

Health anxiety of Iranian medical students during the COVID-19 pandemic

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Abstract

Introduction: The aim of this study was to examine the health anxiety of medical students during the COVID-19 pandemic in Iran.

Material and methods: We performed a descriptive study conducted on 600 students. The short form of the Health Anxiety Inventory (HAI-18) was completed by the students at the outset of the study, and one month later when the COVID-19 virus was named as a pandemic by the World Health Organization, the questionnaire was completed again by the same students, and their health anxiety was compared with that at the outset of the epidemic in Iran.

Results: Analysis of the first results of HAI-18 showed that 47% of the medical students had severe anxiety, and after one month and re-completion of the questionnaire by the same individuals, this rate rose to 84%, indicating a significant difference ($p < 0.001$). The general score of the students' anxiety increased from 34.8 ± 7.35 to 47.1 ± 9.5 ($p < 0.001$). No significant difference was observed in students' health anxiety scores in terms of gender, university faculties, and academic programs ($p > 0.05$).

Conclusions: The increased health anxiety among medical students in Iran during the COVID-19 pandemic should be taken into serious consideration. Providing psychological and social support for students by focusing on their normal study routine can reduce their stress during the global coronavirus epidemic.

Key words: health anxiety, medical students, COVID-19 pandemic.

Introduction

The coronavirus family was first identified in the mid-1960s, but was not considered a serious threat until 2002, when Guangdong Province in China witnessed the emergence of acute respiratory problems which later came to be known as SARS (Stadler *et al.* 2003). Between September 2012 and January 2014, another virus of the same family was identified as the cause of MERS-CoV disease (Daniel *et al.* 2014). Finally, in December 2019, a new type of coronavirus caused severe respiratory illness in Wuhan, China, which is now known as COVID-19. The virus soon spread beyond China's borders (Parker 2020), and on February 19, 2020, the first cases were seen in Iran (Agency IIRN 2020), raising concerns about health.

Health anxiety is a phenomenon that preoccupies many people at some point in their lives, especially after experiencing unfamiliar physical symptoms, hearing news reports about a specific illness, undergoing medical tests, or following a physical illness. This condition is often transient and resolves spontaneously with the disappearance of symptoms or the reassurance of a physician. However, in some cases, although there is no evidence indicating a specific disease, the patient's concerns are not resolved and health anxiety persists (Dibajnia 2012). Health anxiety is a widespread cognitive disorder which is characterized by a person's misinterpretation of symptoms and physical changes with regard to their illness or health (Salkovskis and Howes 1998). Some people misinterpret a wide range

of factors, including physical changes, medical information, medical advice, test results, and other people's reactions and advice as symptoms of a dangerous physical illness, which can lead to shaping increased negative assumptions and thoughts, and these thoughts are often reinforced by mental-emotional images, and thus the person experiences severe and persistent health anxiety (Salimi and Bajestani 2014). The results of some studies show that medical personnel are more likely to suffer from health anxiety than others. Babaei, for example, found that nurses experience more health anxiety than do normal people (Babaei *et al.* 2012). After learning about a specific disease, medical students may consider symptoms that they used to regard as normal to be symptoms of the disease being studied (Zahid *et al.* 2016). According to the latest American psychiatric classification, health anxiety is a new diagnosis that has partially replaced self-morbidity disorder (Tyrer and Tyrer 2014). This type of anxiety has been reported to result in unnecessary use of health services and medical consultation (Tyrer *et al.* 2015).

In a study conducted by Islam *et al.* (2020), 18.1% of the studied students were found to suffer from stress during the COVID-19 epidemic.

In Taif, Saudi Arabia, the fear of illness was higher among medical students (17.4%) compared to non-medical students (15%). This rate was higher among clinical medical students (21.21%) (Althagafi *et al.* 2019).

The current pandemic is one of the most widespread global experiences for many people, especially medical students around the world in recent years. Therefore, its effects must be thoroughly studied. One of the aspects of this pandemic is its impact on the medical student community, which is supposed to be responsible for providing care and relief in the event of illness. Given the increasing prevalence of the disease and its associated psychological impacts, we hypothesized that the COVID-19 pandemic has increased the students' health anxiety. The aim of this study was to determine the effect of the COVID-19 epidemic in Iran and how its change into a pandemic affected the health anxiety of medical students.

Material and methods

A descriptive study was conducted on students from medical universities across the country from February 29 to March 30, 2020 in two phases which were one month apart. The sample size was determined based on the

study of Zahid *et al.* (2016) with the help of MedCalc statistical software with 95% power and 5% error, as 553 people.

$$n = \frac{z_1^2 - \frac{a}{2} \times \frac{P(1-P)}{2}}{d^2} = \frac{(1.96)^2 \times 0.36 \times 0.64}{(0.04)^2} = 553$$

Taking into account the 10% drop in the final sample volume, 608 people were selected. Since students in all universities are connected together through Internet-based social networks and exchange news related to the university therein, and due to the closure of universities caused by the coronavirus pandemic, a web-based sampling method was employed in this research. In the first step, the administrators of these internet-based social groups were identified, contacted, and asked for their help by placing a link to a questionnaire in their groups to be completed by the group members who were medical students.

The research population included students studying at schools of Medicine, Allied Medical Sciences, Rehabilitation, Dentistry, Health, Pharmacy, and Nursing and Midwifery of selected universities across the country, including Ahvaz, Tehran, Isfahan, Shiraz, Yazd, Tabriz, Mashhad, Bushehr, Mazandaran, Khorramabad, Kerman and Sanandaj. The proportional allocation method was used to achieve the sample size for each faculty.

The first section of the questionnaire dealt with the students' demographic information and their university studies during the lockdown, and the second section was the short form of the standard Health Anxiety Inventory (HAI-18). This questionnaire is a standard tool for measuring health anxiety and was first developed by Warwick and Salkovskis (1989) to develop a cognitive model of health anxiety and hypochondriasis. The short form, which contains 18 questions, was designed by the same researchers in 2002 and validated by the test-retest (90.0) and Cronbach's α coefficient (0.70 out of 0.82). The construct validity of this questionnaire was obtained by confirmatory factor analysis using LISREL software¹. Factor analysis showed that the questionnaire had three components: worry

¹LISREL is a 64-bit application for standard and multilevel structural equation modeling. These methods are available for the complete and incomplete complex survey data on categorical and continuous variables as well as complete and incomplete simple random sample data on categorical and continuous variables.

about getting sick (12, 11, 9, 8, 6, 5 questions), worry about the consequences of the disease (18, 17, 16, 15, 13 questions), and general health concerns (14, 10, 7, 4, 3, 2 questions) (Salkovskis and Warwick 2002). Each item in the questionnaire has four options in the form of a statement, and the respondent chooses one of the statements that best describes their condition. Scoring for each item is from zero to 3 points. Option a scores zero, b scores 1, c scores 2 and d scores 3. The highest score that a person can get in this questionnaire is 54 and the lowest is zero. Higher scores represent higher health anxiety. The validity and reliability of SHAI were confirmed for Iranian students by Nargesi *et al.* in 2017. According to the results of this research, the scores were interpreted as follows: scores lower than 17 = no health anxiety, scores < 26 = low health anxiety, scores 26-35 = moderate health anxiety; and scores ≥ 36 = high health anxiety (Nargesi *et al.* 2017).

Inclusion criteria: The students who entered this study were those who were studying in one of the fields of medical sciences and were willing to participate in the study. Students were excluded from the study if they had experienced a stressful incident (e.g., death of a loved one) six months prior to the study. After reaching the desired sample size, the students completed the questionnaire, and one month later when the COVID-19 virus was deemed a pandemic by the World Health Organization, the questionnaire was completed again by the same students and their health anxiety was compared with that at the outset of the epidemic in Iran.

Ethics approval

Online informed written consent was obtained from all participants. The study was approved by the Ethics Committee of Ahwaz Jundishapur University of Medical Sciences (Ref. ID: IR.AJUMS.REC.1398.958).

Statistical analysis

The *t*-test and χ^2 test were used to compare the level of anxiety of students at different intervals. Descriptive statistics (i.e., mean, mean difference, frequency, and frequency percent) were used to describe the demographic characteristics of the participants.

Results

Data obtained in two phases from 600 students from the schools of Medicine, Allied Medi-

cal Sciences, Rehabilitation, Dentistry, Health, Pharmacy, and Nursing and Midwifery were analyzed using SPSS version 22. Eight students were excluded from the study since they did not complete the questionnaire for the second time. The mean and standard deviation of the age of the participants were 22.6 ± 3.5 years, with the oldest age being 48 years and the youngest age being 18 years. Of these participants, 238 (39.7%) were boys and 363 (60.3%) were girls. The participants included 387 (64.5%) bachelor's students, 92 (15.4%) master's students, and 121 (20.2%) PhD students. Of these students, 104 (17.3%) were from the nursing and midwifery school, 60 (10%) from the school of health, 68 (11.3%) from the school of dentistry, 63 (10.5%) from the school of pharmacy, 115 (19.2%) from the school of medicine, 126 (22.7%) from the school of allied medical sciences, and 54 (9%) from the school of rehabilitation.

After analyzing students' initial health anxiety and according to the chi-square test, 47% of students had severe anxiety, and after completion of the questionnaire by the same students in the second phase, 84% of them had this degree of anxiety, and the difference was significant ($p < 0.001$). Also, based on the *t*-test, the mean and standard deviation of the questionnaire dimensions, including worry about getting sick, worry about the consequences of the disease, and general health concerns, increased over time (Table 1), with the mean and standard deviation of the general score of the students' anxiety increasing from 34.8 ± 7.35 to 47.1 ± 9.5 ($p < 0.001$).

According to the χ^2 test, with the increase in COVID-19 prevalence, the frequency of students who believed that corona prevalence is conducive to elevating their health anxiety levels increased (43.7% vs. 80.5%, $p < 0.001$) (Table 2).

The mean and standard deviation of the general scores of anxiety of male and female students at the outset of the outbreak were 35.19 ± 7.66 and 34.2 ± 6.83 , respectively, which later became 47.2 ± 9.67 and 46.9 ± 9.25 , respectively. However, based on the *t*-test, there was no significant difference between the two sexes ($p = 0.28$). According to the results of this study, based on the *t*-test, no significant difference was observed in the overall score of students' health anxiety in different fields in the first and second phases of completing the questionnaire ($p = 0.83$). In addition, the overall scores of anxiety for different university programs are not statistically significant ($p = 0.89$) (Table 2).

Table 1. Assessment of students' health anxiety levels in the first and second phases of data collection

Details	Degree of anxiety			p-value
	Mild	Moderate	Severe	
Frequency (percentage)				
Phase I (n = 600)	44 (7.3)	274 (45.7)	282 (47)	< 0.001
Phase II (n = 600)	4 (0.67)	92 (15.33)	504 (84)	
Mean ±SD				
Phase I	23.54 ±1.57	30.57 ±2.51	40.65 ±6.09	< 0.001
Phase II	24.25 ±0.5	30.92 ±1.79	50.24 ±6.7	
Worry about getting sick (Phase I)	7.06 ±1.1	9.46 ±1.76	12.48 ±2.62	< 0.001
Worry about getting sick (Phase II)	8.00 ±1.15	9.82 ±1.38	16.23 ±3.24	
Worry about the consequences of the disease (Phase I)	6.81 ±1.4	8.76 ±1.72	11.63 ±2.61	< 0.001
Worry about the consequences of the disease (Phase II)	8.00 ±2.44	8.54 ±1.14	14.25 ±2.57	
General Health Concerns (Phase I)	9.65 ±1.49	12.35 ±1.88	16.54 ±3.03	< 0.001
General Health Concerns (Phase II)	8.25 ±0.95	12.55 ±1.49	19.75 ±3.2	

Scores lower than < 26 – low health anxiety, scores 26-35 – moderate health anxiety, scores ≥ 36 – high health anxiety

Table 2. The effect of COVID-19 prevalence on students' health anxiety from their perspective

		Phase I (n = 600)	Phase II (n = 600)	p-value
Students' health anxiety from their perspective	Increased	262 (43.7)	483 (80.5)	< 0.001
	No change or Decreased	338 (56.3)	117 (19.5)	
Sex	Male	35.19 ±7.66	47.2 ±9.67	0.28
	Female	34.2 ±6.83	46.9 ±9.25	
University faculties	Rehabilitation	34.64 ±5.77	48.64 ±7.76	0.83
	Dentistry	35.2 ±8.16	44.83 ±9.82	
	Pharmacy	35.87 ±8.02	48.54 ±8.1	
	Medicine	33.32 ±5.84	47.93 ±9.57	
	Allied Medical Sciences	34.71 ±7.92	47.32 ±9.46	
	Nursing & Midwifery	34.93 ±7.33	47.34 ±9.64	
	Health	34.88 ±7.91	44.59 ±10.05	
Level of education	Bachelor	34.84 ±7.22	46.94 ±9.66	0.89
	Master's	36.0 ±8.28	46.96 ±9.67	
	PhD	34.84 ±7.22	46.94 ±9.66	

Data are based on frequency (%). Statistical test: χ^2 and mean ±SD, statistical test: independent t-test.

Discussion

The aim of this study was to investigate the health anxiety of students of medical universities during the outbreak of COVID-19 in Iran. According to the results of the present study, the anxiety score of 47% of students at the outset of the outbreak in Iran was higher than 35, representing severe anxiety. Also, the students' anxiety score increased significantly after one month from the completion of the first questionnaire, which was concurrent with the identification of COVID-19 by the World Health Organiza-

tion as a pandemic ($p < 0.001$), with 84% of the students having an anxiety score above 35. Meanwhile, most students (67.5%) stated that one month after the coronavirus outbreak, due to the increase in corona prevalence in the world, their health anxiety increased significantly compared to Phase I (40%) ($p < 0.001$). In 2020, Bao *et al.* (2020) reported that with the increase in the number of patients and suspected cases, and with the growing number of provinces and countries where the disease had spread, public concerns about the possibility of contracting

the disease had been on the rise, and this had increased the level of anxiety.

The results of a 2020 study by Wenjun *et al.* (2020) showed that 0.9% of students experienced severe anxiety, 2.7% experienced moderate anxiety, and 21.3% experienced mild anxiety when the COVID-19 epidemic occurred in China. They mentioned COVID-19 as the risk factor for increasing anxiety among students.

In another 2020 study by Liu *et al.* (2020) in China during the COVID-19 epidemic, it was found that the level of anxiety and depression in students was significantly higher than that of other people in the community ($p < 0.05$). In the present study, the level of health anxiety scores of students from different schools of medical science universities did not show a significant difference at the outset of the coronavirus outbreak and one month later. During SARS in Hong Kong, Wang examined students at two Chinese universities and one non-Chinese university, and found that the highest mean of anxiety was related to medical students followed by non-medical students at Chinese universities, while the lowest was reported for science and technology students. Only the mean score of medical students was higher than the normal range of 20-34, and the other two groups were slightly lower (Tze Wai *et al.* 2007). Looking at the effect of SARS on the anxiety of medical students, Loh *et al.* (2005) found that junior students showed significantly more anxiety than clinical (senior) students in relation to attendance and personal protection in hospital, and in meeting people coughing in public places. According to the results of the present study, it seems that the general anxiety score of students does not show a statistically significant difference in terms of different university programs and gender during the first and second phases of completing the questionnaire ($p > 0.05$). In a study by Al-Rabiaah *et al.* (2020), female students showed higher levels of anxiety than their male counterparts during the Middle East Respiratory Syndrome (MERS) epidemic.

Currently, COVID-19, which leads to severe and acute respiratory distress syndrome in some patients and may lead to the death of others, has become pandemic, spreading in all countries of the world (Cascella *et al.* 2020). The lack of any definitive treatment or prevention method along with some epidemiologists' predictions that at least 60% of the population will suffer from this disease have caused enormous stress and anxiety in societies (Anderson *et al.* 2020). Fear of the unknown reduces the perception of immunity in

humans and has always been a source of anxiety for them, and when it comes to COVID-19, the limited scientific information about this disease exacerbates this anxiety (Bajema *et al.* 2020).

In addition to the lack of any proper control over the disease and its serious threats, the presence of erroneous analyses and information can increase concern and anxiety among the public (Bao *et al.* 2020). Numerous studies have shown that emergency health conditions can have psychological effects such as anxiety, fear, and worry among university students (Mei 2011). According to these studies, the stress caused by COVID-19 among students may be due to concerns about the impact of the virus on health (Cornine 2020), on their future employment (Wang *et al.* 2020), and on the increased distance between people due to the effect of quarantine, which is followed by a decrease in interpersonal communication (Xiao 2020). Other factors that may increase students' anxiety are contraction of the virus from an acquaintance or a close relative or a delay in the students' university curriculum, which makes the condition of the epidemic worse for them. In contrast, living with a family and the sense of support and security that comes with it can have a positive effect on coronavirus anxiety (Wenjun *et al.* 2020), but the results of this study show the predominance of coronavirus panic in society. This certainly highlights the need for more research and perhaps psychiatric interventions. It should also be noted that the restrictions and deprivations resulting from international sanctions and the unknown nature of the disease have had a pivotal role in creating fears and emotional reactions in Iranian society (Doshmangir *et al.* 2020). Finally, it seems that with the increase in the level of health anxiety of students of medical universities in Iran during the COVID-19 pandemic and given the special role of these students in promoting community health during crises, their anxiety could be reduced by a number of measures such as holding workshops on disease transmission, providing protective equipment at internship sites, psychological support being provided by university professors and officials, adopting special strategies to advance academic goals, and teaching anxiety coping techniques.

The main strength of the present study was the participation of students from many universities across the country. However, the study was limited in that the participants' details and answers might have been invalid due to online nature of data collection and the low speed of the Internet in Iran.

Conclusions

The global outbreak of coronavirus has caused serious anxiety among medical university students. Individuals with health anxiety experience high and persistent levels of concern about physical symptoms (Eilenberg *et al.* 2015) which if left untreated can persist chronically and impose financial and mental burdens on the individual, their family, and the community (Fink *et al.* 2010). Providing social support for students by focusing on their normal studying routine can reduce their stress during the global coronavirus epidemic. This is because social support for students has been found to be negatively correlated with their stress levels (Al-Rabiaah *et al.* 2020; Cascella *et al.* 2020).

Given the widespread coronavirus vaccination in Iran, the removal of most restrictions, the re-opening of student dormitories, and the requirement for students to attend hospital internship programs, similar research needs to be conducted in order to identify the prevalence of long-term psychiatric disorders such as stress and anxiety caused by the COVID-19 pandemic.

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Disclosure

The authors declare no conflict of interest.

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