



Impact of COVID-19 pandemic on medical education: Iran's experience at the outset of the pandemic

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The purpose of this study was to investigate the impact of COVID-19 pandemic on medical education at the outset of the pandemic. It was a descriptive web-based research, we asked the students of medical universities across the country about the educational status of Iranian medical universities during this epidemic. After reaching the desired sample size (585 people), the received data were analyzed using SPSS statistical software version 22. The data were collected in March 2020. In all universities, an online system provided by the Ministry of Health and Medical Education (called NAVID) Data from 585 students in the study showed The majority (28.3%) of students were from the school of allied medical sciences, followed by nursing and midwifery (24.2%) and the lowest participation (6.6%) was from the school of medicine. The majority (more than 80%) of the students still had no idea when classes and internship courses would start and when they would return to university. we learn is related to students of medical sciences , they need to be educated both in theory and practice on how to provide services under epidemic conditions, and this should be included in their curriculum.

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Introduction

The Occurrence of epidemics has a long history, but the term has not yet been clearly defined by many medical texts (Qiu et al. 2017). In December 2019, cases of severe respiratory illness were reported across the Chinese city of Wuhan due to a new strain of the coronavirus, now known as Covid-19. In mid-January, a large number of Covid-19 cases began to grow, and the virus soon spread beyond China's borders (Parker.2020). These days, the news of the spread of a highly transmitted and deadly virus known as Covid-19 is at the top of the world's news. Corona viruses that infect humans were first identified in the mid-1960s. The four most common types in humans are 229E (alpha coronavirus), NL63 (alpha coronavirus), and OC43 (beta coronavirus). Other contagious viruses that belong to the beta-corona virus include HKU1 (beta coronavirus) and MERS-CoV, which causes Middle East Respiratory Syndrome, SARS-CoV, causing Severe Acute Respiratory Syndrome, or SARS, and SARS-CoV-2 which causes coronavirus 2019 or COVID-19 (CDC. 2020).

There have been a number of common diseases in the history of mankind, and crises related to epidemics have had a major negative impact on health, economy and even national security all over the world (Qiu et al. 2017). The Black Death, for example, was a devastating global epidemic of bubonic plague that struck Europe and Asia in the mid-1300s. The plague entered Europe in October 1347. The disease killed more than 20 million people (almost a third of the continent's population at that time) within five years (History.com Editors. 2020). In 1817, another disease, cholera, began in Southeast Asia and subsequently spread to other parts of the world. These epidemics led to serious complications (Philippe Barboza .2021).

With the discovery of antibiotics and the control of microbial agents, now it was the viruses' turn to develop large epidemics of high mortality and morbidity. The H1N1 virus, for example, spread rapidly around the world from 1918 to 1919. Of course, most people had a good level of immunity and in most cases recovered with normal

treatments, but if the virus is inherently spreading too rapidly and if there are no modern rescue measures, a high mortality rate is expected for all affected populations. During that epidemic, most infected people had limited clinical courses and complete recovery, and the overall mortality rate was between 2 and 5 percent. Mortality occurred within 3 days from the onset of the disease, and the mean duration from the onset of the disease to death was 7-10 days (John et al. 2008). In the flu epidemic of 1918, more than 20 million people died. Influenza epidemics occurred three times in the twentieth century alone (1918, 1957 and 1968) (Meltzer et al. 1999).

Aside from the disastrous, sometimes fatal, consequences for those directly affected, epidemics have negative social, economic, and political consequences. For example, the impact of the H1N1 epidemic in 2009 did not simply include mortality, but it also affected health care systems, animal health, agriculture, education, transportation, tourism and the financial sector. SARS and Ebola also impaired the economy and social order in China and West Africa, reducing the quality of life of families and communities. Ebola alone impaired basic services such as education, transportation, and tourism (Qiu et al. 2017). In today's world, there is still a need to focus on epidemic programs, and the consequences of these epidemics need to be carefully examined from different perspectives. Therefore, at this time when the COVID-19 crisis is at its height, the early complications arising from this epidemic need to be detected from various aspects. Since the beginning of the COVID-19 epidemic, different countries have realized that effective disease management requires access to accurate, complete, workable, and reliable data (Zarei et al. 2021). Information on the effects of the pandemic on education is also needed to improve education during this period. In this study, we examined the impact of this epidemic on medical education in the Iranian academic community.

Method

This was a web-based descriptive study conducted on 585 students in 2020 in Iran. To conduct this research, we first interviewed through telephone the deans or vice chancellors of a number of nursing and midwifery faculties across the country, asking them about their university's educational status in terms of student attendance, class presentation, and activities related to post-graduate students (master's, doctoral). After the sixth interview, we found that all universities had the same educational status, so a questionnaire was prepared to survey students. The questionnaire contained 13 items that assessed the demographic characteristics and educational status of the university. The content was validated by consulting 8 faculty members, and after the completion of 30 questionnaires, the reliability was confirmed by Cronbach alpha.

Afterwards, we conducted a descriptive web-based research on the educational status of Iranian universities of medical sciences at the outset of this epidemic and asked students of medical universities across the country. To this aim, as the first step, the link to the questionnaire was sent to different student groups connected to each other through social networks, and those students who wished to cooperate answered the items of the questionnaires and return them to the research team. After reaching the desired sample size (585 people), the data obtained were analyzed using SPSS statistical software version 22.

Results

Data collection took place three weeks after the closure of the universities in March 2020. The results of interviews with faculty officials showed that clinical internships in all disciplines except for medical residents and interns were closed after the first reports of death from corona were released. Theoretical courses were not held at the same time. In all universities, NAVID, a system provided by the Ministry of Health and Medical Education was introduced to professors and students for offering

web-based virtual courses, but a few universities complained about the shortcomings of this system in their universities. Universities with post-graduate students stated that the classes of these students were the last to be closed.

Data from 585 students in the study showed that their average age was 22.1 years. The majority (28.3%) of students were from the school of allied medical sciences, followed by nursing and midwifery (24.2%) and the lowest participation (6.6%) was from the school of medicine.

Students from different universities participated in this study, with the highest participation rate from Ahvaz Jundishapur University of Medical Sciences with 16.6%, followed by Tehran University of Medical Sciences with 12.6%, and the lowest rate was related to Masjed Soleiman Azad University and Khorramabad University of Medical Sciences, with 2% and 2.3% participation, respectively.

In terms of the programs in which the students were studying, 72.5% were undergraduate students, 20% were students of Medicine, Dentistry and Pharmacy, and 7.5% were post-graduate students.

As far as place of residence and university location were concerned, 34% of students lived in the same city where their university was located, 31% in the same province, and 35.5% lived in a different province.

As with the closure of universities, 56.3% of the students declared that the decision was made by the university itself, 42.5% stated that the request was first made by the students and then pursued by the university, and 1.2% of the students mentioned that the request was made by faculty members.

With respect to class presentation, 22.93% of students said that their classes were held using social networks such as WhatsApp or Skype, 18% announced that they were held using the official system of the Ministry of Health and Medical Education (NAVID), and the rest said no class had been held for them. Also, the majority of them (>80%) still had no idea about when their classes would be held.

Discussion

The prevalence of corona definitely causes enormous damage to the physical health of patients and can lead to death. The mortality rate for COVID-19 is relatively low compared to other known infectious diseases, but its high infectivity poses a serious challenge to prevent its spread (Barrimah et al. 2017). Epidemics have negative social, economic, and political consequences and can impair basic services such as education, transportation, and tourism (Qiu et al. 2017).

In this study, we examined changes in the education system during the Corona epidemic in Iran. One of the problems with the disease was its high infectivity. To prevent transmission to others, all public places and communities, including schools and universities, were closed in Iran. According to our telephone interviews with university officials, the students did not attend the classes three days after the announcement of the first deaths due to corona, and the universities were first closed by provincial officials and then closed altogether nationally. This was also attested by the students participating in this study who made similar statements. According to Navarro et al, during the H1N1 pandemic in 2009, more than 1,300 public and private schools in 240 communities across the United States were closed. The vast majority of these decisions were made following the recommendations of the US Centers for Disease Control and Prevention (CDC) (Navarro et al. 2016).

Jackson et al also looked at the impact of school closures on the outbreak of the flu, stating that the outbreak of the flu often decreases after school closures. This effect is sometimes reversed, and the spread reaches a peak after school reopening. Jackson et al support the causal role of school closure in reducing the incidence of influenza. However, if schools are not closed early at the disease outset, or if they are not closed concurrent with other intervention measures, it is sometimes unclear how much school closures can help reduce the prevalence of the disease (Jackson et al. 2013).

Using a mathematically simulated model, Keslo et al simulated the effect of four social distancing interventions: school closure, increased isolation of symptomatic individuals in their household, workplace nonattendance, and reduction of contact in the wider community. They simulated each of the intervention measures in isolation and in several combinations. They found that performing all 4 measures within 6 weeks for a low-contagious disease would reduce the incidence rate from 33% to below 10% after the introduction of the first case. For patients with moderate infectivity, these measures should be introduced within 2 weeks of the first case to achieve a similar reduction (Kelso et al. 2009). Therefore, the closure of universities and schools three days after the first case of corona seems to be the correct action that should have been taken by other measures. But what is important about medical universities is that many students at these universities, especially those studying Nursing, Midwifery, Physiotherapy, Operating Room Technology, Anesthesiology, etc., are in their final year of university, and they should learn how to work under emergencies such as epidemics, and even be able to do independent clinical work in their last two semesters. Not only does dismissing them disrupt their clinical training process, but their presence with an instructor in a pandemic can reduce the work pressure of the medical staff. Of course medical interns are not dismissed in emergency situations and in addition to attending their clinical courses, they bear a heavy burden of the treatment system. Therefore, revising the curriculum of the above-mentioned students and adding them and even their instructors to medical teams in emergency situations will help the health care system, especially in fast-spreading epidemics that are beyond the power of even the most advanced health care systems in the country (Barrimah et al. 2016).

Another important point is that in the education system, especially medical education, there should be planning, guidelines and regulations to deal with the occurrence of such epidemics, so that faculty members from the departments of Nursing, Midwifery, Physiotherapy, Operating Room

Technology, Anesthesiology, Laboratory Sciences, etc. do not merely observe the battle between the health care team and the epidemic. Rather, they should be next to the students who are about to enter this area soon, and by doing this they become part of the health care providing system. In their research, Navarro et al conclude that state and local legislators and agencies need to do a lot of work before emergencies in order to clarify the implementation of school closure sentences in times of crisis. Health and education officials need to know that, although these relationships are important, the need for clear rules to prevent unnecessary complications is more critical (Navarro et al. 2016). Looking at the anxiety level of medical students after SARS, Loh found that late-year medical students had lower levels of anxiety, and the researchers saw this as a more realistic view of the risk of SARS due to the time they had spent in hospital and the interaction with clinical professors and medical staff. (Li-Cher et al. 2005).

The study was conducted in the first weeks of the epidemic, and neither the participants in the study nor even the officials of the Ministry of Health and Medical Education or university officials knew the date of the reopening of the universities. The severe spread of the disease in different cities and the need to stay at home, forced universities to hold virtual classes. Despite the establishment of virtual learning infrastructure before the start of this epidemic in Iranian universities, unfortunately, this method of web-based teaching has been problematic for both professors and students due to its newness. Many students participating in research stated that no class was held for them, or even if it was, the students did not pursue participation in the class, and since the nature of the work of medical students in some fields is up to 60% dedicated to clinical or laboratory work, this method of teaching was not taken seriously. Of course, due to the nature of the graduate courses, the virtual classes among these students were more welcome. Of course, application of such a system

increasingly necessitates the existence of robust web-based infrastructure in society.

Cook believes that instead of asking if we should use web-based learning, researchers would better say that we should use web-based learning and look for how and when to use it. Although this method of training has many advantages, having these benefits does not necessarily mean that it is the best method, and it should only be used in cases where it seems to be the most effective method of education (2006). Moran et al state that technology, which is increasingly being used in medicine, is trying to make the job of the doctor easier and provide valid and accessible information (Joshua et al. 2018). Another important point is the need to have the infrastructure to do this type of training. In a review of published articles on web-based education, O'Doherty et al enumerate the main barriers to creating and implementing online learning in medical education which include time constraints, poor technical skills, inadequate infrastructure, lack of institutional strategies and support, and the negative attitude of individuals. Solutions, on the other hand, include improving coaching skills, motivation and rewards for the time spent on developing and delivering online content, improving institutional strategies and support, and a positive attitude among all those involved in developing and delivering online content (2018). But is theoretical training enough? In non-medical disciplines, holding a class in this way may largely compensate for class attendance, but medical science is different from other disciplines. Is web-based training applicable to medical education? The answer is definitely yes. Bernardo et al, for example, developed a web-based surgery course and evaluated its results, and they found that a web-based course for pre-clinical medical students can be successfully developed and implemented in medical settings, which can satisfy the educational needs of students. Thus, overall, they recommend web-based learning strategies. (Bernardo et al. 2008) But is this a good alternative to attending a patient's bed and going to a laboratory? The answer to this question is simply

no. In our opinion, this type of training is similar to complementary medicine which may be effective and even necessary, but it cannot replace modern medicine.

Conclusion

The Corona epidemic has led to the closure of educational centers due to its rapid transmission and has certainly affected the country's education system in general, and medical education in particular, but our important lesson from this situation is that the infrastructure of virtual education in society must definitely be strengthened in the best possible way. Professors and students need to get acquainted with this method of teaching to use it even in normal situations, by presenting a part of the course content virtually. The second point is related to students of medical sciences, especially clinical disciplines such as Medicine, Nursing, Midwifery, Physiotherapy, and Operating Room Technology. It is necessary to include theoretical and practical courses on how to provide service during an epidemic in their curriculum.

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