ORIGINAL ARTICLE

Priorities of Medical Education Research at Mashhad University of Medical Sciences based on the model of World Health Organization-Council on Health Research for Development (COHRED)

Background: Due to the variety and extent of health fields and the limitation of resources, as well as the inapplicability of some research activities, it is impossible to work in all research fields to respond to all needs of society. The aim of this study was to determine the priorities of educational research at Mashhad University of Medical Sciences.

Method: This cross-sectional study was conducted with the participation of 30 specialists in Mashhad University of Medical Sciences in 2021-2022. The process for determining research priorities was based on five principles including stakeholder participation, analysis of the existing situation and assessment of needs, specifying research topics, scoring based on criteria, and determining priorities based on maximum agreement. The priorities were based on the four domains of the COHRED model.

Results: A total of 39 research topics were obtained; after scoring and analysis, 15 educational research topics were introduced as priorities. The first priority was teaching clinical skills (44.95), and the second and third research priorities were clinical reasoning skills (44.65) and professional competence of students (44.55), respectively.

Conclusion: It is hoped that the identification of educational research priorities, in addition to guiding the research proposals towards the real needs, attract the attention of policymakers, reviewers, and approvers of educational research projects. In this case, it can be used as a tool for the optimal use of limited financial resources for applicable projects.

Keywords: Research priorities, educational research, Mashhad University of Medical Sciences, COHRED

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أولويات أبحاث التعليم الطبي في جامعة مشهد للعلوم الطبية على أساس نموذج منظمة الصحة العالمية - مجلس البحوث الصحية من أجل التنمية (COHRED)

الخلفية: نظرا لتنوع واتساع المجالات الصحية ومحدودية الموارد، فضلا عن عدم إمكانية تطبيق بعض الأنشطة البحثية، فإنه من المستحيل العمل في جميع المجالات البحثية للاستجابة لجميع احتياجات المجتمع. وكان الهدف من هذه الدراسة لتحديد أولويات البحث التعليمي في جامعة مشهد للعلوم الطبية.

الطريقة: أجريت هذه الدراسة المقطعية بمشاركة ٣٠ متخصصًا في جامعة مشهد للعلوم الطبية في ٢٠٢١-٢٠٢٢. واستندت عملية تحديد أولويات البحث إلى خمسة المبادئ بما في ذلك مشاركة أصحاب المصلحة، وتحليل الوضع الحالي وتقييم الاحتياجات، وتحديد موضوعات البحث، والتسجيل على أساس المعايير، وتحديد الأولويات على أساس الحد الأقصى من الاتفاق. واستندت الأولويات على المجالات الأربعة لنموذج.COHRED

النتائج: إجمالي تم الحصول على ٣٩ موضوعاً بحثياً، وبعد التسجيل والتحليل، تم إدخال ١٥ موضوعاً بحثياً تربوياً كأولويات. وكانت الأولوية الأولى هي تدريس المهارات السريرية (٤٤,٩٥)، وأولويتي البحث الثانية والثالثة هي مهارات الاستدلال السريري (٤٤,٦٥) والكفاءة المهنية للطلاب. (٤٤,٥٥)، على التوالي.

الخلاصة: من المؤمل أن يؤدي تحديد أولويات البحث التربوي، بالإضافة إلى توجيه المقترحات البحثية نحو الاحتياجات الحقيقية، إلى جذب انتباه واضعي السياسات والمراجعين والموافقين على مشاريع البحوث التربوية. ويمكن استخدامه كأداة للاستخدام الأمثل للموارد المالية المحدودة للمشاريع القابلة للتطبيق.

الكلمات المفتاحية: أولويات البحث، البحث التربوي، جامعة مشهد للعلوم الطبية، COHRED

اولویت های پژوهشی آموزش پزشکی دانشگاه علوم پزشکی مشهد بر اساس الگوی سازمان بهداشت جهانی- شورای تحقیقات بهداشتی برای توسعه (COHRED)

زمینه و هدف: به دلیل تنوع و گستردگی عرصه های سلامت، محدودیت منابع، کاربردی نبودن برخی از فعالیت های پژوهشی، فعالیت در تمامی این عرصه ها و پاسخگویی به تمامی نیازهای پژوهشی جامعه غیرممکن است. هدف این مطالعه تعیین اولویت های حوزه پژوهش در آموزش در دانشگاه علوم پزشکی مشهد بوده است.

روش: این مطالعه مقطعی با مشارکت ۳۰ نفر از متخصصان در دانشگاه علوم پزشکی مشهد در سال ۱۴۰۰-۱۴۰۱ صورت گرفت. فرآیند تعیین اولویت های پژوهشی بر پنج اصل مشارکت ذینفعان، تحلیل وضعیت موجود و برآورد نیازها، مشخص کردن عناوین پژوهشی، امتیازدهی بر اساس معیارها، و تعیین اولویتها بر اساس بیشترین توافق استوار بود. تعیین اولویت ها بر اساس معیارهای چهارگانه مدل COHRED انجام گرفت.

یافته‌ها: در مجموع ۳۹ عنوان پژوهشی به عنوان اولویت ارائه گردید و پس از نمره دهی و تجزیه و تحلیل ۱۵ مورد از عناوین پژوهشی به عنوان موضوعات اولویت دار پژوهش در آموزش به دست آمد. اولین اولویت مربوط به آموزش مهارت های بالینی با میانگین ۴۴/۹۵ و دومین و سومین اولویت پژوهشی به ترتیب مهارت استدلال بالینی و صلاحیت حرفه ای دانشجویان با میانگین ۴۴/۶۵ و ۴۴/۵۵ بود.

نتیجه‌گیری: امید است ارائه اولویت های پژوهشی علاوه بر هدایت موضوعات پژوهشی پیشنهادی به سوی اولویت ها، مورد توجه سیاستگذاران، داوران و تصویب کنندگان طرحهای پژوهش در آموزش نیز قرار بگیرد تا بتواند به عنوان یک ابزار در جهت استفاده بهینه از منابع محدود مالی در راستای کاربردی کردن پژوهش ها نیز مورد استفاده قرار گیرد.

واژه های کلیدی: اولویت های پژوهشی، پژوهش در آموزش، دانشگاه علوم پزشکی مشهد، COHRED

أولويات أبحاث التعليم الطبي في جامعة مشهد للعلوم الطبية على أساس نموذج منظمة الصحة العالمية - مجلس البحوث الصحية من أجل التنمية (COHRED)

پس منظر: صحت کے شعبوں کی تنوع اور وسعت اور وسائل کی محدودیت کے ساتھ ساتھ کچھ تحقیقی سرگرمیوں کے ناقابل عمل ہونے کی وجہ سے، معاشرے کی تمام ضروریات کو پورا کرنے کے لیے تمام تحقیقی شعبوں میں کام کرنا ناممکن ہے۔ اس مطالعے کا مقصد تھا۔ مشہد یونیورسٹی آف میڈیکل سائنسز میں تعلیمی تحقیق کی ترجیحات کا تعین کرنے کا

طریقہ: یہ کراس سیکشنل مطالعہ مشہد یونیورسٹی آف میڈیکل سائنسز میں ۲۰۲۱-۲۰۲۲ میں ۳۰ ماہرین کی شرکت سے کیا گیا۔ تحقیقی ترجیحات کے تعین کا عمل پانچ اصولوں پر مبنی تھا۔ اسٹیک ہولڈر کی شرکت، موجودہ صورتحال کا تجزیہ اور ضروریات کا اندازہ، تحقیقی موضوعات کی وضاحت، معیار کی بنیاد پر اسکورنگ، اور زیادہ سے زیادہ معاہدے کی بنیاد پر ترجیحات کا تعین۔ ترجیحات COHRED ماڈل کے چار ڈومینز پر مبنی تھیں۔

نتائج: مجموعی طور پر ۳۹ تحقیق عنوانات حاصل کیے گئے؛ اسکورنگ اور تجزیہ کے بعد، ۱۵ تعلیمی تحقیقی موضوعات کو ترجیحات کے طور پر متعارف کرایا گیا۔ پہلی ترجیح طبی مہارتوں کی تعلیم تھی (۴۴٫۹۵)، اور دوسری اور تیسری تحقیق کی ترجیحات طبی استدلال کی مہارتیں (۴۴٫۶۵) اور طلباء کی پیشہ ورانہ اہلیت (۴۴٫۵۵) تھیں۔ , بالترتیب۔

نتیجہ: امید ہے کہ تعلیمی تحقیقی ترجیحات کی نشاندہی، تحقیقی تجاویز کی حقیقی ضروریات کی طرف رہنمائی کرنے کے علاوہ، پالیسی سازوں، جائزہ لینے والوں اور تعلیمی تحقیقی منصوبوں کی منظوری دینے والوں کی توجہ مبذول کرائے گی۔ اس صورت میں، یہ ہو سکتا ہے۔ قابل اطلاق منصوبوں کے لیے محدود مالی وسائل کے زیادہ سے زیادہ استعمال کے لیے ایک ٹول کے طور پر استعمال کیا جاتا ہے۔

کلیدی الفاظ: تحقیقی ترجیحات، تعلیمی تحقیق، مشہد یونیورسٹی آف میڈیکل سائنسز، COHRED

INTRODUCTION

Research is a precise and organized effort to find the truth, and one of the main missions of research in medical universities is to create an appropriate environment for generating knowledge or, in other words, knowledge enhancement and using it for solving problems and improving community health in various fields (1,2). Research in the field of health is essential for improving the health system and creating innovations (3). Since health areas are diverse and extensive, the demand for conducting health research exceeds available financial resources and capacities. Therefore, it is impossible to be active in all these areas to meet all research needs (4). Research conducted without needs assessment not only does not solve problems but also adds to existing issues and wastes limited resources. This has led to a considerable portion of research conducted today not only failing to address problems but wasting time, energy, human resources, high costs, and ultimately resulting in non-applicability of the results (5-7). Therefore, for optimal use of resources and paying attention to all stakeholders in the health system, the prerequisite for making decisions about which research to choose is to identify research priorities based on a transparent, logical, and systematic process (8, 9).

Determining research priorities is important in the research management cycle and even education process (10). Setting research priorities is a type of research management method and strategic thinking that allows health research to be carried out based on strategies and policies (11). Determining research priorities is implementable and beneficial from macro and national levels to educational departments and research centers (10). Given the undeniable role of research in comprehensive development and the current need and situation of our country for producing knowledge, which is a major mission of universities and is aligned with the country's research policies, vice chancellors for research at various universities have provided an appropriate context for creativity, innovation, discoveries to improve the quality and quantity of research activities (12, 13). In recent years, in addition to the Ministry of Health, Treatment, and Medical Education, vice chancellors for research of medical universities and education development centers (i.e. EDC: the centers for improvement in education pyramid) have given special attention to research in education (14,15).

The goal of Research in Education is to enhance the quantitative and qualitative aspects of research activities in education by formulating and revising educational programs, organizing educational research, guiding and monitoring the implementation of innovative teaching methods, providing research consultations, supporting researchers, providing the infrastructure for using practical research results in order to solve health system problems (16, 17). In other words, research in education tries to assist in fulfilling the main mission of the university's educational system, which is developing and improving the quality of education at the university level through collaboration and support in conducting educational research and utilizing new teaching methods. By using the results of conducted research, decision-makers can take effective steps towards improving the quality of education in national and international levels. These high-value goals can be obtained through proper implementation of the research cycle, which starts with setting research priorities in education (16, 18).

In general, determining research priorities in a country should be in line with its long-term vision. So, it is necessary to identify the strategic research priorities of the country throughout future planning, which serve as the main foundation for management and ensure its progress and development (19, 20). Given the importance of this issue and considering that medical education research is a specific, extensive, and important subject with no longer history that provides a basis for targeted use of limited financial resources, it seemed that determining medical education research priorities could be one of the main objectives of the strategic plan for educational sectors to address the major needs of society. Therefore, this study aimed to determine the research priorities in medical education at Mashhad University of Medical Sciences to address the major educational needs of society and optimize the use of limited resources

METHODS

This Health Systems Research (HSR) was conducted by a cross-sectional design in 2021-2022. The target population included all faculty members, students, researchers and policymakers in the educational sector. The research tool was adapted from the Council on Health Research for Development (COHRED) checklist developed by the World Health Organization task force. Inclusion criteria were being at MUMS and willingness to participate, while exclusion criteria were incomplete checklist submissions. Research priorities were determined using five principles: stakeholder participation, situation analysis and need assessment, topic identification, scoring based on predefined criteria, and prioritization based on the highest agreement.

1. Stakeholder participation: Stakeholders for the strategic committee were selected based on importance, influence, power, capability, situation, and interest. These included faculty members, students, policymakers and managers, research budget providers, researchers, and educational experts. Participation involved meetings and qualitative methods like brainstorming, focus groups, Delphi method, polling, and scoring. The study included two group discussions to brainstorm research priorities at Mashhad University of Medical Sciences. Goal-oriented sampling selected stakeholders who expressed interest. A screening phase with an 8-question checklist was used to manage the potentially large number of priorities. All stakeholders completed the checklist for 40 proposed topics in a 120-minute initial session, with 8 additional topics added. In the first session, 25 Delphi members participated, and in the second session, the number of Delphi panel members increased to 30. In the second session, final scores were calculated using a Likert scale. Topics with scores below 16 were excluded, leaving 39 for the final review. In the third session, 20 experts were selected based on participant

selection and information quality, along with proposed solutions. In the third session, 20 Delphi members participated. Invitations were sent to selected experts explaining the research objectives, methods, participant roles, and confidentiality. After forming the final committee and achieving agreements, a detailed implementation plan was presented.

2. **Analysis of the current situation and needs:** To analyze the current situation, relevant resources were collected, including upper-level education and research documents of the country, the strategic plan of Mashhad University of Medical Sciences, the strategic plan of educational sector at MUMS, the strategic plans of the university's affiliated vice chancellors including educational, research, health and treatment, relevant books and journals, expert opinions of the research committee members at EDC, and the medical education department. Topics were screened by a 20-member committee and integrated based on current conditions and goals. To ensure broad coverage, project objectives were emailed to all faculty, students, and employees at Mashhad University of Medical Sciences, with a follow-up reminder. A formal letter was also sent to the deans of all departments of the seven affiliated faculties.

3. **Identification of research topics:** Using the prepared documents, research topics and domains were discussed with stakeholders. Research titles were determined through multiple sessions using techniques like brainstorming, focus groups, and nominal group techniques. Two focused group discussions, each lasting 90 minutes, were held at EDC.

4. **Scoring based on criteria:** This study used the recommended COHRED model with minor modifications (exclusion of two questions in the "necessity" domain) (21). The recommended COHRED criteria and their scoring method were as follows.

Domain 1: Necessity - This domain evaluated proposed research titles, discarding unnecessary ones. The key question was: Is this research necessary? This domain had five criteria. Three were used: ethical and moral issues, commitment and political acceptance by policymakers, and adequacy and efficiency of information. Two criteria were excluded: human rights (due to lack of clarity) and perceived illegality (as another authority handles legal aspects). Including these could unjustly remove research topics (21).

Domain 2: Relevance - This domain ensured the proposed research is suitable for the target population and addressed the educational issues at the university, considering justice and equality. The key question was: Why should we conduct this research? It included seven criteria: societal needs, prevalence, severity, trend, alignment with national educational policies or goals, urgency, and emphasis on equality.

Domain 3: Likelihood of success for implementation - This domain assessed the organization's ability and resources for conducting the proposed research. The key question was: Is there enough capability for this research? It included four criteria: organizational capacity, likelihood of financial support, cost-effectiveness, and time justification.

Domain 4: Ultimate impact of research outcomes - This domain estimated the benefits, value, and effectiveness of research findings. The key question was: What will stakeholders gain? It included four criteria: utilization and continuation of findings, educational impact or importance, effect on community health, cost-effectiveness, and overall impact on development.

5. **Prioritizing research topics based on the highest consensus:** In this stage, educational research topics were classified and prioritized by integrating common themes. The strategic committee set criteria, and stakeholders scored each topic using an 18-item checklist. Scores ranged from 20 to 50, with the average score determining the final ranking. Topics scoring below 30 were excluded, scores between 30-40 were of medium priority, and scores between 40-50 were of high priority.

RESULTS

Finally, 20 academic faculty members and professionals collaborated throughout the research. In the screening phase, stakeholders reviewed 40 proposed topics using brainstorming techniques and added eight new items, making a total of 48 topics. In the final stage, topics with scores below 16 were excluded, leaving 39 topics.

Table 1. Selected Research Topics by Stakeholders

Research Topic	Score
Review of Curricula	18.30
Curriculum Planning towards Transition to Third-Generation University	17.26
Alignment of Curriculum with Graduates' Needs	18.63
Professional Competence of Students	18.80
Design of Learning Environments	16.92
Innovative Assessment Methods	16.54
Evaluation of Exam Questions	16.31
Evaluation of Professional Ethics	17.70
Research Methodology Training	16.12
Morning Report	16.17
Education in the Post-COVID Era	17.68
Virtual Education	16.85
Virtual Learning and Acquisition	16.31
Virtual Examinations	16.85
Challenges of Virtual Education Users	18.01
Production of Educational Support Products	16.77
Clinical Skills Training	18.83
Clinical Reasoning Skills	19.08
Educational Technology in Medical Sciences	16.56
Artificial Intelligence in Medical Education	16.06
Innovative Educational Technologies	16.70
Student Empowerment Courses	17.51
Faculty Empowerment Courses	18.37
Competency-Based Education	17.43
Motivation and Incentive System in Education	17.32

Table 1. Continued

Research Topic	Score
Professionalism in Various Fields	17.13
Responsive Education in Medical Sciences	16.68
Learners' Educational Needs in Different Fields and Levels	18.20
Problem-Based Learning	17.55
Field-Specific Education	17.95
Post-Graduate Education	16.68
Community-Based Education	16.35
Interprofessional Education	17.37
Communication in Education	16.58
Interdisciplinary Research	16.80
Capacity Building in Education	18.13
Economics of Education	17.24
Education Management and Leadership	17.42
Evidence-Based Medical Education	18.57

Overall, Faculty Evaluation, Student Evaluation, Virtual Education Evaluation, Student-Centered Teaching Methods, Teaching Methods in Small Groups, Comparative Studies in Medical Education, Research in Strategic Programs, Non-specialized Training, and Systematic Implementation of Traditional Methods had scores below 16 and were excluded from priorities. After analyzing 39 topics based on the five COHRED domains, 15 educational research topics were identified (Table 2). The total scores for each domain are reported, with the overall ranking based on these scores.

DISCUSSION

The results showed that the first priority was teaching clinical skills, and the second and third research priorities were clinical reasoning skills and professional competence of students, respectively. Determining priorities is an important process in managing health and medical education research in all countries. This study was conducted using a well-known model developed by the World Health Organization Research Development Taskforce (22) focusing on research in education, selecting strategic committee members from the education system to ensure engagement with primary stakeholders to better reflect community needs. While it was not guaranteed that all experienced stakeholders were identified in the initial session, involving a majority of experienced individuals and using collective wisdom (e.g., emailing academic faculty, students, and experts) was helpful. Prioritizing research requires assessing needs because identifying problems is crucial to avoid wasting resources. Valuable educational research topics should be identified through needs assessment, and priority-setting workshops using standard models like COHRED are essential. The systematic and scientific approach of this study adds to its credibility.

Biomedical research often focuses on accessible patients rather than societal needs, disease prevalence, at-risk populations, and vulnerable groups. Although medical research aims to support the Ministry of Health's goals and improve health services, research results should translate

Table 2. Selected Research Priority Topics Based on COHRED model

Rank	Priority Topic	Necessity (out of 9)	Appropriateness (out of 21)	Likelihood of Success (out of 12)	Final Impact (out of 12)	Total (out of 54)
1	Clinical Skills Training	6.79	18.84	9.39	9.93	44.95
2	Clinical Reasoning Skills	6.84	18.68	9.30	9.82	44.65
3	Professional Competence of Students	6.80	18.94	9.06	9.75	44.55
4	Artificial Intelligence in Education	7.27	18.26	8.86	9.28	43.67
5	Alignment of Curriculum with Graduates' Needs	6.94	17.92	8.99	9.77	43.63
6	Review of Curricula	6.73	17.71	9.01	9.61	43.07
7	Learners' Educational Needs in Different Fields and Levels	6.65	17.55	8.85	9.59	42.64
8	Evidence-Based Medical Education	6.90	17.46	8.63	9.39	42.39
9	Problem-Based Learning	6.96	17.09	8.65	9.12	41.83
10	Innovative Educational Technologies	6.96	17.15	8.71	9.00	41.82
11	Economics of Education	6.88	17.24	8.41	9.23	41.67
12	Production of Educational Support Products	6.76	16.95	8.80	9.10	41.61
13	Faculty Empowerment Courses	6.88	16.44	8.73	9.33	41.38
14	Curriculum Planning towards Transition to Third-Generation University	7.18	16.91	8.39	8.88	41.36
15	Professional Ethics Evaluation	6.34	17.13	8.54	9.08	41.09

into practical services. Therefore, needs assessment is a systematic approach to identifying health sector needs and understanding problems (23, 24). In recent years, numerous studies have been conducted to determine biomedical research priorities using different methods, but the number of such studies in the field of educational research is scarce. The first study was conducted in 2012 by Namati and colleagues in Gilan (25), and the results of this study were similar to the study by Ghadousi et al., conducted in Mashhad in 2015 using a similar Delphi method (26). To the best of our knowledge, this is the first study to determine educational research priorities using the COHRED model.

The priorities obtained in this study showed that clinical skills education and clinical reasoning skills are the first and second most important educational research priorities. This aligns with the study by Ghadousi et al., where clinical skills planning received the highest score (26). Several studies emphasized the importance of clinical skills education and clinical reasoning skills in improving the quality of learning for medical students and reducing medical errors (27-34). Ganbari et al., stated that education is a targeted activity for enhancing learning (35). The main task of educational institutions is to provide the necessary facilities for the growth and improvement of students' professional competence, and the main goal of education in medical sciences is to develop clinical skills and decision-making skills. Similarly, in other studies, emphasis was placed on enhancing students' professional competence (36- 38).

The study by Maleki et al., conducted in Tehran in 2019 showed that research policymakers should prioritize research towards emerging areas of distance education, including artificial intelligence in education (39). Given the occurrence of pandemics like COVID-19 and the conditions of quarantine, the use of artificial intelligence will have a significant impact on education, and reviewing curricula during these pandemics will be helpful (37,40-42). Additionally, in the study by Khaki et al., the importance of curriculum review for improving the quality of education, increasing job satisfaction, and reducing job burnout among assistants was highlighted (43). Sometimes definite resistance is observed to the research topics. For example, in the study by Hatami et al., out of 28 educational departments, only 16 participated in data gathering. Maybe they were concerned about restriction of future projects to the proposed research priorities (21, 44).

LIMITATIONS

This study had two main limitations. First, its findings were based on Mashhad University of Medical Sciences and might not apply to other settings. Second, modifications to the COHRED model, including the exclusion of certain questions, could affect the assessment's comprehensiveness.

CONCLUSION

This model effectively determines educational research priorities. While its reliability is not fully assessable, it is considered to have strong validity. Adherence to agreement is a key principle, with validity and reliability addressed in later stages. The research aimed to secure appropriate budgets, guide research towards priorities, enhance knowledge use in problem-solving, excite researchers, and improve community health. It is hoped that educational research priorities will interest policymakers and project reviewers, helping optimize limited financial resources and drive practical research applications.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors. The ethics committee of Mashhad University of Medical Sciences approved this research, ethics code IR.MUMS.REC.1400.058.

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