Experiences of medical educational managers in the early COVID-19 pandemic: A qualitative thematic analysis

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Abstract:

BACKGROUND: The coronavirus (COVID-19) pandemic changed and disrupted education at medical universities. Educational managers face new challenges and special complexities to manage this situation. This study aimed to explain the experiences of educational managers of Iranian medical universities in the early COVID-19 pandemic.

MATERIALS AND METHODS: This descriptive-qualitative study was conducted at the Tehran University of Medical Sciences, 2020–2021. The study population included all educational managers in one of the positions of the dean of the faculty, educational Vice-Chancellor, head of the department, and other relevant educational directors in medical sciences universities during the COVID-19 pandemic. Data collected from semi-structured interviews were analyzed in MAXQDA2020 software using the thematic analysis approach.

RESULTS: Four main themes and nine subthemes were identified: "The ups and downs of the transition from face-to-face training to virtual training," "Crisis in educational management," "Testing and Evaluation: Obstacles and Problems," "Education and lessons learned from COVID-19."

CONCLUSION: Themes identified from the experiences of educational managers provide new information about the negative and positive effects of the COVID-19 pandemic on the learning and teaching process of medical sciences students. Lessons learned and experiences of educational managers in medical sciences universities amid the COVID-19 pandemic will help health education policymakers so that they can create transformation and innovation in the education of medical science students. Strengthening the e-learning infrastructure will help to create a foundation for a rich way of educating medical students in the post-corona era and when the outbreak of other emerging diseases is inevitable in the future.

Keywords:

COVID-19, educational administrator qualitative research, educational management, medical education, pandemic

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Introduction

The coronavirus (COVID-19) pandemic has posed essential challenges to communities in several areas, the consequences of which will remain with the world for a long time. Medical education was one of the key areas impacted by this unknown crisis.[1-5] The United Nations Educational, Scientific, and Cultural Organization (UNESCO) estimates that more than 900 million students have been affected by the closure of educational institutions and the education systems have undergone dramatic changes.[6]

In this crisis, the dilemma for policymakers was between closing educational institutions and keeping them open.[7] Following

widespread closures around the world, in many countries including Iran, face-to-face education was discontinued and, almost overnight, educational institutions were required to provide online and virtual education.[8]

In this regard, medical schools in different countries decided to invest in online programs such as distance learning, social sites, and digital programs applications, so that instructors can teach their learners through online social interaction to ensure the learning of students and address the concerns of learning disruption due to this crisis.[1]

In previous experiences, such as the Severe Acute Respiratory Syndrome epidemic in 2003, the education of medical students in the affected areas was temporarily suspended due to students' concerns regarding safety and emotional and psychological outcomes. In a pandemic situation, the risks of exposure to infectious diseases may outweigh the educational benefits of those clinical settings.[9] Therefore, educational managers must decide to close faculties or restrict students' attendance in the clinical fields, as well as how to continue clinical education in the absence of contact with the real patient during emerging disease pandemics such as COVID-19.[10]

Previous studies have shown that the COVID-19 pandemic affected the quality of education of medical students.[11] The results of a study in Iran indicate that the postponement of practical courses, internships, and increasing the length of the study were the most important effects of this crisis on medical education which have led to delays in the graduation of medical students.[2]

There is a cause-and-effect relationship between the efficiency of medical school graduates in tomorrow's society and the quality and quantity of their today's learning.[12] Generally, improving and maintaining quality education is one of the highest goals of educational management. Different levels of educational managers in medical universities including the dean of the faculty, educational Vice-Chancellor, head of the department, and other relevant educational directors play a critical role in achieving this goal. Their short-term, medium-term, and even long-term planning and decisions must be appropriate to the requirements of this situation, which require recognizing the challenges in this field.[5,13]

In the review of the available literature, few studies were found in the field of the experiences of medical education managers during COVID-19 in Iran.[5] The experiences of educational managers during this pandemic can vary and be unique in different countries depending on the cultural, social, and economic context. For example, the experiences and challenges of educational managers in developed countries with advanced technologies and infrastructure in the transition from this emerging crisis will be different from those in developing countries such as Iran. Educational managers with different expertise from different universities of medical sciences in Iran participated in the present study. An in-depth study of these experiences and clarifying the hidden and obvious aspects of those challenges can help the theoretical and clinical educational planning of medical students when other emerging diseases occur in the future. Therefore, the present study aimed to explain the experiences of educational managers (administrators) of Iranian medical schools in the early COVID-19 pandemic.

Materials and Methods

Study design and setting
This descriptive-exploratory qualitative study was conducted in Iranian medical schools from November 2020 to May 2021. This study draws upon the principles of thematic analysis as described by Braun and Clarke to establish individual meaning to events and life experiences. Thematic analysis is a method for identifying, analyzing, and interpreting meaning patterns (themes) in qualitative data to answer the research questions.[14,15]

Study participants and sampling
The study population included the dean of the faculty, educational Vice-Chancellor, head of the department, and other relevant educational directors (e.g. the director of the education office) in medical sciences universities (Faculties of nursing, midwifery, Para medicine, medicine, dentistry, and pharmacy, etc.) across the country. Iranian medical universities are nationally ranked into three types: I, II, and III in terms of scientific and educational status. To observe maximum variation, study participants were purposefully selected from all three types. They were contacted by the first author to obtain permission for an interview and willingness to participate in the study. The inclusion criterion was: employment in one of the educational management positions in medical universities during the COVID-19 pandemic. None of the participants refused to participate in the study.

Data collection and tools
In-depth semi-structured interviews were conducted and continued until conceptual saturation. This means that no new information was provided by the participants in the interviews.[16] All interviews were conducted individually and face-to-face by the first author using the interview guide. The first interview was conducted with a head of the department from a university of type I, who was willing to participate

in the study and talk about her experiences. At the beginning of the interview, the researcher introduced herself and explained the aim of the study, and written consent was obtained. The interviews were conducted at a time and place where the participants were comfortable. The interview began based on the research question and an open-ended question such as: *"Can you tell me about your experiences with educational planning for medical students during the COVID-19 pandemic?"* The following questions were asked based on the participants' answers and the interview guide. During the interview, questions such as "What do you mean" or "Can you explain more" were used as needed. At the end of the interview, participants were thanked and asked if there is anything left unsaid, and they were asked about the possibility of holding subsequent interview sessions. The interviews were recorded with the consent of the participant and then transcribed verbatim and returned to participants to check for accuracy.

MAXQDA 2020 software was used to manage and analyze the data. Qualitative data collection and analysis proceeded simultaneously. Data analysis was performed using Braun and Clarke's six-step inductive thematic analysis approach.[14,15] In the first step, to achieve familiarization with the data, the original audio recordings were transcribed by the first author immediately after each interview. Then, the transcripts were carefully read and reread several times, to develop a general and in-depth understanding of each interview so that the researcher would immerse herself in the data and generate an initial idea about data. Each written paragraph, sentence or phrase, or word that was related in terms of concept and content was considered a meaning unit. Then, parts of the transcripts were summarized and coded by the first and second authors according to the research question independently. The coding performed by the two researchers was compared and discussed, and the necessary corrections were made. In the third stage, groups of codes related to the research question and identification of potential themes were generated. The fourth stage consisted of two steps: reviewing and refining the themes. The first step involved reviewing the level of the coded summaries, and the second one considered the validity of the individual themes and whether they accurately reflect the whole data set. Data were reviewed by consensus of the authors to make sure that themes were sufficiently supported by the data, whether the data fit together, or if the themes overlapped. The fifth stage included defining and naming themes in line with the research question. Then, the data were analyzed within each theme because the data within themes should meaningfully cohere together, with an identifiable and clear distinction between themes. By defining and

reviewing, the nature of what a theme was discussing became clear, and what aspect of the data set each theme contained was determined. In the final stage, the findings were reported to examine the themes and the relationships between them, and a thematic map was drawn [Figure 1].

In order to demonstrate trustworthiness in our research, according to Braun and Clarke, the following was done: [14,17]

By prolonged engagement, and spending enough time to collect and analyze the data, a deeper and more accurate understanding of the data was achieved. Researcher triangulation was used in all stages of data analysis. To verify the credibility of the data, quotes and the themes were reviewed by four participants (head of the department, educational Vice-Chancellor, director of education, director of graduate studies, and dean of the faculty). Their feedback was used to revise or modify the identified themes. This member check helped researchers to balance the themes presented by the researchers with the participants' views. A peer check was also done by a colleague and disagreements were resolved by consensus among all researchers. To achieve confirmability of the data, a complete description of the research process including an accurate description of participants, sampling method, time and place of data collection, analysis, and generation of codes and themes were documented to provide the possibility of following the research path for other researchers and readers.

Ethical consideration
This study received ethical approval from the Ethics Committee of the School of Medicine of Tehran University of Medical Sciences (ethical code: IR.TUMS.MEDICINE.REC.1399.392).

Results

A total of 18 interviews were conducted with 14 participants. Four educational managers were re-interviewed due to high workload and time constraints, as well as to obtain richer and deeper information from the experiences of these participants. The interviews lasted between 30 and 45 minutes. The demographic data of the participants are presented in Table 1.

In this study, more than 630 codes were generated during analysis, which was organized into four main themes and nine subthemes: "The ups and downs of the transition from face-to-face training to virtual training," "crisis in educational management" "testing and evaluation: obstacles and problems," "education and lessons learned from COVID-19" [Table 2].
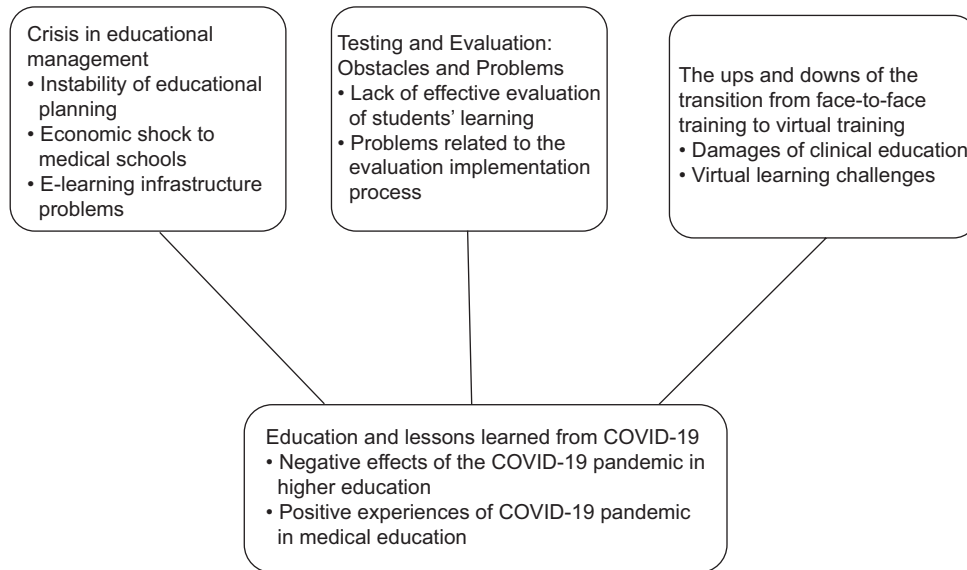
Figure 1: Thematic Map

Table 1: Characteristics of study participants

Participants' characteristics	Value
Age	(42–59) 50 ± 0.007
(Range) Mean and standard deviation (year)	
Gender	
Female	11
Male	3
College degree	
Master's	5
Doctoral	9
Managerial position	
Dean of the Faculty	2
Educational Vice-Chancellor	3
Director of Graduate Studies	2
Director of Education	3
Head of Department	4
Work Experiences	
(Range) Mean and standard deviation (year)	(10–29) 21.07 ± 6.61
Years of management	
(Range) Mean and standard deviation (year)	(1–15) 7.07 ± 4.28

Theme 1: The ups and downs of the transition from face-to-face training to virtual training

Medical education was greatly affected by the COVID-19 pandemic, as this field includes a large number of practical and clinical courses. This theme was formed from two subthemes: damages of clinical education and virtual learning challenges.

Subtheme 1-1: Damages of clinical education

The participants' experiences indicate that clinical training during the COVID-19 pandemic has suffered considerable damages. All participants referred to this issue, including the replacement of clinical training with other training methods, the closure of some clinical wards after the COVID-19 pandemic, and the

significant reduction in the number of patients referred to non-COVID-19 wards.

"Our biggest problem after the epidemic was clinical education. 'Some clinical wards were COVID-centers, and students' clinical education was not provided in those wards." (Educational Vice-Chancellor, University Type I)

"The number of visits to gynecological clinics has decreased which has affected the quality of student education." (Head of the Department of Midwifery, University Type I)

Subtheme 1-2: Virtual learning challenges

Following the onset of the COVID-19 pandemic, virtual education was selected as a way to continue education by the centralized system of the Ministry of Health and Medical Education and the deans of Iranian universities of medical sciences. Participants pointed to problems in this area based on their experiences, such as lack of awareness of students and professors with e-learning, individual resistance to accepting this big change and the impossibility of getting proper feedback from students, and so on.

The remarkable finding was that this problem existed in the large universities and even the universities in the capital of the country, and there was no difference in their statements compared to the managers' experiences in the lower level universities of the country.

"Teachers were not well adapted to virtual learning and did not know how to upload content to the relevant systems at all." (Educational Vice-Chancellor, University Type I)

"We did not know whether our education was useful or not. Have the students learned the educational content at all?" (Head of the department, University Type III)

Table 2: Thematic analysis findings

Themes	Subthemes	Code examples
The ups and downs of the transition from face-to-face training to virtual training	Damages of clinical education	Reducing the amount of internship and internship units
		Lack of clinical education in some areas
		Reduce practical skills training in students and assistants
	Virtual learning challenges	Lack of familiarity of professors and students with virtual education systems
		Uncertainty about students' learning in virtual education
Crisis in educational management	Instability of educational planning	Lack of a specific program for pandemic conditions
		Changes in plans due to unpredictability of Corona headquarters decisions
	Economic shock to medical schools	Financial problems of schools to provide equipment
		The economic aspect of accounting for professors
	E-learning infrastructure problems	Limitations on internet speed and volume
		Problems with platforms
Testing and Evaluation: Obstacles and Problems	Lack of effective evaluation of students' learning	Possibility of cheating in virtual evaluation
		Impossibility of full evaluation of students
	Problems related to the evaluation implementation process	Professors' refusal to accept online evaluation
		Lack of familiarity of professors with how to hold a virtual test
		Revealing professors' test bank in online exam
Education and lessons learned from COVID-19	Negative effects of the COVID-19 pandemic in higher education	The effect of corona on student recruitment in some residency programs
		Cause damage to human communication in virtual education
	Positive experiences of COVID-19 pandemic in medical education	Create awareness to prepare for similar future events
		Identify shortcomings and needs in education
		Familiarity with various methods of content production in the world

Theme 2: Crisis in educational management

University curriculums were constantly changing during the COVID-19 pandemic, and financial problems and a lack of adequate e-learning facilities were among the shortcomings of the upstream policy to manage this situation. Three subthemes developed this main theme, which included instability in educational planning, economic shocks to medical schools, and e-learning infrastructure problems.

Subtheme 2-1: Instability of educational planning

One of the experiences reported by most participants was the frequent changes in educational planning following the outbreak of the disease. Participants' statements showed that frequent and sometimes sudden changes in educational planning occurred more frequently at the beginning of the COVID-19 epidemic. These changes improved with the adaptation of the system and individuals and also controlling the existing conditions. *"Because in Iran, centralized decisions about the activities of institutions and universities are made by the National Headquarters for Coronavirus Control, and universities are required to comply with these decisions, so the situation was unpredictable and forced us to constantly change our plans And that was our hardest work in educational planning. We decided in college in the morning, then we changed the program according to the decisions of this headquarters at night." (Educational Vice-Chancellor, University Type I)*

"We have had to change the curriculum over and over again. One of the reasons was the density of students in the dormitory. We were trying to set up a program again, and we saw that *our training fields were reduced. For example, parts of Valiasr Hospital were closed. We had to change the program again or adjust the program a bit." (Educational Vice-Chancellor of a paramedical school, University Type II)*

Subtheme 2-2: Economic shock on medical schools

Undoubtedly, in this pandemic, universities also faced economic problems in providing protective equipment for staff, instructors, and students, paying instructors' salaries and financing the internet for vulnerable stakeholders. Participants believed that this could be due to the lack of a predetermined budget to deal with the crisis and the impact of COVID-19 on the country's economy, including the health and education sector. Our findings indicated that all medical universities from different levels (types I to III) faced unpredictable economic and budgeting pressure during this crisis. However, about six months after the beginning of the pandemic, credits were considered to address the economic and budget pressure on the universities.

"We suffered from a shortage of protective equipment, and no credit had been provided in advance for the faculty's budget and planning. But shortcomings were eliminated and the faculty provided protective equipment for students and faculty members." (Head of the Department of Midwifery, University Type I)

"One of our problems was how to calculate duty units, full-time and payments. In any case, all the instructors in this situation had their economic issues." (Head of the Department of Nursing, University of Type II)

Subtheme 2-3: E-learning infrastructure problems

Analysis of the interviews indicated that educational infrastructure was one of the significant challenges for managers. Some of these infrastructural problems were related to the facilities of the whole country, including access to the internet, and others were related to the provision of web-based systems and e-learning by the responsible institutions and their specific challenges.

"We didn't have the necessary infrastructure for virtual education as we should. Our internet bandwidth is limited and, as you know, our internet speed is also low." (Director of Education, University Type II)

"We used Skyroom for our online training, but the problem was that Skyroom had limited space and we had trouble holding our virtual classes." (Dean of Faculty, University Type I)

Theme 3: Testing and evaluation: Obstacles and problems

Evaluation is an important part of higher education, like the education process, it underwent changes that were undoubtedly accompanied by many challenges, including the resistance of teachers and students and their ambiguity and uncertainty about the efficiency of online exams or how to conduct them.

The third major theme included two subthemes: Lack of effective evaluation of students' learning and problems related to the evaluation implementation process.

Subtheme 3-1: Lack of effective evaluation of students' learning

The possibility of students' cheating or their anxiety during the online test may affect the accuracy of the results of this test, so they may not properly reflect the student's learning.

"Students could easily cheat in virtual evaluation, especially at the undergraduate level, and we had to impose restrictions on virtual exams." (Head of the Department of Anesthesiology and Operating room, University Type II)

"Students were stressed due to time constraints and the impossibility of returning to the previous questions in the virtual exams." (Educational Vice-Chancellor, University Type II)

Subtheme 3-2: Problems related to the evaluation implementation process

Our participants faced challenges in evaluating students, both as teachers and as managers. Getting faculty and students to collaborate on their virtual evaluation in the early days of the pandemic was an important and time-consuming concern that was eventually achieved through some arrangements, however, ensuring the reliability of test results is itself a challenge that still remains in the education system.

"The problem we had in this area was the instructor's concern that their questions would be exposed in the virtual evaluation. Because each instructor had a test bank that might give a repetitive question to another class or entrance student, and with virtual evaluation, students could store the questions and give them to other students." (Head of the Department, University Type III)

"We had a lot of problems with virtual evaluation, one of them was the instructor did not accept the virtual method of evaluation, and we developed that method." (Director of Education, University Type II)

Theme 4: Education and lessons learned from COVID-19

The prevalence of COVID-19 has not only had a major impact on the education and evaluation process but also on students' motivation to continue their education or their interpersonal relationships. This pandemic has had a positive outcome, such as the massive change in e-learning. Two subthemes of negative effects of the COVID-19 pandemic in higher education and positive experiences of the COVID-19 pandemic in medical education developed this main theme.

Subtheme 4-1: Negative effects of the COVID-19 pandemic on higher education

The experiences of educational managers participating in the present study indicate that the COVID-19 pandemic has had negative effects on educating students in medical schools. Concerning reducing the motivation of students, a participant mentioned:

"Unfortunately, in this pandemic, we didn't recruit assistants in the field of anesthesia assistants, and this made the assistants unmotivated towards their field." (Director of Graduate Studies, University Type II)

"One of the serious harms of e-learning in this pandemic was its negative impact on human communication which led to limited interactions between teacher and student." (Dean of Faculty, University Type III)

Subtheme 4-2: Positive experiences of the COVID-19 pandemic in medical education

In addition to the aforementioned destructive effects, most participants agreed that the COVID-19 pandemic brought positive experiences and lessons for educational managers in medical schools. One of the most important of these experiences was the development of distance learning methods for seminars, workshops, classes, and even clinical courses.

"Although the COVID-19 pandemic did serious damage to education in medical schools, it also created a lot of awareness and opened new doors for us, like familiarity with distance education or using technologies to teach clinical skills such as distance surgery." (Dean of Faculty, University Type I)

"Virtual education also had good experiences. Not only has the student been able to grow but *also the medical schools have been able to make good progress in this regard."* (Director of Education, University Type II)

"This pandemic enabled us to identify needs, strengths, and areas for improvement in our college." (Head of Department, University Type I)

Discussion

This study aimed to explain the experiences of medical educational managers of Iranian medical schools in the early COVID-19 pandemic.

Because medical disciplines are clinical in nature, therefore, clinical education is an integral part of the curriculum in medical schools, where students learn to integrate knowledge, skills, attitudes, values, and philosophies of the profession.[18] This is while the COVID-19 pandemic has disrupted much clinical training for medical students.[19] Most of the participants in our study stated that the student's learning of clinical skills was affected by the closure of some clinical departments and the reduction of the number of educational units in the curriculum.

One of the challenges experienced by educational managers during the outbreak of COVID-19 was the challenge of e-learning. All over the world, learners and instructors at all levels of education were forced to use virtual education in various forms, and Iran was not an exception. Although there were many benefits to using e-learning during this pandemic, it was also associated with concerns and challenges.[20] In line with our findings, in a study in Libya, the majority of participants did not agree with the use of e-learning in clinical education.[21]

Before the launch of the COVID-19 pandemic, the emphasis was on the development of e-learning to transform and innovate education in medical universities, and most colleges also offered short-term training courses for instructors. However, even though there were advantages for lecturers to use this teaching method, for reasons such as time-consuming content production, they were reluctant to use this innovation in their teaching. Therefore, the sudden encounter with a change in teaching methods during the COVID-19 pandemic caused many challenges for faculty and students. Most of the participants indicated that instructors and students were reluctant to use e-learning due to their unfamiliarity with the process of e-learning and the use of e-learning systems. Therefore, they initially resisted this change in the education system. Also, participants believed that the lecturer did not have confidence in the students' learning in virtual education. The results of studies conducted on medical students have shown that issues such as low experience and limited technical skills in the field of virtual education technologies, low mastery of instructors and students in this field, having a negative attitude, distrust, and as a result, users' unwillingness is addressed as the barriers of applying e-learning in the COVID-19 pandemic,[20,22] which was consistent with the results of the present study.

Due to the alteration in the normal routine of medical schools during this pandemic, the set of decisions made by educational managers to develop educational goals was frequently changed due to unpredictable pandemic changes as well as momentary decisions of the national headquarters for coronavirus control. The results of other studies indicate that uncertainty about the duration of this pandemic and subsequent effective decisions in these circumstances required sufficient knowledge regarding aspects of an unknown problem that had many ambiguities. Therefore, decision-making in these critical situations was very difficult and different from other common decisions.[12]

Appropriate infrastructure is one of the requirements of providing virtual education, including high-speed internet, and easy-to-use and maximum functionality platforms. However, most of the educational managers in the present study faced many problems with internet bandwidth limitations, content production, uploading, and downloading in virtual education systems at the beginning of the pandemic. Some students did not have access to the internet and the technologies needed to participate in e-learning. So, one of the participants says: *"Some students in the early days of the pandemic were forced to quit school or took time off from college and eventually fell behind their classmates due to the lack of fast and affordable internet access in some areas and villages of Iran."* Our finding was consistent with the results of a study in Iran.[23]

With the transition from the initial shock stage of this crisis, Iranian universities took steps in this regard and made it possible for these students to stay in dormitories and use the internet. The response to changes in education conditions during the COVID-19 pandemic varied from country to country according to their educational, economic, and social infrastructure. Developed countries such as the United States, Britain, and some European countries faced fewer challenges of transition from face-to-face to virtual education, compared with those

in developing countries such as Iran, where distance education does not have a long history. Lack of financial resources and necessary infrastructure in these countries were among the obstacles and challenges in e-learning during the COVID-19 pandemic. Our findings were consistent with the results of some studies in low- and middle-income countries.[5,21,23]

The results of this study confirm those of Sadeghi Mahali *et al*.[20] A theoretical study in Kenya (2020) showed that online education was not interesting for learners due to a lack of access to smartphones, internet connections, computers, television, and radio,[1] which is consistent with our findings. The pedagogical study by Toquero (2020) figured out the unprepared higher education institutions to implement the online system as a challenge,[24] which aligns with our results.

Another challenge posed by our participants in the COVID-19 pandemic was financial and economic issues to provide software and hardware infrastructure for virtualization distance teaching, personal protective equipment for professors and students to resume face-to-face clinical training, as well as a limitation to purchasing facilities and equipment for clinical skills training centers and classes in medical schools. Due to the lack of budget in the annual operational plan, medical schools faced many financial challenges during this crisis. Therefore, attracting financial resources from donors was considered a solution in medical schools. According to the opinion of the participants in the current study, medical science universities can take effective steps to solve the financial problems caused by this pandemic and even in future emerging crises by moving towards the third-generation university and entrepreneurs. Therefore, medical universities must pay attention to this issue in revising their mission.

In the present study, one of the challenges experienced by the participants was how to evaluate students, because, in this pandemic, evaluation methods were affected and completely changed compared to traditional and face-to-face methods. This made it necessary to adopt innovative methods for evaluation.[10] The results of studies indicate that lack of experience and familiarity with electronic evaluation, communication and technical problems, lack of access to the necessary facilities, and other things, increase stress and anxiety in medical students. Also, they report the factors that cause concern and anxiety in instructors and medical educators as the quality of the tests, methods of designing an electronic evaluation, validity, and reliability of electronic exams, fairness, and equity in exams, acceptance, and usefulness of electronic exams, cheating, Google search during exams and technical issues.[5,25,26]

Our participants noted the negative effects of the COVID-19 pandemic in higher education and positive experiences of the COVID-19 pandemic as threats and opportunities created by this outbreak. The researcher considered closing schools and universities as one of the negative impacts of the COVID-19 pandemic on higher education. Many learners have been deprived of the necessary social contact for learning and development.[27] The negative effects of the pandemic are expected to continue for a long time, especially since the behavior and pathophysiology of the virus have not been well understood yet.[28] However, from the perspective of our educational managers, alongside the challenges experienced by the COVID-19 pandemic, it has also led to positive experiences such as the widespread use of various online methods such as webinars. Before the COVID-19 pandemic, online webinars were limited in our region and attendees had to pay a certain fee. But during the outbreak of COVID-19 many scientific societies, and educational centers often hold their educational processes online in the form of free webinars.

Another positive event after the COVID-19 pandemic is that instructors are more inclined to use e-learning. Studies showed that at the beginning of the pandemic, the resistance of instructors and students was the main challenge of medical schools, but after the initial pandemic shock, this resistance was gradually broken and the awareness of various content production methods in the world increased.[20] Before the pandemic, e-learning infrastructure was not well established in our country, but the outbreak has led them has lead them to a much wider use of e-learning. Also, it seems that the infrastructure of this educational method should be developed even with the rise of COVID-19 and be used as a very suitable tool for educational policy. Because, such crises may recur in the future, we should not waste time.

Limitations
One of the limitations of the present study is the type of study design and the limitation on the generalizability of the results of our qualitative research to other communities.

Another limitation of the present study was of lack of access to upstream educational managers (policymakers in the Ministry of Health and Medical Education) to use their experience due to their busy schedules.

Conclusions

After the outbreak of the COVID-19 pandemic worldwide, to meet the immediate need in the learning and teaching process, face-to-face and even clinical teaching methods

became a combination teaching method. The findings of this study showed that the limitation of clinical education fields, lack of knowledge of teachers and students about virtual education, infrastructure, economic problems, and policy-making in medical education were some of the challenges experienced by educational managers of Iranian universities of medical sciences. Identifying the challenges of providing infrastructure, planning, and evaluating education can help policymakers and stakeholders to implement an appropriate system for combined education in the corona and post-corona eras. Also, educational managers can use the results of the present study to modify the current and ongoing structures in Iranian medical schools.

Acknowledgment

Conflicts of interest

There are no conflicts of interest.

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