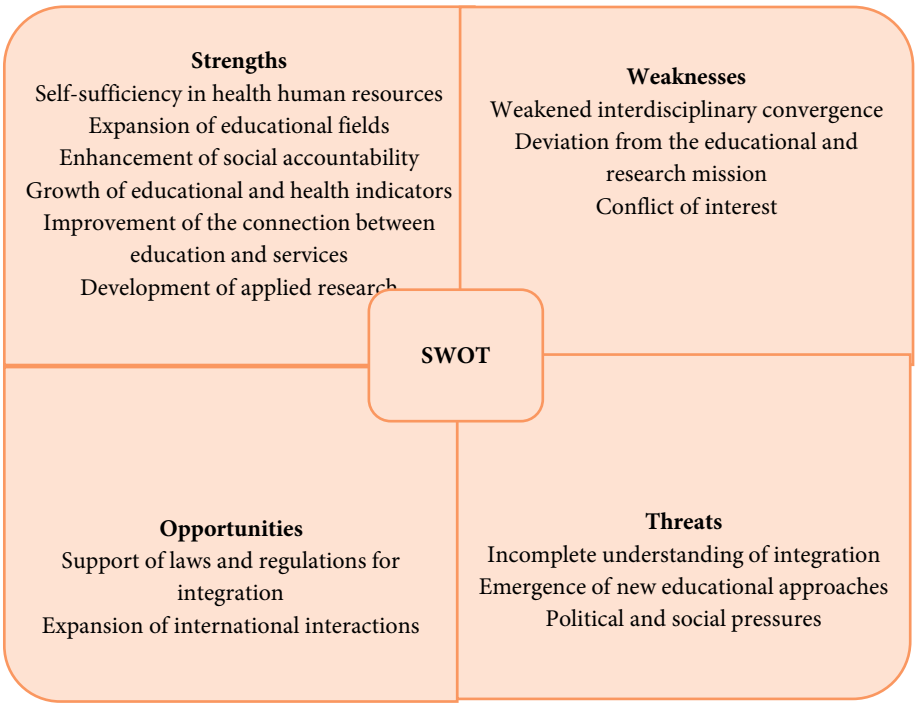

Figure 1: Main themes identified in the integration of medical education and service delivery using a Strength, Weakness, Opportunities, Threats (SWOT) approach

Table 2. Extraction of main themes and subthemes of the integration of medical education and service delivery using a Strengths, Weaknesses, Opportunities, Threats (SWOT) approach

SWOT Components	Main Themes	Subthemes
Strengths	Self-sufficiency in health human resources	Increased capacity for human resources training
		Independence from foreign manpower
		Provision of the necessary workforce for deprived areas
	Expansion of educational fields	Establishment of educational fields in the country's healthcare networks
		Increased number of educational hospitals and beds
		Possibility of using more paraclinical spaces
	Enhancement of social accountability	Breaking down the barriers of medical schools
		Accountability to societal expectations in the health sector
		Possibility of student presence at all levels of service delivery
	Growth of educational and health indicators	Increased number of medical science education programs
		Increased number of educational and therapeutic institutions and centers
		Development of primary healthcare services
	Improvement of the connection between education and services	Using healthcare service facilities for educational purposes
		Using the capacity of faculties to meet the health workforce needs
		Proximity and communication between faculty members and health managers
	Development of applied research	Easier access to health system information
		Establishment of an interactive environment between researchers and executive managers
		Increased selection of health system applied topics
Weaknesses	Weakened interdisciplinary convergence	Weakened interdisciplinary convergence within the Ministry of Health
		Weakened interdisciplinary convergence between ministries (Ministry of Health and Ministry of Science)
		Weak university-industry relationship
	Deviation from the educational and research mission	Expansion of university responsibilities
		Involvement of university management teams in executive affairs and service delivery
		Excessive involvement of faculty members in service delivery
		Underdevelopment of interdisciplinary research
	Conflict of interest	Conflict of interest in the accreditation of educational and therapeutic institutions and centers
		Conflict of interest in the balanced development of medical education
		Managerial conflict of interest (law-making)
Opportunities	Support of laws and regulations for integration	Approval of the integration plan by the Supreme Council of the Cultural Revolution
		Approval of the integration plan by the Islamic Consultative Assembly
		Approval of the integration plan by the country's scientific documents
	Expansion of international interactions	Expansion of health tourism
		Development of foreign student recruitment
		Development of international research
Threats	Incomplete understanding of integration	Neglect of functional integration
		Lack of budgeting aligned with integration goals
		Misalignment of laws and regulations with integration goals
	Emergence of new educational approaches	Development of artificial intelligence
		Development of virtual learning
	Political and social pressures	Excessive increase in student capacity despite the lack of infrastructure
		Excessive increase in independent medical schools
		University's involvement in challenges beyond its scope of responsibility

SWOT: Strengths, Weaknesses, Opportunities, Threats

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Original Article

Integration of Medical Education and Healthcare Services from an International Perspective

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Abstract

Background: An integrated health system is a method to establish more efficient and effective healthcare by prioritizing patients and better meeting the health needs of communities.

Objectives: The aim of this article is to present Iran's experience with integration and examine whether other countries are adopting a similar approach.

Methods: A search was conducted in national and international databases using Farsi and English keywords, without any time limit. Official websites of international organizations, health systems, and well-known universities were also searched. Extracted information was analyzed and organized according to the research goals.

Results: There are three general interpretations of the term "integration" in the field of health and medical sciences: "Integration in medical education or integrated curriculum," "Integrated care," and "The integration of medical education and healthcare services." Sub-groups are discussed within each topic, and examples and key points are provided. The Iranian health system is presented as an example of integrated medical education and healthcare provision. In addition, the views of the World Health Organization and the World Federation of Medical Education on this approach are briefly reviewed. Similarities were observed between integrated medical education and healthcare provision, integration in medical education, integrated care, and University Health Systems in terms of addressing community health needs and improving the quality of clinical practice.

Conclusion: The review showed that while integration is essential for addressing societal health needs and is recommended by international organizations, accountability cannot be achieved solely through curriculum or health service provision integration. Successful integration relies on strong partnerships, effective mentoring, interdisciplinary education, and a commitment to continuous quality improvement. Establishing a dedicated ministry for medical education could align community health needs with training and foster interdisciplinary collaboration. The Iranian health system model has successfully linked education with practice, enhancing health outcomes, especially in rural and underserved regions.

Keywords: Delivery of Healthcare; Health System; Iran; Medical Education

Background

An integrated health system is seen as a way to address the challenge of ensuring that healthcare remains accessible and reliable across various regions globally. It has been advocated as a more efficient and effective approach that prioritizes patients and better caters to the needs of communities. This strategy helps professors and students become more familiar with people's health needs and encourages them to be involved in health promotion and preventive initiatives (1).

It provides a real understanding of the environment, context, culture, customs, problems, needs, and potentials of the community in which the service will be provided. This understanding makes it easier to identify strengths and opportunities and to find solutions to health challenges with the participation of the community (1).

In 1985, a law was passed that transferred all health-related schools and institutions from the Ministry of Higher Education to the Ministry of Health in I.R of Iran. This led to the creation of the Ministry of Health

and Medical Education. Ministry of Health and Medical Education (MOH and ME) in I.R of Iran is responsible for developing and implementing policies related to healthcare system and medical education. In 1994, provincial health organizations and medical sciences universities were merged, and universities of medical sciences and health services were established. As a result, the chancellors of these universities became responsible not only for education and research, but also for the healthcare of their entire province (2).

Integrating education and providing services through mutual communication and synergy was a step toward social accountability (3). After approximately forty years since the implementation of the integration of medical education into the healthcare service delivery system in Iran, many Persian and some English articles have addressed this issue. However, a comprehensive review of similar experiences in other countries has not been conducted. Therefore, in this research, we aim to present Iran's experience with integration and examine whether other countries are adopting a similar approach. In addition, we aim to provide a collection of evidence on the incorporation of medical education into the healthcare service delivery system, as reflected in international recommendations, other healthcare systems, and medical science university programs.

Objectives

The aim of this article is to present Iran's experience with integration and examine whether other countries are adopting a similar approach.

Methods

Literature searches were conducted in PubMed, Scopus, ScienceDirect, and Google Scholar databases using English keywords, and in national databases such as "Magiran," "Medlib," "Irandoc," "Iranmedex," and the "Scientific Information Database (SID)" using Farsi keywords, without time limits. The search strategy for each database was developed in collaboration with an experienced librarian. In addition, the sources of selected articles and their references were reviewed to collect as much relevant material as possible. Furthermore, an additional Google search was conducted to extract relevant documents for identifying grey literature. Official websites of international organizations, certain health systems, and well-known universities were also searched.

The search string was constructed as follows: ("integration" AND "medical education" AND "healthcare, provision" OR "delivery of healthcare" AND "health system" AND "Iran").

Inclusion and Exclusion Criteria: Farsi or English articles that addressed the integration of medical education in the field of service provision were included in the study. Articles that could not be accessed in full were excluded.

In the first step, the titles of the articles were checked, followed by a review of the abstracts of the selected articles. Subsequently, the entire documents were studied and analyzed without any restrictions regarding the type of article or its method. Extracted information was analyzed and organized according to the research goals.

Results

The review revealed that there was no universally agreed-upon definition or concept of integration, and various integration models exist (4). In total, there are three main categories of articles about integration.

1. Articles introducing integration in medical education.
2. Articles about integrated care.
3. Articles on the integration of medical education into medical services.

1. Integration in Medical Education or Integrated Curriculum

The concept of integration has gained significance in medical education over the past two decades, aiming to enhance the relevance of knowledge to clinical practice. This shift promotes a more cohesive medical curriculum and encourages student engagement. Vertical integration in medical education improves learning by connecting basic and clinical sciences (5).

"Curricular integration," in the context of education, refers to the intentional blending or coordination of different components within an academic curriculum. In medical education, curricular integration involves connecting various subjects, topics, or learning experiences to create a more cohesive and comprehensive learning environment.

In the context of medical schools, curricular integration may include horizontal integration, vertical integration, and interdisciplinary integration.

Many of the top medical schools worldwide, especially those with modern and innovative medical education programs, recognize the importance of integration. However, they have often pursued integration in their educational curricula and incorporated curricular integration into their teaching methods. Table 1 presents a selection of medical science universities that have adopted an integrated curriculum approach (6–8).

Curricular integration aims to break down traditional silos between subjects and create a more interconnected and meaningful learning experience. It helps students see the relevance and interconnectedness of different topics, fostering a deeper understanding of the subject matter and its application in real-world situations. Taking steps toward integrating practical methods of education with theoretical content leads to an improvement in the quality of clinical practice and increases the satisfaction of students and professors (9). However, this approach alone cannot fully meet the broad and inclusive expectations intended from integration.

2. Integrated care

Integrated care is defined as a comprehensive range of care and services provided to patients by local and regional healthcare organizations working together (10). Integrated healthcare, commonly known as interprofessional healthcare, requires extensive collaboration and communication among healthcare professionals. Here are a few examples.

The Concept of Integration, or Integrated Care, in Low- and Middle-Income Countries: In low- and middle-income countries, integration often focuses on merging programs tailored for specific diseases or service packages aimed at particular populations, such as HIV/AIDS, tuberculosis (TB), and reproductive healthcare. The main objective in these countries is to enhance the accessibility and reach of essential services (11).

The Concept of Integration, or Integrated Care, in High-Income Countries: In high-income countries, the emphasis is frequently on managing multiple health conditions within a broader group of patients or on organizing a wider array of services, some of which extend beyond the healthcare system. The main objective in these countries is to improve outcomes, patient satisfaction, and the quality of care (12).

Integrated Care Systems in England: The 42 Integrated Care Systems (ICSs) in England are collaborative initiatives that bring together health and care entities to develop coordinated services and shared strategies. Comprising NHS bodies, upper-tier local councils, voluntary organizations, social care providers, and other stakeholders involved in improving community health, ICSs were formally established on 1 July 2022 and now cover the entirety of England. These frameworks build upon preexisting partnerships across the nation (13).

3. The Integration of Medical Education and Healthcare Services

The integration of medical education and healthcare services refers to a comprehensive strategy that combines both systems in a coordinated manner. In this context, integration involves establishing a seamless connection between medical education and the practical aspects of care delivery (2).

A unique example of the integration of medical education and healthcare services is the Iranian health system:

Iranian health system: In Iran, the integration of provincial health organizations and medical universities led to the establishment of the universities of medical sciences and health services in 1985 (2). The main aims of these reforms were to train sufficient health personnel, prepare personnel to care for the health of the community, and improve the quality of healthcare delivery (14).

Table 1. Examples of Universities/Medical Schools with Curricular Integration Approach

Faculty/Universities of Medical Sciences (Country)	Curricular Integration Approach
Harvard Medical School (USA)	Harvard uses a New Pathway curriculum that integrates basic and clinical sciences, emphasizing problem-solving and case-based learning.
University of Washington (USA)	Integration of courses such as pharmacology, ethics, behavior modification, etc. has been done during the students' education
Maastricht University (Netherlands)	Maastricht employs a problem-based learning approach, integrating clinical and basic sciences throughout the curriculum.
University of Calgary Cumming School of Medicine (Canada)	The University of Calgary has a longitudinally integrated clerkship program, emphasizing continuous clinical experiences.
Monash University (Australia)	Monash uses a vertically integrated curriculum, starting clinical experiences early in the program and emphasizing problem-solving
University of Dundee School of Medicine (UK)	Dundee's curriculum integrates clinical and communication skills with basic science from the beginning of the program.

Following the establishment of the Ministry of Health and Medical Education in 1985, the integration of health services with medical training led to a substantial increase in the number of medical and health-related schools, faculties, faculty members, medical student admissions, postgraduate training

programs, and subspecialties. As a result, the number of registered doctors increased from about 20,000 in 1985 to 130,616 in 2020 (15). Comparable increases in health-related manpower training have resulted in sufficient personnel and self-sufficiency among health professionals (14). At the same time, the quality of medical education has improved through expanded field and ambulatory care training, a greater focus on teaching preventive medicine, and a notable increase in research endeavors (14, 16, 17). Enhancing postgraduate education has significantly contributed to advancements in research across basic sciences, epidemiology, clinical sciences, and public health-oriented fields (18). Over the past three decades, scientific publications, research centers, and scientific journals have rapidly increased (15). These developments have positioned Iran between 15th and 16th in global rankings for published medical articles in the Web of Science (19). This shows a trend toward publishing in higher-impact factor journals over the past decade.

The traces of these changes can be seen in the revised curriculum, which has shifted toward community-oriented medical education (2). Mandatory field training for all medical students during their clinical medicine stage and internship, as well as clinical training in ambulatory care and outpatient services at teaching hospitals or health centers (rather than specialty hospitals), constitutes the fundamental changes in clinical education (14).

The integration aimed to enhance community health responses while expanding learning, teaching, and research activities. This included improvements in life expectancy, access to primary healthcare in rural areas, availability of clean water, the total number of rural health facilities, and vaccination rates. Conversely, it sought to reduce neonatal and under-5 mortality rates, lower the maternal mortality ratio, decrease the number of patients sent abroad for treatment, and limit the number of foreign physicians practicing in Iran (14). The I.R. of Iran's experience has proven to be a cost-effective and sustainable strategy in achieving optimal health for all its citizens (2, 18).

While the movement toward completing the integration in Iran continues, its achievements so far have been impressive in community-responsive medical education, medical research, and improvements in the country's health situation. There has been a significant enhancement in health indicators across all 31 states nationwide, especially in rural areas, remote locations, and less developed provinces (2, 20).

World Health Organization's View on Integration of Medical Education and Healthcare Services: Based on the evaluation conducted by the Eastern Mediterranean Office, the World Health Organization (WHO) has described Iran's experience in integrating education with healthcare services as an effective and forward-looking approach. The WHO has strongly recommended government support for this approach and noted that separating health education from the provision of services and care will cause significant damage in strategic, technical, financial, and support areas (21).

World Federation of Medical Education's View on Integration of Medical Education and Healthcare Services: The World Federation of Medical Education (WFME), which sets medical education standards, has emphasized the necessity of ensuring a practical connection between the medical education program and the skill training phase in medicine. This connection is crucial in the conditions students face after graduation. WFME has highlighted the importance for students to engage with patients and acquire clinical knowledge and sufficient skills to assume appropriate clinical responsibilities after graduation (22). The WFME report praised Iran's medical education reforms as exemplary and potentially influential for other countries worldwide. Professor Henry E. Walton, the former president of WFME, referred to Iran's integrated system as the "medical education of the 21st century" (23).

Moving Toward Response to the Health Needs of Society

Some universities of medical sciences have made changes to the education system in response to society's health needs and have introduced innovations in this field that align with the integration of medical education and the service delivery system.

University Health System: A "university health system" typically refers to a university or academic institution that not only offers medical education but also operates a comprehensive health system, including hospitals and clinics for patient care, research facilities, and often involvement in community health initiatives. However, this strategy does not imply the integration of the education system and the healthcare system at the national level. The combined term, including the "name of the university" and "health system," is used for such institutions. For example, the Miami University Health System, Riverside University Health System, University of Pennsylvania, University of North Carolina, Yale, and the University of Michigan provide health services,

education, and research through medical schools by creating networks at the state level in the United States (24-27).

The National University Health System is an academic health system responsible for the health of the population in the west of Singapore. It consists of three schools, and students attend general practitioners' clinics, polyclinics, and hospitals affiliated with the university, undergoing clinical training before starting work (28). The National University Health System has an integrated curriculum that combines basic sciences, clinical training, and early patient exposure. The curriculum is designed to promote a holistic understanding of medicine.

The "Johns Hopkins Health System Corporation" is a non-profit organization established with the aim of providing the highest level of medical care and preventive services in close cooperation with the Johns Hopkins University School of Medicine. This organization provides inpatient and outpatient services through numerous hospitals and treatment centers, as well as primary care through 15 health centers in the state of Maryland. It also offers care for military retirees and home health services, along with research facilities (29).

There are also some universities with prominent university health systems and the same missions as those mentioned above, without having "health system" in their name (Table 2).

The Evolving Role of Community Needs in Medical Education: Many institutions have a symbiotic relationship between medical education, clinical practice, and research, all contributing to advancements in community health:

Faculty of Medicine, University of Gezira

This faculty is one of the pioneers of social accountability, especially in solving rural health problems. The innovation of this faculty in education has also influenced the educational programs of other Sudanese medical faculties. Several strategies, such as community-centered and community-based education, problem-based education, self-directed learning, teamwork, and early practical education, have been adopted in line with the curriculum of Island College (35). The approach of this faculty is such that a quarter of its curriculum content is based on society and includes education, field research, and village development. In groups, students attend rural areas to identify and solve problems. This course is accompanied by health education activities, environmental health initiatives, and the provision of health services. Evaluations of the students have shown that although they understand the importance of social responsibility and are motivated to work in deprived areas after graduation (36), graduates have adapted to the environment dictated by the healthcare delivery system, so their community service was similar to that of other graduates (37).

Table 2. Examples of Medical Sciences University/School with Some Functions of Health System

Medical Sciences University/School (Country)	Function (Functions of Health System)
Mayo Clinic Alix School of Medicine (USA) (30)	It is responsible not only for medical education but also for providing medical and healthcare services. It also has a research institute and is known for its patient-centered care and medical education (resource generation, financing, service provision).
University of California, San Francisco (UCSF) School of Medicine (USA) (31)	Medical education, research, and provision of patient care, especially to disadvantaged communities, are carried out in hospitals and health centers in an integrated manner (resource generation, financing, service provision).
Karolinska Institute (Sweden) (32)	This institution provides the country's widest range of education in the field of medicine and health sciences in Sweden and holds the largest share of the total academic medical research conducted in Sweden. By establishing a relationship with the Karolinska University Hospital, a strong correlation has been established between medical education and the provision of healthcare services (resource generation, service provision).
King's College London School of Medicine (UK) (33)	King's College London is associated with King's Health Partners, a collaboration with three major London NHS Foundation Trusts, integrating medical education with healthcare services (resource generation, service provision).
University of Toronto Faculty of Medicine (Canada) (34)	The University of Toronto is affiliated with a network of hospitals. Together, they form the Toronto Academic Health Science Network.

The University of Illinois College of Medicine Rockford

This college is known as a leader in medical education in rural areas, and it seeks to influence the future of medical science while providing exceptional health services to the local community by benefiting from advanced research. Medical education at this

college is community-based, with an emphasis on early exposure of students to the service delivery environment. The Rockford campus of the University of Illinois College of Medicine, located in Rockford, Illinois, is part of the larger University of Illinois system. It offers a full range of medical education programs and is strongly committed to serving rural and underserved areas. The college has developed programs and initiatives to meet the unique needs of these communities. The rural education program was created as a supplement to the regular medical education program, with the aim of attracting students to provide services in underserved areas of Illinois. In this program, rural students who wish to return to rural Illinois communities to provide medical services are recruited and employed. At the same time as their regular medical education, they participate in rural interprofessional curricula, seminars, and field trips, and carry out projects based on the rural community. They are also present in the community during the clinical course, in addition to their hospital rotations (38).

Cuba: Medical education in Cuba is generally focused on community-oriented primary care. It is provided by medical schools affiliated with the Ministry of Public Health. The medical education curriculum is designed to be comprehensive and integrated, with a strong emphasis on practical training, community-based care, prevention, and ethical issues. Medical schools provide more than 75% of training in the community from the early years (39). The "Family Doctor Programme" was established in 1984. Therefore, the medical curriculum was redesigned to align with the program's objectives. Students gain a holistic, integrative, and coordinated approach to each patient and community (39).

Medical students, especially during the internship period, are in contact with the community and people in rural settlements, going house to house. This enables them to gain the experience of providing health services to specific communities in real-life environments. As a result, deprived people benefit from free health services (40).

India: In 2017, the National Health Policy highlighted the necessity for a transformation in the medical education system and emphasized the importance of integrating the education system with the provision of health services and care in India, so that students could learn in real environments instead of just in medical schools. According to this policy, each medical college actively participates in the healthcare delivery system for a defined geographical area and takes responsibility for a known population (41).

Australia: Australia has initiatives to encourage medical students to experience rural and regional placements during their education, exposing them to the unique challenges and opportunities of healthcare in these areas. Since 2000, Australia has had a national policy called the Rural Clinical Schools program, which aims to provide undergraduate medical students with experience in rural areas. This strategy has been accompanied by an increase in the desire of Australian medical graduates to provide services in rural areas (42). Some medical schools have developed programs that involve extended clinical placements, rural rotations, or specific tracks focused on rural health. In the Riverland region of South Australia, professors provided medical education in this way, highlighting the benefits for both students and the local people, who gained better access to health services (43).

Using the strategy of medical education in underprivileged areas, especially to improve access for rural people to medical services and care, familiarize students with these areas, and improve the chances of doctors staying in rural areas, is an experience that has been implemented in different parts of the world (44).

Africa: Many medical schools in African countries have paid attention to rural communities and their health needs in the medical curricula. The term for this approach is called "Community-Based Education and Service" (COBES). The goals of this approach are: training in healthcare facilities in rural communities, changing students' attitudes about the effectiveness of health-promoting and preventive initiatives, and improving rural communities' access to healthcare. COBES influences the recruitment and retention of medical doctors in underserved areas (45).

It seems that many countries and medical education systems have recognized the importance of integrating medical education and healthcare systems in improving the quality of healthcare delivery and outcomes. The most important initiatives to encourage medical students to experience rural and regional placements, as well as community-based education, were key points highlighted in this policy review. While the specific approaches may vary, these efforts share a common goal: "better serving the needs of patients and healthcare professionals."

Discussion

There are different perceptions and definitions of integration in the health system. Some articles have

focused on integration solely in medical education and curricula, while others emphasize the health service delivery system. From a holistic perspective, integrating both components aligns with the overall structure of the health system and supports unified governance. In this view, integration implies an interconnection between the training of healthcare professionals and the practical aspects of providing healthcare. The integration of medical education and healthcare services through a single ministry is a relatively unique approach, and the I.R. of Iran is a pioneer in this approach. While most countries do not have an integrated ministry of health, treatment, and medical education like the I.R. of Iran, they have implemented an integration strategy known as "integrated care" to enhance the quality of healthcare delivery and health outcomes, or an “integrated medical curriculum” that connects various subjects and clinical experiences, dismantling the traditional divide between basic sciences and clinical practice to enhance students' understanding of disease processes and patient care.

The review showed that the Iranian system, which integrates healthcare services and health education sectors, is considered a model for other countries and has garnered significant international interest (46). Furthermore, the integration was recommended by international organizations, and most health systems and educational institutes were aware of it. However, the way of its implementation was often fragmented or limited to the integration of different disciplines in the curriculum or in specific geographical areas.

Some of the points highlighted in this review could be taken into account for successfully and fully implementing the integration:

1. Social accountability

Social accountability connects the efforts of medical schools to their impact through education, research, service provision, and healthcare management (47). Social accountability is an approach that aims to improve medical care by promoting collaboration among citizens and holding medical education accountable in the field of health services. Social accountability should become a fundamental aspect of the culture in medical faculties so that it can help set the necessary standards and implement changes in the educational curriculum.

2. Community-Based Education and Service (COBES)

COBES address local community health needs. By being in the community (especially underserved areas and rural regions), students acquire key skills and competencies relevant to community needs. Furthermore, they realize the effectiveness of this approach in health promotion and disease prevention. As a result, more students are encouraged to consider primary healthcare (instead of secondary/tertiary hospitals) as the workplace of the future. It is highly recommended that COBES be part of the curriculum in medical education (45).

The community-oriented approach in medical education and clinical practice is one of the achievements of integration. With the presence of students in the community, the place where they will provide services in the future, this goal is achieved. The importance of this approach has been evaluated in research studies from different perspectives, and most students have considered attending community centers more useful compared to hospital clinics (48).

3. Interprofessional Collaboration and Curricular Integration

Expanding interprofessional collaboration within the healthcare team is known as one of the principles of integration and is consistently emphasized by the WHO (49). This involves eliminating the historical boundaries between medical education and other fields of medical sciences, such as nursing, pharmacy, and paramedical sciences. This leads to the promotion of teamwork and cooperation. Medical science faculties should adopt an interdisciplinary approach and be familiar with the literature of other disciplines. This approach prepares students for future practice (50). It has also been considered in curricular integration.

The experience of the University of Washington Health Sciences Center is an example of promoting interprofessional collaboration in education, services, and research among healthcare professionals (44). In this regard, plans have been developed with the aim of promoting interprofessional teamwork to improve the quality of services, healthcare, and patient safety. The results of this experience were remarkable in several areas: the number of interprofessional courses, shared indirect costs, and the development of an interprofessional culture among faculty and students.

Therefore, the social accountability of universities, community-based education and practice, interprofessional collaboration, and curricular integration are three important components of the "Integration approach." However, the crucial part of this approach, which is often neglected, and the distinguishing feature of Iran's health system compared to other countries, is having an integrated policy in education and service provision throughout the country,

from medical universities to healthcare fields. The importance of this vital aspect is so great that, without considering the integration of medical education and health services, social accountability cannot be achieved (37).

Conclusion

In the field of medical education, the concept of integration has become increasingly important. It is believed that integrating different aspects of knowledge with practice helps students develop a deeper understanding that is more relevant and useful in real-life clinical practice, offering a promising approach to the preparation of the next generation of healthcare professionals in order to improve patient outcomes. Creating a unique ministry for medical education and practice could involve integrating community health needs into medical training and fostering interdisciplinary collaboration. By bridging the gap between education and practice, the Iranian health system model has resulted in better health conditions in the country, especially in rural areas, remote regions, and less developed provinces. Successful integration requires strong partnerships, robust mentoring programs, interdisciplinary and community-based education, and a commitment to continuous quality improvement. As healthcare continues to evolve, the synergy and harmony between medical education and healthcare services will play a pivotal role in shaping a workforce that is adept at meeting the complex needs of patients and delivering high-quality care.

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Original Article

Social Responsibility and Accountability: The Outcome of Integrating Health, Treatment, and Medical Education

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Abstract

Background: Following several challenges occurred in the country's health system in the 1980s, including a severe shortage of specialized human resources and inadequate access to high-quality healthcare services in many regions of the country, the medical education and healthcare service delivery systems were integrated, resulting in the establishment of the Ministry of Health, Treatment, and Medical Education. One of the primary goals and features of this integrated system is accountability to the community health needs. Given that no coherent study has been found regarding the level of social accountability within the integrated health system in Iran.

Objectives: The current research was conducted aiming to measure the level of accountability of the Iranian health system.

Methods: This study sought to evaluate the level of accountability of Iranian integrated health system to societal needs. Following a literature review and holding the expert panel, a questionnaire was developed to measure the level of accountability of Iranian health system across four domains: Generalities, education, healthcare service delivery, and research. The questionnaire was distributed among the target population (faculty members, health system managers, healthcare service providers, and medical students selected in the Health System Management Olympiad of the Ministry of Health), and 11 responses were received. Subsequently, the responses were analyzed using the Kruskal-Wallis and Mann-Whitney U tests.

Results: The findings obtained from participants' responses to the questionnaire revealed that the accountability of the Iranian health system to the community health needs was assessed to be at a moderate level. Furthermore, no significant difference was observed in accountability among the four mentioned domains.

Conclusion: Indicators related to the quantitative development of human resource education and service delivery were associated with a reasonable level of success. However, it did not achieve significant success in the areas of improving the quality of medical education, promoting evidence-based decision-making, and making the educational programs community-oriented. According to the results, Iranian integrated educational system has not performed successfully in training non-specialized skills, such as communication, health education for other medical staff members and patients, critical thinking, and healthcare team leadership, as well as the teaching medical students to pay attention to the cost-effectiveness of treatment interventions and prescriptions. Similarly, in the field of medical research, the overall performance was not satisfactory, with the lowest scores had been related to the utilization of research findings in policy-making and improving the cost-effectiveness of services through research results.

Keywords: Integration; Accountability; Medical Education

Background

Before the Revolution in Iran, due to the country's historical backwardness in health higher education, the number of healthcare professionals was insufficient to meet the people's healthcare needs. Consequently, to meet these needs, a considerable number of foreign

physicians were employed in medical centers, which, in addition to reducing the quality of services provided, also culminated in numerous cultural problems. Moreover, medical students were trained in specialized hospitals affiliated with the Ministry of Science, which had no connection to the Ministry of Health or society. As a result, the education of students lacked aspects of community orientation, to the extent that some graduates were even incapable of providing primary healthcare services (1).

Following the Islamic Revolution and the establishment of the Cultural Revolution Headquarters in 1980, the responsibility for reviewing and assessing the status of medical science training was assigned to the Medical Division of the Cultural Revolution Headquarters. After a two-year review conducted by experts and specialists, the members of this division concluded that medical education in the country faced numerous and profound challenges. Medical education programs varied significantly and were inconsistent across different medical schools. Some schools lacked adequate faculty members and curricula. A severe shortage of human resources was evident in most regions of the country, to the extent that in some areas, there was only one physician for every 18,000 citizens. Ultimately, due to the existing capacities and facilities, there was no clear prospect for improving the situation and significantly increasing the number of physicians (2).

In order to resolve the aforementioned challenges, the Medical Division of the Cultural Revolution Headquarters proposed the integration of medical schools with the Ministry of Health (at that time). Subsequently, numerous expert meetings were held with the participation of representatives from the Ministry of Health, the Ministry of Science, Parliament members, and medical education specialists. The primary objectives of this plan, as stated, were to utilize all of the country's healthcare facilities to expand medical education and better accountability of the community health needs through making medical education community-oriented. Ultimately, after extensive expert reviews, this plan was approved by the Cultural Revolution Headquarters, the Cabinet, and the Islamic Consultative Assembly, and the Ministry of Health, Treatment, and Medical Education was thus established in 1985.

Experts' viewpoints on the implications of the integration policy are diverse and sometimes contradictory. Some experts argue that the integration of education into the healthcare service delivery system, along with the establishment of the Ministry of Health, Treatment, and Medical Education, has significantly increased student admission capacity in the field of medicine due to the expansion of educational facilities and opportunities. Moreover, educating medical students in real healthcare settings has promoted the social accountability of medical education and empowered students to satisfy societal needs.

On the other hand, despite the positive outcomes and changes that have followed the implementation of integration and the establishment of the Ministry of Health in the areas of education, research, and healthcare service delivery in the country, some challenges and shortcomings remain unresolved. Some experts in this field believe that what has been performed is merely structural integration, and that functional integration and complete unity at all levels have not yet occurred. Moreover, some experts argue that the increased responsibilities of universities of medical sciences, along with their obligation to manage non-educational affairs, have culminated in a deviation from the educational mission and, consequently, a weakening of their social accountability of education in these institutions.

Given the existence of diverse and sometimes contradictory viewpoints among experts regarding the results and consequences of integrating education into the healthcare service delivery system, as well as the emergence of numerous crises and challenges in the country's health system in recent years, such as the coronavirus disease 2019 (COVID-19) pandemic which has partially revealed the weaknesses and strengths of Iranian health system, and considering the lack of a coherent study on the level of accountability of the country's health system to the community healthcare needs, the present study was designed and implemented. The current research aimed to examine the views of experts in the field of health, treatment, and medical education in the country regarding the issue of integration in order to obtain a clear picture of the country's medical education system's level of accountability to societal needs, as well as the current status of integration and its positive and negative consequences.

Objectives

The current research aimed to examine the views of experts in the field of health, treatment, and medical education in the country regarding the issue of

integration in order to obtain a clear picture of the country's medical education system's level of accountability to societal needs, as well as the current status of integration and its positive and negative consequences.

Methods

This research aimed to assess the level of social accountability of the integrated education and healthcare service delivery system in Iran across three domains: Education, research, and service delivery. Following a literature review on the integration of education and service delivery in the Iranian health system and holding two expert panel meetings at the Youth and Elite Club of the Academy of Medical Sciences of Iran, the study questionnaire's items were designed. In the mentioned questionnaire, respondents' activity categories were initially asked to (3 faculty members, 1 healthcare provider, 3 healthcare executives, and 4 medical students; some participants fell into multiple categories, but the one in which they were most active was chosen) (Table 1). Subsequently, 45 items were formulated, divided into four domains: Generalities (16 items), accountability in education (15 items), accountability in service delivery (10 items), and accountability in research (4 items). Participants responded using a Likert scale ("very low, low, moderate, high, and very high).

The questionnaire was distributed to a purposefully selected sample population consisting of students who had won medals in the Health System Management Olympiad, faculty members of universities of medical sciences, health management researchers, and experts experienced in the health system, and 11 responses were collected from these four target groups.

The scores of each question were finally analyzed using SPSS software. Additionally, the mean scores for each of the education, research, and service delivery sections were calculated.

In the data analysis process, the mean scores for each domain were initially calculated as a percentage of the maximum possible score (55 points) and compared. Subsequently, the Kruskal-Wallis nonparametric test was used to examine the significance of the differences in social accountability among the three domains. Furthermore, the Mann-Whitney U nonparametric test was employed to pairwise compare each domain in terms of the significance of the differences in the level of social accountability among these domains. A significance level of $P < 0.05$ was considered.

Results

The mean score obtained in the generalities section was 30.250 ± 5.568, which, considering the maximum score of 55, was reported as 55%. The highest score (41 points and 74.55%) belonged to "an adequate number of universities of medical sciences in the country to meet the community health needs," and the lowest score (21 points and 38.18%) belonged to "Accountability to all community health needs, including mental and spiritual health" (Table 2).

The mean score obtained in the accountability in education section was 24.533 ± 5.501 (44.61%) (Table 3). The highest score obtained in this section (40 points, 72.73%) belonged to the item "The effectiveness of training and education of intermediate-level personnel, such as nursing assistants, pharmacy assistants, and dental assistants, in accountability to health needs."

Table 3. Mean scores for each domain

Domain	Points (Mean (SD))	Percentage of Maximum Points = 55
Generalities	30.250 (5.568)	55
Accountability in education	24.533 (5.501)	44.61
Accountability in service delivery	25.800 (4.289)	46.91
Accountability in research	21.250 (3.500)	38.64

SD: Standard Deviation

The lowest score in this domain (18 points, 32.73%) belonged to the item "The adequacy of medical-educational centers, as well as educational departments and clinics, to meet the common health needs in each region" (Table 2).

The mean score obtained in the accountability of service delivery section was reported as 25.800 ± 4.289 (46.91%) (Table 3). The highest score in this section (31 points, 56.36%) belonged to the item "Accountability of the integrated health, treatment, and medical education system in health crises, such as the COVID-19 pandemic or natural disasters." The lowest score in this domain (16 points, 29.09%) belonged to the item "The adequacy of the current payment system in improving social accountability" (Table 2).

The mean score obtained in the accountability of research section was 21.250 ± 3.500 (38.64%) (Table 3). The highest score in this section (25 points, 45.46%) was attributed to the item "Appropriateness of research priorities in universities of medical sciences in each

region with the needs of that region, aiming to improve the quality of services delivered." The lowest score in this domain (17 points, 30.91%) belonged to the item "Utilization of findings of research conducted in universities of medical sciences in health decision-making and policymaking" (Table 2).

A Kruskal-Wallis test was used to assess the significance of the differences in social accountability among these three domains, demonstrating no significant differences in the integrated system's level of accountability (P = 0.125). Furthermore, a pairwise comparison of the three domains using the Mann-Whitney U test revealed no significant differences in the integrated system's level of accountability among the domains (Table 4).

Table 4. P-value in pairwise comparisons of domains using the Mann-Whitney U test

Domain	P-Value
Education	With service delivery: 0.216 With research: 0.262
Service delivery	With research: 0.054
Research	

Overall, based on the responses obtained from the investigated population, the integrated system's social accountability in the three domains of "education, research, and service delivery" was evaluated to be at a 'moderate' level. Additionally, no significant difference was observed in the integrated system's level of social accountability among these three domains.

Discussion

The current research primarily aimed to assess the accountability status of Iranian integrated Health, Treatment, and Medical Education System. Findings revealed that, according to experts and authorities in this field, the accountability of the country's health system is to some extent acceptable and has been largely successful in achieving its therapeutic, health, and educational goals.

Based on the findings from experts' perspectives, the integrated health system has been highly successful in "establishing an appropriate number of universities of medical sciences to meet the community health needs," "cultivating a sufficient number of specialized human resources in various medical fields," and "training intermediate-level personnel, such as nursing assistants, pharmacy assistants, and dental assistants."

However, according to the participating experts, the integrated health system has performed poorly in areas such as "utilizing the findings of research conducted in universities of medical sciences in decision-making and policy-making," "the payment system status in improving social accountability," and "paying attention to the cost-effectiveness of services in prescribing in the curricula of medical sciences disciplines."

Universities and schools of medical sciences were established with the philosophy of accountability to the community health needs. Therefore, the whole planning and policy-making in this field, as well as the evaluation of the performance of these educational institutions, should be geared toward fulfilling accountability to the community health needs. In fact, accountability is an integral part of the foundational principles and development of universities of medical sciences. Since this accountability is realized through the pathway of healthcare service delivery, it is shaped and given meaning within a unified whole of interaction between the school, the community, and the service delivery system (3).

The necessary actions to satisfy societal needs are defined at three levels: Social responsibility, responsiveness, and accountability. Social responsibility involves identifying community needs, prioritizing them, and designing plans to address them. If the health system goes beyond this level and takes proactive measures to meet these needs, the second level, or responsiveness, is achieved. By continuing on this path and evaluating the outcomes of interventions implemented by policymakers, the third and most complete level, social accountability, is also realized (4).

One of the strategies to achieve this goal is through community-oriented medicine and community-based education. Accountable medical education is indeed a type of education that considers regional and national healthcare needs and seeks to cultivate physicians capable of accountability and satisfaction of people's health needs. The ultimate goal of establishing universities and schools of medical sciences has been accountability to the community real needs. In order to achieve this goal, medical education must focus on solving the fundamental problems of society in terms of content and function (1). A prerequisite for realizing this goal is to change and design educational programs so that they can train a workforce equipped with effective skills in various fields:

a) A clinician who possesses the necessary specialized knowledge and skills.

b) An educator who promotes a healthy lifestyle through education to the public and healthcare workers.

c) A resource manager who makes the best and most appropriate use of the available diagnostic, therapeutic, and healthcare facilities in the country and plays a valuable role in prevention, health promotion, rehabilitation, social work, intersectoral collaboration, and community participation (3).

The healthcare system must be accountable for the quality of services delivered by healthcare providers, as well as by universities and faculties, through the enhancement of knowledge, attitudes, skills, and abilities of the cultivated providers. Conversely, separating the field of medical education from the field of healthcare service delivery culminates in minimizing this accountability at both levels. In other words, the health system will not be accountable for the quality of services delivered by the institutions it has not trained, and medical schools will deliver their graduates to an independent and separate system, without being accountable for their subsequent performance.

The experience of integrating the medical education system into the healthcare service delivery system in Iran, despite the presence of numerous health system researchers and experts and the creation of a suitable platform for providing practical, community-oriented, and targeted education, and forging a link between education and implementation, can serve as a good model at both the national and international levels. The development of applied health research, the expansion of social medical education, crisis management in emergencies, the model of ongoing medical education for the medical community, the model of public health education, the development of specialized training, the educational management model, and the cancer registration model in Iran are among the successful examples that can be utilized at various levels. However, to make universities more responsive to the needs of the health system, more measures and strategies need to be considered, and the academic sector, with a deeper understanding of societal needs, must insist on implementing revised educational programs while continuously reviewing curricula.

The present study findings are consistent with findings of several previous studies (5-7).

Nouri-Hekmat et al. examined the objectives, outcomes, barriers, and future of the integration policy and reported the greatest success of the integration policy in the area of healthcare service delivery. They stated that increasing the capacity of supplying health human resources and the rapid increase in the number of educational centers were among the greatest achievements of this policy, which is also mentioned in the World Health Organization (WHO) report (5) and aligns with the findings of the present study.

The results of Baqeri Lankarani et al.'s study to evaluate the consequences of the integration law and the establishment of the Ministry of Health, Treatment, and Medical Education demonstrated that "developing trained human resources, improving medical knowledge, increasing knowledge and skills in the health sector, and elevating the quality and quantity of health services" were the three main consequences of integration. The primary goal of the policy of integrating the medical education system into the service delivery system was to increase the human resources and make the country independent of the activities of foreign physicians. The remarkable increase in the capacity for admitting medical students after the approval of the integration policy and the subsequent increase in the number of educational centers, both made the country's health system independent of non-Iranian physicians and culminated in the growth of human resources in other specialized fields of medical sciences, such as dentistry and paramedical sciences (6).

In addition, according to the results of Shakibaei et al.'s study investigating the perspectives of faculty members at Kermanshah University of Medical Sciences regarding the extent to which the objectives of the integrated system were achieved, the achievement of integration goals, as perceived by faculty members, was 52.37%. Moreover, from their viewpoints, the highest level of success of the integration policy was achieved in the area of healthcare services and indicators, while the lowest was attributed to research activities and facilities and social achievements of the integration plan (7).

Conclusion

The findings of this study revealed that indicators related to the quantitative development of the human resources in education and service delivery, which were among the main objectives of the integration policy, were accompanied by a considerable success, and integration in this area has been able to meet the country's needs. However, in the field of enhancing the quality of medical education, promoting evidence-based decision-making, and making educational programs community-oriented, the integration policy has not achieved significant success. According to the results, Iranian integrated educational system has not performed successfully in training non-specialized skills, such as communication, health education for

other medical staff members and patients, critical thinking, and healthcare team leadership, as well as the teaching medical students to pay attention to the cost-effectiveness of treatment interventions and prescriptions. Similarly, in the field of medical research, the overall performance was not satisfactory, with the lowest scores had been related to the utilization of research findings in policy-making and improving the cost-effectiveness of services through research results.

Based on the findings of this research and other studies, it is recommended that further investigations be conducted into the reasons for the relatively poor performance of the integrated system in achieving its qualitative educational and research objectives.

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

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Table 1. Participants' categories and their respective backgrounds

Row	Occupational Category	Faculty Member's Rank and Department	Executive Category and Background
1	University faculty members	Professor at Tehran University of Medical Sciences	
2	Healthcare service provider		Private clinic director PhD in Healthcare Service Management with university teaching experience as a contract instructor
3	Executive and managerial positions in the health system		Over 31 years of experience in public sector Over 25 years of experience in management of the health system and health insurance
4	Executive and managerial positions in the health system		Research expert and researcher at University of Health and Ministry of Health Executive vice-president of a private research service institution
5	University faculty member		
6	University faculty member Healthcare service provider Executive and managerial positions in the health system	Head of the Pediatric Department, Tehran University of Medical Sciences	President of Tehran University of Medical Sciences
7	Medical science student		
8	Medical science student		
9	Medical science student		

10	Medical science student		Head of the Olympiad Committee, Tehran University of Medical Sciences Head of the Medical Unit, Research Center, Tehran University of Medical Sciences
11	Executive and managerial positions in the health system		10 years, including Parliamentary Research Center

Table 2. Questionnaire items and their corresponding scores

Domain	Item	Point (Out of 55)
Generalities	1. Equitable distribution of specialized human resources to meet the healthcare needs of different regions of the country.	26
	2. Independence of universities of medical sciences in each province in management for appropriate accountability to the specific needs of that province.	32
	3. Creating greater responsibility for public health through the involvement of faculty members and students in service delivery.	32
	4. Creating greater responsibility for national health through the involvement of faculty members in executive positions and health system management.	27
	5. Effective performance of the integrated system in cultivating a sufficient number of specialized human resources in various medical fields.	37
	6. An adequate number of universities of medical sciences in the country to meet the community health needs.	41
	7. An appropriate gender ratio to meet the healthcare needs of both men and women in society.	39
	8. A balance between the authorities of universities of medical sciences in the country and their responsibilities, control, facilities, and capacities.	30
	9. Ensuring that the multiple responsibilities of universities of medical sciences, including service delivery, do not hinder their educational and research missions.	28
	10. Providing appropriate conditions and incentives for faculty members to be more involved in educational institutions than in the private sector.	25
	11. Complete structural integration being the best system for linking universities and service delivery in achieving social responsiveness.	29
	12. The effectiveness of the integrated system in reducing the costs of healthcare services for the community.	25
	13. Addressing all community health needs, including mental and spiritual health, in the integrated system.	21
	14. Paying attention to the various aspects of the presence of learners in the healthcare field in the integrated system.	27
	15. Reducing the workload of faculty members and students by employing contract specialists in teaching hospitals and setting a specific ceiling for the number of shifts and the visited patients.	29
	16. Increasing the accountability of the integrated system by integrating education and service delivery for other healthcare personnel, such as nurses.	36
Education	1. Alignment of medical education programs at the national level with the healthcare needs of the country.	23
	2. Alignment of medical education programs at the provincial level with the healthcare needs of each province.	19
	3. Training of local healthcare personnel for each province for employment and addressing the healthcare needs in the same province.	21
	4. The adequacy of medical-educational centers, as well as educational departments and clinics, to meet the common health needs in each region.	18
	5. The existence of appropriate collaboration and communication between the medical education referral system and the utilization of the healthcare network's capacity for medical education.	24
	6. Ensuring that increased workload for students in providing services does not hinder their overall education and study.	26

	7. Implementing necessary mechanisms and oversight to prevent academic exploitation of students, such as imposing excessive and non-educational service activities.	22
	8. Incorporating training essential skills for community interaction, such as communication skills, critical thinking, and public health education, into medical education.	19
	9. Addressing health and epidemiological issues in the curricula of medical sciences programs.	26
	10. Focusing on "cost-effectiveness of services in prescription" in the curricula of medical sciences programs.	21
	11. Effective performance of universities of medical sciences in identifying, planning for, and serving disadvantaged and minority groups.	25
	12. The ability of the medical education system to cultivate graduates equipped with adequate knowledge and clinical competence.	30
	13. Designing appropriate measures for the continuing education of graduates.	27
	14. The effectiveness of training and educating intermediate-level personnel, such as nursing assistants, pharmacy assistants, and dental assistants, in accountability to health needs.	40
	15. Improving the quality of education and accountability in education by categorizing faculty members into educational, research, medical, and administrative roles, and developing promotion guidelines for faculty members in each category.	27
Service delivery	1. Adequate performance of universities of medical sciences in providing healthcare services in accordance with the needs of the target population.	26
	2. Adequate performance of universities of medical sciences in providing preventive healthcare services commensurate with the needs of the target population.	25
	3. Adequate performance of universities of medical sciences in forecasting the healthcare needs of the target population and providing the necessary resources.	28
	4. Adequate performance of universities of medical sciences in providing high-quality healthcare services in accordance with clinical guidelines and the latest scientific advancements.	26
	5. Adequate performance of universities of medical sciences in providing high-quality preventive healthcare services to the target population.	28
	6. The importance attached by universities of medical sciences to the service cost-effectiveness in healthcare service delivery.	22
	7. Adequate performance of universities of medical sciences in providing healthcare services to disadvantaged, at-risk, and minority groups.	30
	8. Accountability of the integrated health, treatment, and medical education system in health crises, such as the COVID-19 pandemic or natural disasters.	31
	9. Existence of appropriate interaction between universities of medical sciences and resident physicians in providing suitable working conditions for these physicians.	26
	10. The adequacy of the current payment system in in improving social accountability.	16
Research	1. Appropriateness of research priorities in universities of medical sciences in each region with the needs of that region, aiming to improve the quality of services delivered.	25
	2. Utilization of findings of research conducted in universities of medical sciences in health decision-making and policymaking.	17
	3. Improving resource efficiency and cost-effectiveness of services through research conducted in universities of medical sciences.	20
	4. Enhancing the quality of services provided to underserved, at-risk, and minority populations through research conducted in universities of medical sciences.	23

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Viewpoint

The History and Evolution of the Integration of Medical Education into the Field of Healthcare Services (Healthcare Network) of the Islamic Republic of Iran

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Abstract

Background: In Iran, the shortage of medical workforce in the population has caused the health of people to be exposed to many risks in different parts of the country, especially in deprived areas. Therefore, in 1983, the plan for "Integrating Education and Research in Health Care and Services" was presented by the Supreme Council of the Cultural Revolution and approved in 1985 after some amendments.

Objectives: This article reviews the history and evolution of the "Integration of Education and Research in Health Care and Services" project.

Methods: The library study method (reviewing reliable sources in domestic and international publications, using the study keywords), recording the author's personal experiences, and content analysis were used.

Results: All quantitative indicators (such as the number of educational centers and student admission capacities) qualitative indicators (such as the level of accountability and social commitment of academics and the health culture of the community) and general health indicators in the country were improved.

Conclusion: Integrating education and research in health care and services is a revolutionary and beneficial achievement in the country and an inspiring experience for all health systems in the world. If generalized and deepened, it can become the most prominent contemporary healthcare experience in the world.

Keywords: Integration; Medical Education; Higher Health Education; Social Accountability; Islamic Republic of Iran; Health; Health Care Network; Health System

Background

With the increase in population and changes in its pattern, the World Health Organization (WHO) has emphasized the transformation and change of the medical education program (1). The initial idea of integrating medical schools and the health system was formed in developing countries, and the first successful experiences in this regard were reported in countries such as Egypt, Sudan and several African countries (2). In Iran, the shortage of medical workforce in the population has caused the health of people to be exposed to many risks in different parts of the country, especially in deprived areas. Increasing the admission and training of medical workforce was beyond the responsibility of the Ministry of Higher Education due to the lack of necessary facilities and educational conditions. The above reasons led experts to consider the only solution to be "integrating education and research into health care and services" and the formation of a new ministry that would be responsible for both systems. Therefore, in 1983, the plan for "Integrating Education and Research in Health Care and Services" was presented by the Supreme Council of the Cultural Revolution and approved in 1985 after some amendments (3).

The role of health in the development and progress of societies is more important than ever, and one of the most important criteria for assessing the level of development of countries is their health status (4). In our country, special attention has always been paid to health in the country's macro policies and programs (5). The "integration plan" is not limited to the country's borders and has also attracted the attention of reputable and important medical education associations around

the world. In some countries in the region, such as Saudi Arabia, following the example of Iran, colleges affiliated with the Ministry of Health were formed (6, 7).

Unfortunately, due to insufficient familiarity and limited awareness of the merits and benefits of this merger, including the country's self-sufficiency in health workforce, improving the quality and community-oriented nature of medical education, accountability and justice in health, and improving health indicators in the country, voices of opposition are occasionally heard, for unrelated and sometimes false reasons. Of course, it is a matter of joy that the Supreme Leader has reminded the authorities of the importance of maintaining this "integration plan" over the past few decades and has emphasized and strengthened this important issue by including this important matter in Section 8 of the General Health Policies (8).

Medical Education after the Revolution to the Formation of the Ministry of Health and Medical Education

"After the Islamic Revolution of Iran in 1978, two major changes occurred in the country's health system: one was the formation of the Ministry of Health and Medical Education and the other was the establishment of the country's health care network. The Ministry of Health and Medical Education is responsible for all aspects of policy-making, planning, leadership, supervision, monitoring, and evaluation of health services, and at the same time, it is responsible for training and educating the health workforce in a community system that provides health services, and this constitutes the country's health structure" (9).

The Cultural Revolution Headquarters, which was established by order of Imam Khomeini in 1970, was responsible for reviewing and compiling university programs (9). "In the medical branch of the headquarters, which is responsible for Dr. Azizi, several university professors such as Dr. Seyed Alireza Marandi, Dr. Mohammad Razia Kalantar-Motamedi, Dr. Hedayat A... Eliasi and health experts such as Dr. Pilehvari, Dr. Shadpour and Dr. Vakil, as well as representatives of medical students such as Dr. Marzieh Dastjerdi and Dr. Hossein Ali Jelve Moghadam, Dr. Abolhasani and student Shahid Tavakoli were present. The medical branch of the Cultural Revolution Headquarters called for the opinions of all professors and experts and received more than 200 articles ranging from one page to detailed comments, and all of them were reviewed in the meetings of the medical branch and in the presence of invited professors and experts, and ... where possible, in the presence of the author of the plan (9).

A review of the medical branch of the headquarters was carried out during the years 1359 to 1361, and in the academic year 1363 to 1364, two important measures were taken:

1. Increasing the admission of medical students through the Dean of the Faculty of Medicine of Shahid Beheshti University (Dr. Azizi), so that for the first time 637 students were admitted for the first year. This was the beginning for increasing the number of students in other faculties of the medical department and adapting the education situation to a larger number of students.

2. The bill to establish the "Ministry of Health, Treatment, and Medical Education" was submitted to the Islamic Consultative Assembly once again through the government delegation with the agreement of the two Ministers of Health and Higher Education, Dr. Seyed Alireza Marandi and Dr. Iraj Fazel, and was approved by an overwhelming majority after months of discussion and exchange of opinions. In approving this bill, a large part of the country's planning and responsible medical force and the medical representatives of the Islamic Consultative Assembly made great efforts.

Finally, in 1364, the set of faculties and higher education institutions of the medical department and The Ministry of Health established a new organization called the Ministry of Health, Treatment and Medical Education. From the beginning of the establishment of this ministry, the goals were designed in such a way that each province would have a medical university that would be responsible for all educational, research, health, and medical affairs of the relevant province, and as a result of the combination of science, knowledge, and dynamism of universities with the experience and follow-up of the health and medical system, the country's medical system would create a coherent system in all related matters (from the village to the provincial center) (10). Table 1 shows the historical course of higher medical education in the last 1.5 centuries (9).

The establishment of this ministry was able to improve the country's medical situation in terms of quantity and quality (9). This was done in various stages:

1. Faculties and universities of medical sciences were established in 1986 and it was decided that eventually, a university of medical sciences would be established in each province, whose director would be responsible for all matters related to health, treatment, education, and medical research, and that services would gradually be

integrated into it. Universities would become more active in health and medical affairs, and the hospital and outpatient facilities of the former Ministry of Health would be used to train the medical team. At this stage, the management of regional health and treatment organizations in Tehran and the provinces of the country was not integrated into the management of universities and practically operated separately. Although the managing director of the regional organization was like the president of the university, the use of human resources and facilities of each system, as well as the participation of each system in policy-making, planning, implementation and evaluation of the other system, was limited (9).

2. The complete integration of the universities of medical sciences and regional health and treatment organizations in Tehran and the provinces was carried out in 1993. In this way, the vice president of health of the University of Medical Sciences was responsible for all health affairs of the province, and the vice presidents of support, education, student affairs, and research of the universities were able to carry out significant activities in their respective affairs throughout the province, using all human resources, technical facilities, and welfare to advance the set goals (9).

Table 1. Historical history of higher medical education in the last 150 years: from the establishment of Dar al-Fonun to the formation of the Ministry of Health, Treatment and Medical Education (1228 to 1364 AH)

Row	Institution or ministry	Year of establishment
1	Dar Al-Fonun	1849
2	Ministry of Science	1853
3	Ministry of Education, Endowments and Specialized Industries	1909
4	Ministry of Culture	1940
5	Ministry of Education	1964
6	Ministry of Science and Higher Education	1967
7	Ministry of Culture and Higher Education	1978
8	Ministry of Health, Treatment and Medical Education	1985

In this way, education and research in the country's health and treatment networks took on a new form, and the relationship between the universities and the network in all aspects of service, treatment, education, and research became stronger. The "integration plan" led to the formation of the Ministry of Health, Treatment, and Medical Education and the establishment of universities of medical sciences and health and treatment services in all provinces of the country. It is undoubtedly one of the most important achievements of the sacred system of the Islamic Republic of Iran (11).

Some areas of the integration plan:

The system of providing health care and services

Before the Islamic Revolution, there was no coherent system for providing health care and services to society. In the field of providing inpatient medical services, there were a few acceptable hospitals in Tehran and some large cities.

Addressing the issues of prevention, hygiene, health promotion, addressing social factors affecting health, and most importantly, justice in health, did not exist, and after the revolution, it was fully implemented through the expansion and modernization of the country's healthcare network.

Shortage of doctors

One of the influential factors was the shortage of doctors, which caused this need to be met by employing non-Iranian doctors with low qualifications. The shortage of specialized human resources in the country had caused patients to be sent to other countries to receive some medical services. Before the 1970s, we sent 11,000 patients abroad annually, and each cost an average of $10,000, but currently, we have more than 95,000 general practitioners, more than 49,000 specialist physicians, and more than 8,000 fellowship and subspecialist physicians in the country.

Inadequate health and prevention

The provision of health care and health promotion services was not noticeable, and preventive measures were very minimal. The situation of women in society before the revolution was much worse than that of men. Due to the lack of heartfelt belief in health and prevention, the limited funds in this area were spent on building hospitals and purchasing equipment requested by the owners of the trust votes.

The change in Western attitudes from super specialization and intensive care to primary healthcare

Perhaps if doctors and officials had not graduated from medical schools under the supervision of the Ministry of Science, they would have been more familiar with the real health needs of society with a more comprehensive view. As a result, they would have been aware of the consequences of expanding to all aspects of health and also addressing social factors affecting health,

preventing non-communicable diseases, and most importantly, justice in health (12).

Outline of developments from the establishment of the ministry to the beginning of the Seventh National Development Plan

University Development Council (1985)

Establishment of the country's healthcare network (1985)

Growth and expansion of educational discipline (increase in medical schools and human resource training, increase in hospitals and educational beds, establishment of educational fields in healthcare networks) (from 1985 to the present) Improving the country's health indicators (increasing life expectancy, reducing mortality, developing health care, increasing access, preventing and controlling non-communicable diseases) (from 1985 to the present)

Increasing the number and diversity of educational fields in proportion to the society and improving the quantity and quality of medical education (specialized and subspecialized courses, master's and PhD courses, increasing the number of students in medical fields, increasing the number of university ranks, improving the professor-student ratio, increasing the number of universities and medical schools, eliminating the need to send patients abroad, increasing the production of drugs and biological materials in the country, increasing research centers and expanding applied research, creating a network of medical education development centers) (from 1985 to the present)

Major planning and policymaking to provide, maintain, and promote equitable and accountable health with special emphasis on the dimension of Islamic spiritual health (from 1985 to the present) (to date)

Self-sufficiency in manufacturing various vaccines (from 1985 to date)

Establishment of medical schools and universities (1986)

Law on promoting breastfeeding and supporting mothers during breastfeeding (1993)

Complete integration of medical universities and regional health and treatment organizations in Tehran and the provinces (1993)

Approval of the National Universal Health Insurance Law (1994)

Razi Research Festival (30 editions have been held since 1995 to 2024)

Establishment of the Supreme Health Council of the country (1983)

Food Safety and Health Council of Iran University of Medical Sciences and Health Services (1986)

Shahid Motahari Educational Festival (1988, 17th edition held since 2008)

Family doctor and referral system in urban areas (1992)

Establishment of the Epidemiology Research Center for Non-Communicable Diseases (2012)

Establishment of the Iranian-Islamic Traditional Medicine Office at the Ministry of Health, Treatment and Medical Education (2013)

Launching the National Population Cancer Registry Program (2014)

Establishment of the Research Center for Fetal Developmental Disorders (2015)

National Center for Strategic Research in Medical Education (2016)

Development and approval of the National Document on Comprehensive Development and Growth in Early Childhood (2016)

Approval of the Health Culture Promotion Program (Approved at the 707th Session of the General Culture Council on 9/5/1397)

The First Health Science and Technology Park in Isfahan (2018)

Iran's National Document on Rare Diseases (2019)

Achieving the first rank in drug production in the region (2019)

Fourth rank in recombinant drug production in Asia (2019)

Management and containment of the COVID-19 crisis and vaccine production (2019-2020)

Implementation of the Daroyar Plan (1401)

Implementation of nursing tariff (1401)

Improvement of indicators

The total preventive and health measures resulted in the mortality of children under 5 years of age decreasing from 135 cases per thousand live births to 16 cases in 2019, while severe and even moderate malnutrition cases practically disappeared, and mild cases also showed a significant decrease. To reduce mortality and improve the health of pregnant mothers, measures such as their monthly care and timely administration of dual tetanus and diphtheria vaccines by health experts, as well as extensive training of local midwives, especially in observing hygiene principles, were taken, which resulted in the maternal mortality rate decreasing from 255 per 100,000 live births at that time to 25 per 100,000 live births in 2019. At the same time, infant mortality also decreased from 90 per thousand live births in villages and 104 per thousand live births in cities to 13 per

thousand live births. As a result of all these measures, the life expectancy of women, which was 55 years at the beginning of the Islamic Revolution, increased to 79 years in 2019, and the life expectancy of men increased from 56 years to 76 years in 2019 (12).

Discussion

The integration of health and education has led to a move towards community-centered medical sciences, which was born of the Islamic Revolution and has improved health indicators in the country (13). The main goal of integrating medical education into the health system was to provide a comprehensive approach and better education for more and more applicants for medical sciences and to create diversity and balance between the ranks of service providers (14). The main message of integrating medical education into the health system has been to be responsive to the needs of society and to train the quantitative and qualitative human resources (15). The experience of the Islamic Republic of Iran shows that the "integration plan" has not only made the country self-sufficient in terms of health and human resources, but also is the most appropriate, sustainable, and economical means of achieving community health in society (16).

With the "integration plan," the growth of education and research expanded throughout the country, especially in deprived areas, and great strides were made towards educational justice. The history of higher medical education in Iran, from Dar al-Fonun to the establishment of the Ministry of Health and Medical Education, lasted 136 years (9). During this period, medical education has undergone enormous quantitative and qualitative changes. Indicators of responsiveness to the needs and expectations of society show remarkable progress in the field of health in the past forty years (17). Although no one can claim that integration is the only solution or that it can solve all the country's health problems alone, it is certainly the most economical and realistic solution available. Of course, effective monitoring and evaluation must be an integral and continuous part of the system (18).

Conclusion

Integrating education and research in health care and services is a revolutionary and beneficial achievement in the country and an inspiring experience for all health systems in the world. If generalized and deepened, it can become the most prominent contemporary healthcare experience in the world.

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Viewpoint

Integration of Education and Research into Healthcare Services According to Health Upstream Documents in the Islamic Republic of Iran

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Abstract

Background: This paper provides an overview of the plan of integration of education and research into healthcare services, as outlined in upstream laws and documents. Legal documents serve as a guiding framework for the direction of a nation's health system. The desired vision for the health system is typically reflected in development policies and plans. Having up-to-date health national policies is viewed as a hallmark of good governance in health systems. Fortunately, this issue has been given due attention in our country.

Objectives: This paper provides an overview of the plan of integration of education and research into healthcare services, as outlined in upstream laws and documents.

Methods: A library-based study method (reviewing reputable domestic and international publications on the keywords related to the study) was used to review upstream laws and documents related to the general health policies and content analysis.

Results: The emphasis on the inherent importance and necessity of integration of education and research into healthcare services, as well as the mission to fulfill it, has been clearly articulated in upstream laws and documents in the health sector, at specific time intervals and in accordance with societal needs.

Conclusion: The integration of education and research into healthcare services has been a revolutionary and highly beneficial achievement for our country. Thus, given our country's health system state, the promulgated upstream laws and documents have comprehensively addressed all necessary aspects for strengthening the national health system, and can play a significant role in transforming the health system and advancing its objectives.

Keywords: Integration of Medical Education; Higher Health Education; Upstream Laws and Documents; Islamic Republic of Iran; Health; Healthcare Network; Health System

Background

According to the World Health Organization (WHO), the primary goals of a health system are to enhance community health, ensure accountability, and promote equitable financial engagement, and health system reforms are fundamentally aimed at realizing these goals (1). In the years following the Islamic Revolution, the education of specialized healthcare professionals in Iran underwent significant transformations. The Medical Education Curriculum Review Committee was established in the early years of the Cultural Revolution Headquarters to conduct a comprehensive quantitative and qualitative assessment of medical education, highlighting the existing challenges in its final report. Following the publication of the aforementioned research report and subsequent approval by the Islamic Consultative Assembly, in 1985, all authorities, duties, and responsibilities of the Ministry of Culture and Higher Education pertaining to medical education were transferred to the newly established ministry. With the separation of medical education from the Ministry of Culture and Higher Education and its integration into the then Ministry of Health and Welfare, the Ministry of Health, Treatment, and Medical Education was formed (Table 1) (2).

The vision for the health system is specified through macro-level policies and programs (3, 4). These general policies determine the main guidelines and decisions that are implemented to safeguard the public interest and ensure the coherence and harmony of societal goals (5). The development of upstream documents, development policies, and budgetary plans are all types of macro-level and national policies (6).

The ultimate goal of any health organization is to meet the needs of individuals and the community. As these needs are constantly evolving, service-providing

organizations must remain flexible and adaptable. Therefore, reforming the health system or sector should be viewed as an ongoing and continuous process (7).

Table 1. The historical trend of medical higher education in Iran over the recent 150 years: From the establishment of Darolfonoun to the establishment of the Ministry of Health, Treatment, and Medical Education (1849-1985)

Row	Institution or Ministry	Establishment Year
1	Darolfonoun	1849
2	Ministry of Science	1853
3	Ministry of Endowments and charity	1909
4	Ministry of Culture	1940
5	Ministry of Education	1964
6	Ministry of Science and Higher Education	1967
7	Ministry of Culture and Higher Education	1978
8	Ministry of Health, Treatment, and Medical Science	1985

Given the importance and position of integration of medical education and research into healthcare services, this study focuses on the integration of education and research into healthcare services in health upstream documents in the Islamic Republic of Iran. These documents include:

- Constitution of the Islamic Republic of Iran (1989)
- Vision Document 2025 (2003)
- Statement on the Second Phase of the Islamic Revolution (2018)
- General Policies on Science and Technology (2014)
- National Development Plans (1989-2023)
- General Policies on Health (2014)
- Population Policies (2014)
- Comprehensive National Scientific Plan (2010)
- Health System Transformation Plan (2011)
- The Law on the Formation of the Ministry of Health and Medical Education (1985)

1- Constitution of the Islamic Republic of Iran

In order to realize Clauses 4, 12, and 13 of Article 3 of this law, the Government of the Islamic Republic of Iran is obliged to strengthen the spirit of inquiry, research, and innovation across all scientific, technical, cultural, and Islamic fields by establishing research centers and encouraging researchers. It must also establish a sound and just economy based on Islamic principles to create welfare, eradicate poverty, eliminate all forms of deprivation in terms of nutrition, housing, employment, and health, generalize insurance, and promote self-sufficiency in science, technology, industry, agriculture, military affairs, etc. Article 29 of this law emphasizes the optimal and coordinated use of health facilities to achieve these objectives.

2- Vision Document 2025

A society that is committed to human flourishing, supported by an efficient, equitable, and innovative health system, has attained the leading position in the Southwest Asia region regarding health indicators and scientific authority in science and technology. It has emerged as a medical hub for both Southwest Asia and the global health community.

3- Statement on the Second Phase of the Islamic Revolution

A comprehensive list of mandatory statements related to medical education has been identified within the 12 domains: “Governance, knowledge, corruption deterrence, economy, cultural development, social development, self-confidence and hope, international interactions, youth-orientation, national resistance, enemy deterrence, and justice” (8).

Instead of relying on individual, discretionary decisions by senior health managers, a comprehensive framework for an optimal health system must be designed, aligned with established policies, program-orientation, and organization-orientation (9).

4- The Law on the Formation of the Ministry of Health and Medical Education

Article 1 of this law signifies the optimal and coordinated use of health sector resources for all members of society in the realization of Clauses 4, 12, and 13 of Article 3 and that portion of the objectives of Article 29 of the Constitution of the Islamic Republic of Iran that has been formed by the Ministry of Health, Treatment, and Medical Education since the adoption of this law. Articles 3, 5, and 10 address the cultivation of a workforce committed to ethics and possessing adequate skills and competencies, the establishment of educational equity, the expansion of medical research and science, the presence of diverse research institutes alongside universities of medical sciences, and the coordination and trusteeship of charitable healthcare centers. Article 7 explicitly addresses the primary role of the Ministry of Health, Treatment, and Medical Education in policymaking, policy determination, and medical education planning.

5- General Policies on Health

The general policies on health promulgated by the Supreme Leader, which were announced in 14 clauses in 2014 in enforcement of Article 110, Clause 1 of the Constitution of the Islamic Republic of Iran.

The core axes of these policies encompass human and Islamic values, public awareness, and the

enhancement of community members' responsibilities and capabilities. They prioritize prevention over treatment, promote evidence-based decision-making, and strengthen infrastructure. Additionally, they focus on demand management, food security, the separation of regulatory functions, and the quality and safety of services. Achieving equity in health promotion, particularly in underserved areas and among populations in need, is also a key objective. The policies aim to expand the quantity and quality of health insurance, ensure sustainable financial sources, and transform Iran into a medical hub in Southwest Asia and the Islamic world (10).

Part 1 of Clause 7 of the general policies on health, promulgated by the Supreme Leader on April 07, 2014, stipulates that "the Ministry of Health, Treatment, and Medical Education is responsible for the health system trusteeship, including executive policymaking, strategic planning, evaluation, and trusteeship." Trusteeship, as one of the most critical functions of a health system, is a primary responsibility of the government that cannot be delegated, and the government must be accountable for it by prioritizing the public interest (11).

Clause 7 emphasizes the separation of roles in healthcare, specifically the responsibilities for trusteeship, financing, and service provision, aiming at ensuring accountability, equity, and optimal healthcare service provision to the people (12).

Furthermore, Part 2, Clause 7 of the general policies on health emphasizes "management of health resources through an insurance system, centered on the Ministry of Health, Treatment, and Medical Education, in collaboration with other centers and institutions." Additionally, Part 1, Clause 8 of these policies focuses on "promoting decision-making and taking actions based on solid and scientific findings in health care, education, and services, through the development of standards and guidelines, and the evaluation of health technologies." Hence, when considering trusteeship and assigning all its responsibilities to the Ministry of Health, Treatment, and Medical Education, it implies a mandatory requirement for the ministry's involvement in all these areas (13, 14).

A review of Clauses 7 and 9 of the general policies on health reveals that the Supreme Leader's primary emphasis lies on the core aspects of trusteeship, including legislation, strategic policymaking, and supervision and enforcement of laws and regulations. According to this national document, the Ministry of Health has been designated for the primary trusteeship role, and all other institutions and organizations are expected to operate under its authority. The direct and indirect impacts of trusteeship and its functions on health system goals and outcomes, such as accountability, effectiveness, quality, accessibility, coverage, and safety are worthy of consideration (15).

Although the general policies on health (promulgated by the Supreme Leader) lack a separate chapter or clause explicitly dedicated to ethical principles or "ethical appendix," every clause of this document is imbued with ethical and moral concepts (11).

The importance of sustainable and equitable financing is explicitly emphasized in several clauses (7 and 9) of the promulgated document, particularly in Clause 10, as the financing system can be likened to the beating heart of the health system. Financing is considered equitable when individuals benefit from services according to their ability to pay and their specific needs (16).

Another important function is health service provision. The Islamic Republic of Iran does not limit health service provision to the government sector, but highlights the use of both public and private sectors alongside the government sector in Clause 9 (17). Similar to other upstream documents, such as the Sixth Development Plan, the focus of health services is on the family physician (18).

Over the past decade, Iran has made significant strides in medical research, elevating its international standing. These achievements have coincided with a surge in the number of research centers and researchers working at these centers, increased research funding, and a growth in the number of Iranian journals indexed in international databases, such as Scopus, PubMed, and ISI (19, 20).

Clause 14 not only emphasizes the enhancement of Iran's position in research but also highlights the issue of scientific leadership and transforming Iran into a research and scientific hub in medical fields in the among regional and Islamic countries, with a focus on Islamic and humanitarian principles and values (11).

In Clauses 1 and 13 of the document, besides quantitative and qualitative development, emphasis is placed on a health-centered, community-needs-based, accountable, and equitable approach to medical education (21).

Following the Islamic Revolution, the country's pharmaceutical system was renamed the "Modern Iranian Pharmaceutical System" and later the "Generic Pharmaceutical System," as mentioned in Clauses 4 and 5 of the general policies on health (22).

6- Comprehensive National Scientific Plan

The "comprehensive national scientific plan" has incorporated the theme of universalizing science in values and strategies. In line with the presented visions in the field of health, the mission of the "Health Science, Technology, and Innovation System" is to identify and address challenges in the following key areas: (1) Trusteeship and provision of healthcare services, (2) capacity building of the human resources required by the health system, (3) equitable provision, production, and distribution of financial resources, (4) excellence in production, and (5) utilization of knowledge in areas where the country has relative and competitive advantages to achieve a leading position in the region.

7- Policies on Science and Technology

One of the areas where the impacts of science and technology advancements are most evident is healthcare. Science and technology have the potential to revolutionize our understanding of diseases and enhance the effectiveness of healthcare provision. The vision for science and technology in healthcare is "to achieve the highest level of public health in the region by 2025 by leveraging existing knowledge and generating new scientific and technological advancements."

8- Health System Transformation Plan

This plan is, in fact, a comprehensive collection of activities within the health sector of the country, including health, treatment, education, research, and technology. By designing this plan, the original and transformative health policies are specified, and it is hoped that by gaining legitimacy from the main pillars of the Islamic Republic of Iran, it will culminate in stability in policies, which will undoubtedly lead to the improvement of the health system.

9- The Five-Year Development Plan Act

Our country has formulated and implemented seven five-year national development plans since the Islamic Revolution. The first through sixth development plans have focused on expanding the service provision network and improving health standards to ensure universal access to public services. These plan have aimed to promote public health, expand universal insurance, control population growth, create structural and institutional changes to facilitate privatization, ensure equitable financing, reform the policymaking and financing systems for developing insurance, reduce the public's share of health costs, and implement various initiatives, such as healthcare network reform, the integration of medical education into hospitals, hospital autonomy, the establishment of a family physician system, health transformation, etc. (23, 24).

Chapter 14 of the Seventh Development Plan draft focuses on enhancing the health system and consists of 6 articles. The topics include improving the quality of services, governance of the health system, drugs, medical equipment, and health insurance, reducing costs, and increasing patient satisfaction. It is explicitly stated that the Ministry of Health, Treatment, and Medical Education is solely responsible for executive policymaking, strategic planning, evaluation, and supervision (25).

Conclusion

Based on the WHO conceptual framework, healthcare systems have three primary objectives: Improving population health, ensuring equitable financing, and being accountable to people's expectations regarding issues beyond health concerns. Four core functions must be performed to achieve these objectives: Trusteeship, financing, resource provision (human resource, physical resource, equipment, drugs, and information), and service provision (17).

In the years following the Islamic Revolution, various reforms were planned and implemented within the Iranian health system, including the integration of health system and medical education plan in the 1980s, the expansion of healthcare networks in the 1990s, the hospital self-governance plan and the establishment of a payment system in the 2000s, the implementation of the family physician plan in the 2010s, and the health system reform plan in 2014 (26, 27).

Some of the initial strengths and opportunities encompass the localization of staff, particularly health workers, scientific evidence-based policymaking, and needs-based training, leading to remarkable improvements in health indicators (28). One area that facilitates Iran's progress toward becoming a global health leader is the health system transformation (29). The Iranian health system offers a unique model that integrates healthcare services and education and research, aiming to enhance public health (30).

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