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# The Prevalence of Anxiety and its Associated Factors among Medical Interns during the COVID-19 Outbreak in Iran

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Quantitative Study

## Abstract

**Background:** Since the Coronavirus disease 2019 (COVID-19) pandemic outbreak, medical personnel have undergone a considerable amount of physical and mental pressure. Medical interns (MIs) are a distinct population of healthcare workers. In Iran, MIs refers to senior medical students who are undergoing their clinical training. We aimed to determine the prevalence of anxiety due to COVID-19 among MIs and identify personal factors associated with anxiety.

**Methods:** A cross-sectional study was carried out during April 18th to 24th, 2021. An online questionnaire containing a demographic characteristics questionnaire and the Corona Disease Anxiety Scale (CDAS) was sent to all of the 679 MIs of Shahid Beheshti University of Medical Sciences, Iran, through WhatsApp© messenger and 420 individuals (62% response rate) were enrolled in the study voluntarily. Independent t-test, one-way ANOVA, and Tukey's HSD post hoc test were conducted using SPSS software to identify the predictive factors for anxiety.

**Results:** The results showed that 70.2% of the participants had no or mild anxiety, 25% had moderate, and 4.8% had severe anxiety. The most significant factors associated with anxiety were female gender ($P < 0.001$) and living with parents ($P < 0.01$). However, there was no significant difference between single and married groups ($P = 0.42$).

**Conclusion:** It is suggested that medical universities and the government collaborate to provide an adequate psychological service for MIs, focusing on female interns who are living with their family members.

**Keywords:** Anxiety; Coronavirus; Mental Health; Psychology; Students

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## Introduction

The novel corona virus (2019-nCoV) pneumonia was first reported in Wuhan, China, in late December 2019 (Lu et al., 2020). It rapidly spread around the world. On March 11, 2020, the World Health Organization (WHO) declared the situation a global pandemic (World Health Organization, 2020a). Iran was one of the countries with a high prevalence of COVID-19 (World Health Organization, 2020b). Since the outbreak, Iran's government attempted to extend the quarantine and prevent the further spread of the virus. However, the number of patients grew at an accelerating rate.

In addition to the physical symptoms of the COVID-19, its psychological effects should also be taken into consideration. It has been documented that the mental impacts of previous infectious outbreaks, such as severe acute respiratory syndrome (SARS), have been longer lasting than their physical impacts (McAlonan et al., 2007).

Health care providers are one of the most vulnerable populations during epidemics (Guerrero et al., 2021). Among 545 COVID-19 frontline physicians in Morocco, 370 individuals showed generalized anxiety symptoms most of whom were women (Ouazzani Housni et al., 2022). Another survey on medical staff exposed to COVID-19 patients demonstrated a considerable rise in their anxiety level and poor sleep quality. Female gender and young age were identified as independent risk factors of anxiety in this study (Alboghdadly, Saadh, Kharshid, Shaalan, & Alshawwa, 2022). Lang, Liu, He, Lv, and Xu (2020) reported working hours as another risk factor for anxiety in medical staff during the COVID-19 pandemic.

Medical interns (MIs) are a distinct group of healthcare workers that faced extraordinary pressure and psychological disorders during this sudden onset life-threatening situation. In Iran, medical internship refers to the last 2 years of medical school in which MIs start their clinical training. The COVID-19 pandemic had unfavorable effects on medical education. Moreover, MIs are frontline workers at a high risk of exposure to the infection. Studies have shown that despite health needs in a substantial proportion of medical students, they are unwilling to seek help especially in mental health issues including anxiety (Moreira de, Moreira, & Telles-Correia, 2018). However, It is known that medical students are at greater risk of anxiety disorder in comparison to their age-matched peers in the general population (Keyvanfar et al., 2022). Although, anxiety is a common mental disorder, it has not received much attention and is mostly unrecognized and undertreated (Willgoss, Goldbart, Fatoye, & Yohannes, 2013). Anxiety can impair MIs' functions and prevent the provision of an efficient and safe medical care to patients.

There have been few reports on medical students' psychological status in Iran at the beginning of the COVID-19 pandemic (Miri, Razavi, & Mohammadi, 2021; Nakhostin-Ansari, Sherafati, Aghajani, Khonji, Aghajani, & Shahmansouri, 2020). To the best of our knowledge, no study has been conducted exclusively on the MI population. Thus, our primary aim was to investigate and analyze the prevalence of anxiety due to COVID-19 in a sample of MIs in 1 Iranian medical school. Our secondary goal was to identify personal factors associated with anxiety in order to detect it and provide timely assistance to at risk interns.

## Methods

A cross-sectional survey was conducted from April 18th to 24th, 2021 (14 months after confirmation of the first case of COVID-19 by Iranian official authorities) among MIs of Shahid Beheshti University of Medical Sciences, Iran, using an online questionnaire. Respondents who were current MIs of the university, answered all of

the questions, and had access to the Internet and WhatsApp© messenger were included in the study. This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences.

*Questionnaire:* The first section of the study questionnaire was a demographic characteristics questionnaire including questions on factors such as gender, marital status, and living status (living in their parents' home, in the dormitory, or alone). The second section of the questionnaire was the Corona Disease Anxiety Scale (CDAS). The CDAS is applied for the assessment of psychological and physical symptoms of anxiety related to the COVID-19 pandemic. This tool has been examined in the Iranian society and has shown a good internal consistency (α = 0.91), reliability, and validity (Alipour, Ghadami, Farsham, & Dorri, 2020). The CDAS consists of 18 items scored on a 4-point Likert scale ranging from 0 to 3 (0 = never, 1 = sometimes, 2 = most of the time, 3 = always). Thus, the sum of the items for each individual was considered as the anxiety score which ranged from 0 to 54. Based on their anxiety score, the participants were divided into the three categories of no to mild (0-16), moderate (17-29), and severe (30-54) anxiety.

*Participants:* The total number of the target population was 679 individuals. Due to the corona virus pandemic limitations and social distancing, the questionnaires were sent to all of the MIs through WhatsApp© messenger and the participants voluntarily enrolled online. All participants were assured that their identity would remain confidential. In total, 420 (62% response rate) completed questionnaires were collected and analyzed.

*Data analysis:* SPSS software (version 25.0; IBM Corp., Armonk, NY, USA) was used to conduct the statistical analysis. Student's t-test was utilized to explore which demographic characteristics influenced anxiety among the participants. $P < 0.05$ was considered as statistical significance. One-way ANOVA and Tukey's HSD post hoc test were performed to evaluate the significant associations between the living status and CDAS score. The Pearson correlation coefficient was used to assess the association between stressors and anxiety intensity categories.

## Results

The responses of 420 MIs [196 (47%) men and 224 (53%) women] were received. The demographic information of participants is summarized in table 1. Their ages ranged from 20-36 years with a mean of 25.07 (SD = 1.55) years. Moreover, 340 (80%) participants were single. In addition, most of them [247 (59%)] were living at their parents' home, 100 (24%) MIs were living independently in their own home, and 73 (17%) in the dormitory.

**Table 1.** Demographic characteristics and the results of independent t-test and one-way ANOVA analysis among medical interns

| Variable | Sample (n = 420) | Percentage (%) | Anxiety scale | |
|---|---|---|---|---|
| | | | Mean ± SD | P-value |
| Gender | | | | < 0.01 |
| Male | 196 | 47 | 14.75 ± 7.93 | |
| Female | 224 | 53 | 11.51 ± 7.27 | |
| Marital status | | | | 0.42 |
| Single | 340 | 80 | 13.10 ± 7.98 | |
| Married | 80 | 20 | 13.82 ± 6.94 | |
| Living status | | | | 0.01 |
| Home with family | 247 | 59 | 14.02 ± 7.31 | |
| Alone | 100 | 24 | 12.95 ± 8.90 | |
| In the dormitory | 73 | 17 | 11.03 ± 7.40 | |

SD: Standard deviation

According to the CDAS score, 70.2% of the participants had no or mild anxiety, 25% had moderate anxiety, and 4.8% had severe anxiety. The prevalence of moderate to severe anxiety was 23% (45) and 36% (80) among men and women, respectively. Moreover, 29% of single and 32% of married interns were affected by moderate to severe anxiety. Moreover, anxiety was more prevalent (34%) among MIs who were living with their family (Table 2).

To determine the factors influencing anxiety level in MIs, student's t-test was conducted. The results showed that female interns were more likely to have anxiety during COVID-19 outbreak ($P < 0.01$). However, there was no significant difference between single and married groups ($P = 0.42$). One-way ANOVA revealed a correlation between living status and anxiety level ($P = 0.01$) (Table 1). To determine which subcategories were associated with anxiety, Tukey's post-hoc analysis was conducted and the results are presented in table 3. Anxiety due to the COVID-19 epidemic was significantly higher in MIs who were living with their family in comparison to those who lived in the dormitory. Living alone at home did not have a significant effect on the anxiety score of MIs.

## Discussion

In this survey, our goal was to evaluate the psychological well-being of MIs during the COVID-19 pandemic and determine the factors that increased their anxiety level. Our results showed that 29.8% of interns were influenced by moderate to severe anxiety due to the COVID-19 outbreak which is more than the estimation of the study by Mattila, Peltokoski, Neva, Kaunonen, Helminen, and Parkkila (2020) who reported a 15% prevalence of moderate to severe anxiety in hospital staff. The main possible reason for this difference was a sudden growth in the number of suspected cases and deaths in Iran, so that there was at least 1 infected person in most families. The rapid rise in the number of cases forced the government to extend the quarantine. As of April 17th 2021, most of the businesses were closed and people were not allowed to move around the city after 10 p.m. Moreover, travelling outside the city was banned. These restrictions resulted in an increasing distance among people. Moreover, increased anxiety of MIs might have been related to the impact of the disease on their education, as presence of MIs at hospitals was reduced and their courses were taught online (Theoret & Ming, 2020).

Another study that was conducted in Iran at the beginning of the outbreak reported that 38% of medical students had experienced anxiety symptoms which is more than that in our study (Nakhostin-Ansari et al., 2020). The discrepancy might be due to the difference in the assessment stage and location.

**Table 2.** Prevalence of anxiety according to the demographic factors (n = 420)

| Variable | Normal to mild anxiety [n (%)] | Moderate anxiety [n (%)] | Severe anxiety [n (%)] | P-value | Phi value |
|---|---|---|---|---|---|
| Gender | | | | 0.017 | 0.13 |
| Male | 151 (77) | 38 (19) | 7 (4) | | |
| Female | 144 (64) | 67 (30) | 13 (6) | | |
| Marital status | | | | 0.65 | 0.05 |
| Single | 241 (71) | 82 (24) | 17 (5) | | |
| Married | 54 (67) | 23 (29) | 3 (4) | | |
| Living status | | | | < 0.01 | 0.20 |
| Home with family | 163 (66) | 75 (30) | 9 (4) | | |
| Alone | 74 (74) | 16 (16) | 10 (10) | | |
| In the dormitory | 58 (80) | 14 (19) | 1 (1) | | |

**Table 3.** The result of Tukey's post-hoc comparison for the living status items (n = 420)

| Variable | | Mean difference (I-J) | P-value |
|---|---|---|---|
| I | J | | |
| Home with family | In the dormitory | 2.98 | 0.01 |
| | Alone | 1.06 | 0.48 |
| In the dormitory | Home with family | -2.98 | 0.01 |
| | Alone | -1.92 | 0.24 |
| Alone | Home with family | -1.06 | 0.47 |
| | In the dormitory | 1.92 | 0.24 |

By the time this survey was carried out, about 14 months after the onset of the outbreak, healthcare workers had become adjusted to the condition and were more able to manage the patients. In addition, healthcare authorities provided safer protective equipment in contrast with the early peak of the infection. The dissimilarity in the assessment tool could be another reason for the lower statistics in the current study compared to the mentioned study. To avoid the bias of measuring anxiety due to causes other than the outbreak, we used CDAS which is specifically designed to evaluate the anxiety caused by COVID-19.

A survey conducted on the Iranian general population reported a prevalence of 53.4% for anxiety which is higher than our statistics (Mohammadzadeh, Delshad, Khosravan, Bazeli, Armanmehr, & Paykani, 2020). This might be due to the better access of medical students to the most updated and reliable information resources about disease prevention and prognosis which results in reduced stress and anxiety (Saddik et al., 2020). Additionally, hospital personnel have a better opportunity to receive medical care and use greater therapeutic facilities in the condition that they become infected.

There were several limitations in the current investigation. The first limitation was the cross-sectional nature of the study and lack of a longitudinal follow-up. Second, as filling in the questionnaire was done voluntarily we might have selection bias. Third, we conducted the study in only one university, whereas educational and therapeutic strategies and patient load vary among different hospitals of universities. Therefore, more assessments in the medical universities of other regions of Iran are recommended. The final limitation was that there are other risk factors that were not evaluated in this study including age, level of knowledge about COVID-19, life-time psychiatric disorder, medical comorbidity, individual income, family social support, having children, smoking and alcohol consumption status, physical activity, and previous experience of COVID infection in the participants or their family members. Future studies can take these factors into consideration.

Our data also suggested that the anxiety level is higher in female interns. This finding is supported by other investigations among medical and non-medical individuals (Haque, Ul Islam, Hasan, Hossain, Hossain Khan, & Islam, 2022; Quintana-Domeque, Lee, Zhang, Proto, Battisti, & Ho, 2021). Nevertheless, neither Quek et al. (2019) nor Jafari, Nozari, Ahrari, and Bagheri (2017) have found a gender difference in anxiety level before the outbreak. This could be explained by the fact that differences in brain and bodily functions lead to different early and late responses to new conditions in men and women (Christiansen, 2015; Nakhostin-Ansari et al., 2020). It has been shown that living with parents, in contrast to living in the dormitory, was associated with increased anxiety in MIs. This variable had the most correlation with the development of anxiety in comparison to other stressors evaluated in this investigation (phi value = 0.20). Fear of being a carrier and the

possibility of transmitting the virus to other family members might be the reason for the higher anxiety in this group. However, living with parents was suggested as a protective factor in another study (Aylie, Mekonen, & Mekuria, 2020).

## Conclusion

In summary, we estimated that 29.8% of MIs have experienced moderate to severe anxiety due to the COVID-19 pandemic. Female gender and living with parents were the independent factors associated with the development of anxiety. Due to the critical nature of MIs' role in patient care, it is suggested that medical universities and the government collaborate to provide an adequate psychological service for MIs, focusing on those who are in the high risk category.

## Conflict of Interests

Authors have no conflict of interests.

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*Statement of Ethics*

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences. All of the participants approved a written consent before starting filling the questionnaire.

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