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 and the World Federation of Medical Education on this approach are briefly reviewed. Similarities were observed between integrated medical education and healthcare provision, 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 healthrelated 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

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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 middleincome 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	The University of Calgary has a longitudinally integrated clerkship
of Medicine (Canada)	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 healthrelated 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 communityoriented 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 costeffective 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-WHO looking approach. The 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).

Medical Sciences	Function (Functions of Health System)
University/School (Country)	
Mayo Clinic Alix School of	It is responsible not only for medical education but also for providing medical and
Medicine (USA) (30)	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	Medical education, research, and provision of patient care, especially to disadvantaged
Francisco (UCSF) School of	communities, are carried out in hospitals and health centers in an integrated manner
Medicine (USA) (31)	(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	King's College London is associated with King's Health Partners, a collaboration with
of Medicine (UK) (33)	three major London NHS Foundation Trusts, integrating medical education with
	healthcare services (resource generation, service provision).
University of Toronto Faculty	The University of Toronto is affiliated with a network of hospitals. Together, they form
of Medicine (Canada) (34)	the Toronto Academic Health Science Network.

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

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 medical training needs into 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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