

Design, Implementation, and Evaluation of a Short-Term Research Skills Training Course for Clinical Faculty Members: A New Experience at Kerman University of Medical Sciences

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Abstract

Background: Several research skills training courses are designed for both faculty members and students in educational and research institutions around the world.

Objectives: The current study aimed to design, implement, and evaluate a short-term research skills training course for faculty members of Kerman University of Medical Sciences.

Methods: The current scholarship study was conducted in three stages, in 2017. The first stage comprised of a comparative study needs assessment, and course design. The training course was conducted with the participation of 30 faculty members and the teaching of 10 experienced professors. Participants were evaluated through practical work and homework. Instructors were evaluated by participants using survey forms. The course was evaluated through interviews with several participants and professors.

Results: After eight months of research and holding 16 sessions (which each took between 2 to 4 hours), a course with three main modules was designed in 2017. Instructors used appropriate teaching methods, including interaction with participants, problem-solving, discussing, teamwork, and practicing at home. According to the results of the evaluation, the content of the course was appropriate for the research activities of participants. Besides, they believed that the instructors were among the strengths of the course.

Conclusion: Certainly, increasing research skills of faculty members will lead to better guidance of assistants and qualitative improvement of research conducted by students.

Keywords: Training; Research skills; Faculty; Medical

Background

Research is one of the most important pillars of sustainable development in all countries, and for this reason, the accuracy of research methods is of crucial importance (1). The increased number of articles and journals in medical

sciences indicates the expansion of various researches in the field of medical sciences, in which appropriate data extraction is the prerequisite of application of their results (2). According to the data published by the Web of Science (WoS) database, scientific articles published by Iranian researchers increased

from 983 in 1997 to 49696 by the end of 2017, which indicates a more than 50 times increase. Besides, from 2015 to 2019, the publication of top articles increased by 5 times (3). World Health Organization (2004) emphasized “linking research to practice” in its 2004 report and asked countries to make efforts to transfer the knowledge gained from research (4). Active methods of knowledge transfer intend to influence and implement (5). The quality of research and articles, as well as their influence, should always be considered. In a study, 83 articles published in three scientific journals published in 2011 were examined and several problems, including general writing errors (47.0%), incorrect writing of methods (32.2%), incorrect findings (45.4%), and problems in writing references (25.3%) were identified (6). Certainly, teaching research skills to researchers is an effective way to address such problems.

In this line, special attention should be paid to the responsible implementation of medical research, and the knowledge of researchers concerning this issue should be improved (7). Ethical issues are intertwined with research and should not be considered as a secondary issue. Ethics should guide the research design. Universities should have careful plans and clear guidelines for informing researchers and university professors about such issues and make sufficient efforts to teach the principles of proper research (7). University faculty members, as the main pillar of training specialized personnel, have a crucial role in the advancement of scientific development of the country. Therefore, learning research methods and having a research perspective are important components of faculty members. Therefore, research activities have a large weight in the rating system of faculty members.

Expansion of postgraduate courses and clinical assistantships has resulted in the employment of several young faculty members in universities. This indicates the importance of familiarizing them with the basics of research in developing scientific papers and guiding students about how to conduct proper research. The first step in designing curricula is needs assessment; because identifying problems is the prerequisite of setting goals and determining how to address them.

Objectives

Several studies investigated the educational needs of faculty members, including research conducted at Isfahan School of Medicine (8), Medical Education Development Center of the Kerman University of Medical Science (KMU) (9), and Arak University of Medical Sciences (10), which in all cases a special emphasis is placed on developing skills in using statistical software, writing articles, and strengthening critical thinking. Therefore, in the current study, a short-term research course was held for clinical faculty members to improve their capabilities and to evaluate the impact of the training on the level of research knowledge of participants.

Methods

The current scholarship study intended to design, implement, and to evaluate a short-term research skills

training course for clinical faculty members of KMUS who had less than 20 years of experience. Participants were identified, and faculty members with less than 10 years of experience were prioritized. In the first round, 30 faculty members participated. After receiving the ethical code (IR.KMU.AH.REC.1395.4), the study was conducted in three stages.

Designing the Course

This step was performed by conducting a comparative study and needs assessment.

Comparative study

To identify appropriate articles, databases such as Google and Google Scholar as well as websites and databases such as BioMed Central, PubMed, Wiley, Education Resources Information Center (ERIC), National Institutes of Health (NIH), and other various databases available in the electronic library of the KUMS were searched for the period of 2005 and 2016. Using appropriate keywords, similar courses, both national and international, were identified and examined. To increase the comprehensiveness of the search, the track citations method was used.

Searching for resources and training programs took about 100 hours, then search results (nearly 248 files) were categorized. The search continued by one of the experts under the patronage of one of the main members of the research team, and with the supervision of two main members of the team, the appropriate studies and documents were identified from mid-August to February 2015.

Needs assessment

This step was performed as a qualitative study in the form of an expression of experiences. After consulting with the research team, experts and experienced individuals were identified using the purposive sampling technique. Written consent was taken to record the semi-structured interview, which took 30 minutes on average. Participants were reassured about the confidentiality of the interviews. Interviews continued to reach data saturation. Nine university professors were interviewed from May to September 2016. Interviews were recorded and transcribed. Then, the content analysis was performed.

Program design

Using the previous similar courses, interviews were conducted. Based on the educational goals, the curriculum of the course, including the number of steps (educational modules) and the duration of each step, was designed. Then, educational titles and sub-titles, educational strategies, major teaching and learning methods, duration of face-to-face training programs and apprenticeship, nominated university professors to join the research team to present the courses, and how to evaluate the learners and its frequency, were determined.

After developing the initial draft, implementation obstacles were discussed in two meetings with the main researchers in December 2016, and the necessary

amendments were made. To finalize the program, two meetings were held with instructors and participants.

Nearly 40 clinical faculty members with 5 to 10 years of experience, who were able to attend classes and declared their interest in participating were selected. Then, based on the participant's opinions, it was decided to hold classes every Thursday from 14:00-16:00. In another meeting that was held with the participation of 30 instructors and 30 faculty members who had a history of research and teaching in this field, the final program was discussed. University professors presented specific curriculums, and after consultation with the research team concerning how to teach and communicate with the participants, how to perform teamwork, and practices, provided their strategies. All opinions and results of the meetings were recorded, and after consulting with fellow professors, on May 12, 2017, the final program was prepared for implementation.

Designing the Execution Plan

Necessary equipment and human and financial resources were reviewed before, during, and after implementing the program. Organizational arrangements and educational space required to implement the course were established in the school of medicine. Two experts working in the school ran all administrators.

By cooperating with the computer experts of the faculty,

a special section was developed on the school's website for online registration in the program. Besides, a telegram channel, an e-mail group, and an SMS group were also set up, and letters of invitation from professors were designed.

Experts of the program participated in performing other necessary measures and processes, such as communications with professors, announcing the programs, typing evaluation forms, holding evaluation stages, teamwork, and receiving practices, sending feedback, etc.

After making necessary coordination with instructors, a week before beginning the course, official invitation letters were sent for instructors. Audio files, short films, and photographs were produced from all sessions. After editing, the files were available through the website.

Assessment

Participants' evaluation: based on the educational content, assignments, and teamwork activities of participants were evaluated by instructors.

Instructors' evaluation: using a survey form, participants were interviewed at each session.

Evaluation of the course: using a qualitative study, experiences of participants and instructors were obtained. The interview guide is provided in [Table 1](#). A summary of the experiences is given in the findings section.

Table 1. Interview guide to evaluate the short-term research skills training course for clinical faculty members

Content	How do you evaluate the content of each course?
	Did the content meet your needs?
	Was the practical work enough?
Instructor	Was the instructor sufficiently familiar with the educational content?
	In general, how do you evaluate the instructors?
Place	Was the course venue appropriate?
	Were the facilities tailored to the content of each course?
Timing	Was the timing appropriate?
	Was the timing appropriate to the content of each course?
Open questions	What facilities should have been available?
	Which part was more useful, theory, or practical work?
	Which module had the most useful content?
	Which part of the course you prefer to be repeated, and why?
	Do you prefer an online course or face to face courses?
	What were the strengths and weaknesses of the course?

Results

In the current study, the final program that was implemented, and the results of its evaluation are presented. The results of the comparative study and interviews with experts will be presented in another article.

The program was developed with the participation of key members of the project in four sessions. Based on the results

of the review and programs identified by the comparative study, interviews were conducted simultaneously with sessions. At this stage, the content analysis of the interviews was a great help for coordinating executors.

The course was discussed in two meetings of the faculty council in July and August 2016, and some modifications were made. Eventually, the proposed course, including

implementation steps, topics, timing, and proposed instructors, was developed. The course was reviewed in three sessions, held from October to November 2016. Finally, after eight months of research and holding 16

sessions (which each took between 2 to 4 hours), three main modules were designed, in one of the sessions, 30 experts participated. The finalized program is provided in [Table 2](#).

Table 2. Curriculum of the short-term research skills training course for clinical faculty members

	Module	Schedule	Teaching method	Participants' evaluation
Module one	Necessity of research	One session, 2 hours	Panel attended by three professors in three different disciplines	Each participant chosen a research topic, and then developed a research methodology
	Choosing a research topic	One session, 2 hours	Panel attended by two professors.	
	Different types of studies	Three session, 7 hours	Lecture, discussing different types of articles, and presenting similar studies	
Module two	Search strategies and databases	Two session, 5 hours	Lecture, practical work at the computer center	Literature related to the topic were searched. Proposal writing, individually and by teamwork
	How to write a proposal (1), literature review, introduction, and references.	Two session, 3 hours	Lecture, presentation, and practical work	
	Sampling techniques	One session, 3 hours	Lecture, problem-solving, and presentation	
Module three	Ethical considerations	One session, 2 hours	Lecture, presentation and problem-solving	Ethical considerations related to the topic were discussed.
	Statistical analysis and using analysis techniques	Two session, 4 hours	Lecture, presentation and problem-solving	Appropriate statistical tests were chosen
	Determining sample size	One session, 3 hours	Lecture, presenting the required materials	Homework were assigned according to the topic
	How to write an article	Two sessions, 6 hours	Lecture, presenting materials, analysis of essays	Homework by study analysis checklists developed for each topic.

Evaluation of the program

Using a qualitative study and collecting experiences of participants and instructors, the course was evaluated. Participants reported that the course and its content were appropriate to their research activities. Besides, they noted to instructors and the innovative teaching methodology as strengths of the course. Considering that the participants were new faculty members, they expressed their need for continuous participation in such courses, while emphasizing on the time constraints due to involvement in treatment activities as an important barrier that affects the efficiency of the course. On the other hand, they believed that the course should be longer so that more time be allocated to the practical training. Instructors also described the course as useful and effective and believed that by using practical materials, they could draw participants' attention to the use of research skills in guiding learners. The instructors emphasized the continuation of the program and its importance for future faculty members.

Discussion

In the current study, the final course had three modules that were developed in eight months, one meeting per

each week. The course content included "Choosing research topic", "literature review methods", "different types of research studies in medical sciences", "ethical considerations of various studies", "how to write different sections of a research proposal", "sampling techniques and determining sample size", "applied statistics" and "how to write an article". In terms of content, there were similarities between our course and the courses that were found through searching in websites and literature. Reputable research institutes place special attention to the training of professors and researchers, continuation of training, and using different designs (for example, Harvard University's distance learning course (11), training course of American Health Institute (12), and the research course designed for pharmacy students (13)).

Harvard University's distance learning course (i.e. "Principles and Practice of Clinical Research (PPCR Course)) is designed to train clinical professors on a weekly basis for six months and contains four modules: "basic principles of clinical research emphasis on the clinical trial, and ethical considerations of this type of studies, biological statistics, practical aspects of clinical studies, and designing various studies (11). The national institute of health of the United States has several training

courses on research skills, one of which was a two-week intensive course for doctoral students in 2014 (12).

A study developed a clinical research course for pharmacy students in the forms of lectures, group discussions, workshops, and presentations to familiarize students with the design and evaluation of research, ethical and legal considerations, and analysis of findings. Using a survey study, the authors evaluated learners' knowledge using three measures related to the research protocol, documenting ethical issues, and presentation and influences of this course on learners' knowledge about research methods and interest of participants in continuing their studies in postgraduate courses. According to the results, those who were participated in these courses were more willing and had more knowledge in this area (13).

In the current study, after holding 16 meetings, a training course with three modules was developed. Then by doing practical work during the sessions, learners were evaluated. The evaluation of the course in the current study was performed by conducting a qualitative study, which, according to the results, using appropriate teaching methods was a strength.

The methodology used in the current study, which is a study of educational development, is published in prestigious domestic journals (14-16).

In a study conducted at Isfahan University of Medical Sciences (IUMS), a teaching course, both theoretically and practically, for histology courses is developed and implemented, and the evaluation revealed higher satisfaction of both instructors and students. Besides, due to flexibility in learning, it led to increased learning (14). In a study conducted by Rashidi and Avijgan at IUMS, an e-learning course was developed for histology courses of medical students. According to the evaluations, the course was successful in increasing the satisfaction of students and professors (15). In another study, a responsive community-oriented course was designed and implemented by the education development center of Shahrekord University of Medical Science Studies (16).

Conclusion

One of the important points of the current study was the emphasis of participants on increasing the duration of practical works and using resources other than audio files of sessions. Also, they asked for repeating the course and holding it as an official course with a participation certificate. Given the results of the participant's evaluation and their final evaluation, it seems that despite all limitations, the objectives of the course are achieved. One of the limitations of the current study was the limited time of participants, which left no option except to hold the course at weekends with limited hours, and despite the emphasis on teamwork and homework, participants could hardly perform homework. Another important limitation is the lack of similar studies that can carefully be used for comparison. Many similar courses of reputable institutions and universities are not available through the internet, but one of the strengths of the current study is implementing

the course for clinical faculty members, which is one of the most important points of this scholarship study. Besides, the current study provided a valuable experience for designing and implementing more advanced courses and providing continuous education in this area. Participation of highly experienced professors of the university and using new teaching methods are other strengths of the current study.

Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open http://sdme.kmu.ac.ir/jufile?ar_sfile=795899].

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