Available online at www.medicinescience.org

ORIGINAL ARTICLE

Medicine Science International Medical Journal

Medicine Science 2021;10(3):918-23

Anxiety levels of medical students during COVID-19 outbreak

Hilal Guzel[1], Halil Ibrahim Guzel[2], Ismet Dogan[3]

[1]Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Anatomy, Afyonkarahisar, Turkey
[2]Afyonkarahisar State Hospital, Psychiatry Clinic, Afyonkarahisar, Turkey
[3]Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Biostatistics, Afyonkarahisar, Turkey

Received 02 April 2021; Accepted 13 April 2021
Available online 01.08.2021 with doi: 10.5455/medscience.2021.04.109

Abstract

As Covid-19 spread to many countries in a very short time and became a global epidemic, WHO declared the epidemic as a "pandemic" on March 11, 2020. In respiratory diseases such as Covid-19, the transmission rate of the disease is high and the highest risk has always been healthcare workers during pandemic periods. Our aim the present study is to measure medical students anxiety levels and the different variables affecting their anxiety during unusual Covid-19 outbreak. A cross-sectional study was conducted on medical students. Coronavirus Anxiety Scale and the Beck Anxiety Inventory tests applied to all students. An online-based platform was used to distribute the survey developed by using the Google Forms. A total of 370 medical students participated in the survey. In this study 67.3 % (n = 249) of the participants were female and 32.7 % (n = 121) were male. 55.7 % (n = 206) of the participants were preclinical students, 44.4 % (n = 164) were clinical students. There was a statistically significant difference in anxiety levels according to gender and grades. We found that the prevalence of severe anxiety was higher in female students than in male students. Compared to clinical stage, preclinical students had a higher anxiety level according to BAI scores. Determining the anxiety levels of medical students and offering possible solutions for this is of vital importance as a healthy workforce will be maintained future global outbreaks.

Keywords: Anxiety, medical students, beck anxiety inventory, coronavirus anxiety scale

Introduction

In December 2019, it was determined that there were many pneumonia with unknown cause in Wuhan, China, and after the rapidly increasing number of cases, the World Health Organization (WHO) announced that the reason for these complaints in patients was a new type of coronavirus (2019-nCoV). In February 2020, in the report published by WHO, it was announced that the official name of the new disease was named "Coronavirus Disease 2019" and the abbreviation was named "Covid-19" [1]. As Covid-19 spread to many countries in a very short time and became a global epidemic, WHO declared the epidemic as a "pandemic" on March 11, 2020 and asked all countries to take serious measures [2,3].

In respiratory diseases such as Covid-19, the transmission rate of the disease is high, especially the personnel working in health institutions are more likely to be infected, and the highest risk has always been healthcare workers during pandemic periods. In addition, healthcare workers are exposed to the highest level of stress while fighting the disease on the front lines by risking their lives in all pandemics [4,5]. Among the factors that increase psychological strain in healthcare workers during pandemic periods; risk of contracting the virus, high case load, insufficient healthcare workers, long working hours, uncertainties in treatment, seeing colleagues caught the virus, losing the patients they care for, fear of infecting their families. After all, healthcare professionals are more concerned about being infected with Covid-19 than other individuals [6,7].

Symptoms of psychiatric diseases such as anxiety, depression, PTSD (Post-Traumatic Stress Disorder) are primarily involved in the psychosocial effects of pandemics. This outbreak is a distressing trauma that threatens the lives of individuals.In studies conducted on healthcare workers in China, the first country to fight Covid-19, symptoms of anxiety, depression, PTSD and burnout were observed in the majority of Covid-19 employees [8]. Studies conducted during the outbreak focused especially on healthcare professionals, and in fact, medical students were also affected by this extraordinary process [2,6].

***Corresponding Author:** Hilal Guzel, Afyonkarahisar Health Sciences University, Faculty of Medicine, Department of Anatomy, Afyonkarahisar, Turkey
E-mail: hilalgzl@hotmail.com

While it has been shown in different studies that medical education itself causes significant stress on students, witnessing this important task on the shoulders of healthcare professionals during the outbreak may have adversely affected future physician candidates [9]. Although it is known that a certain amount of stress stimuli affect some people positively; however, as the level of stress increases, anxiety increases as well [10]. Fear of getting sick, being alone at home and problems in education is a predictable process that can negatively affect students' mental health. The knowledge, attitude and behavior of medical students are important both to control the spread of the virus and to protect their mental health. In this context, our aim the present study is to measure medical students anxiety levels and the different variables affecting their anxiety during an extraordinary outbreak process.

Materials and Methods

A cross-sectional study was conducted on medical students in December 2020. Because of the social isolation, an online-based platform was used to distribute the survey developed by using the Google Forms.The target population comprised medical students of Afyonkarahisar Health Sciences University. We conducted our study about nine months after the Covid-19 case was encountered for the first time in Turkey. In combination with sociodemographic questions, we applied the Coronavirus Anxiety Scale (CAS) and the Beck Anxiety Inventory (BAI) tests to all students.

Coronavirus Anxiety Scale

In the study, a brief mental health scan, the CAS was used to identify possible cases of dysfunctional anxiety associated with the Covid-19 outbreak developed by Lee [11]. Turkish validity and reliability of the scale was made by Evren et al. [12]. CAS is a 5-point Likert type scale and consists of 5 questions and one dimension. (Scoring the scale: 0: Never, 1: Rare, less than a day or two, 2: a few days, 3: more than 7 days, 4: It has been carried out almost every day in the last two weeks).

Beck Anxiety Inventory

BAI is a test composed of 21 elective questions created by Aaron T. Beck. [13]. The test is considered to be an internationally validated tool used to measure anxiety severity in a person.Each item marked on the BAI has a score. The answers given to the questions are evaluated as: none, 0 points, mild 1 point, moderate 2 points and serious 3 points.The score obtained from the scale indicates the level of anxiety experienced by the individual. 0–7 points obtained from the scale are evaluated as minimal anxiety symptoms, 8–15 points as mild anxiety symptoms, 16–25 points as moderate anxiety symptoms, 26–63 points as severe anxiety symptoms.Turkish validity and reliability of the scale made by Ulusoy et al [14].

Medical students were invited and encouraged to participate in the survey by lecturers of the university.The online survey link was sent to the contact students of each class via email and whatsapp, then the link was sent to other students. The inclusion of the students was anonymous and voluntary. All questions on the survey were mandatory; therefore, there are no missing data in this study. In order to increase the reliability of the feedback, it was stated that it is not necessary to write names to the students who filled out the questionnaire. The possible effect of exam anxiety on students was also considered, and the questionnaire was conducted after the exam period was over.

Statistical Analysis

The Kolmogorov-Smirnov test was used to investigate whether the distribution of continuous numerical variables is distributed close to normal or not. Frequencies and percentages were used for continuous numerical variables, categorical variables were shown as number and (%) percentages. Mann Whitney U test and Kruskal-Wallis test were used to determine the significance of the difference in terms of continuous numerical variables in which sortable variables and parametric test statistic assumptions were not provided. Categorical variables were analyzed by Chi-Square test. Analysis of the data was done in IBM SPSS Statistics 20.0 (IBM Corporation, Armonk, NY, USA) package program. Results with $p < 0.05$ were considered statistically significant.

Ethical approval for the study was obtained from Afyonkarahisar Health Sciences University Clinical Research Ethics Committee with the protocol number 2011-KAEK-2 meeting number 2020-13.

Results

A total of 370 medical students participated in the survey. In this study 67.3 % (n = 249) of the participants were female and 32.7 % (n = 121) were male. 55.7 % (n = 206) of the participants were preclinical students, 44.4 % (n = 164) were clinical students.

The BAI scores were divided into four categories in terms of anxiety levels: minimal (0–7), mild (8-15), moderate (16-25), and severe (26-63). About 35.4 % of students had minimal anxiety, 28.9 % were as mild, 22.2 % were as moderate and 13.5 % were as severe anxiety during outbreak. There was a statistically significant difference in anxiety levels according to gender and grades. We found that the prevalence of severe anxiety was higher in female students than in male students. Compared to clinical stage, preclinical students had a higher anxiety level according to BAI scores. No significant association was established between anxiety levels and getting infected with Covid-19, infected family member. It is also important to note that students with high anxiety received more psychological treatment. As the anxiety level increased, the psychological support received by the students increased significantly (Table 1).

During this period, 15.9 % of the students stated that they smoked and 84.1 % did not smoke. There was a significant difference between smoking and anxiety levels according to BAI scores, and non-smokers had higher anxiety (Table 1).

Out of the total medical students suffering from Covid-19 related anxiety, females were more anxious than males. CAS scores of individuals infected with Covid-19 were found to be higher than those who did not. There was no significant association between CAS scores and infected family member and smoking (Table 2).

According to our findings, students in the early medical education showed higher anxiety and BAI and CAS scores was also higher among female medical students.When the anxiety levels were

Table 1. Comparison of different demographic data with anxiety levels according to BAI

Variables	BAI Anxiety Levels (N)						
	Total	Minimal	Mild	Moderate	Severe	df	P
Gender							
Female	249 (67.3 %)	67	78	63	41	3	*0.000
Male	121 (32.7 %)	64	29	19	9		
Grade							
Preclinic	206 (55.7 %)	68	53	46	39	3	*0.006
Clinic	164 (44.3 %)	63	54	36	11		
Do you smoke?							
Yes	59 (15.9 %)	25	6	19	9	3	*0.005
No	311 (84.1 %)	106	101	63	41		
Have you diagnosed with Covid-19?							
Yes	44 (11.9 %)	17	10	10	7	3	0.794
No	326 (88.1 %)	114	97	72	43		
Have your relatives or friends diagnosed with Covid-19?							
Yes	326 (88.1 %)	115	91	74	46	3	0.562
No	44 (11.9 %)	16	16	8	4		
Have you got psychological support because of Covid-19?							
Yes	13 (3.5 %)	0	2	5	6	3	*0.000
No	357 (96.5 %)	131	105	77	44		

Chi square ($\chi 2$) test of significance was used in order to compare of different demographic data with BAI anxiety levels. BAI (Beck Anxiety Inventory), df (degree of freedom).
*A value of $p < 0.05$ was considered statistically significant.

Table 2. Comparison of different demographic data with coronavirus anxiety scale scores

Variables	CAS Scores						
	Total	Mean	SD	Min	Max	Median	P
Gender							
Female	249 (67.3 %)	1.85	3.132	0	18	1.00	*0.000
Male	121 (32.7 %)	0.64	1.291	0	8	0.00	
Grade							
Preclinic	206 (55.7 %)	1.79	3.246	0	18	0.00	0.173
Clinic	164 (44.3 %)	1.02	1.817	0	15	0.00	
Do you smoke?							
Yes	59 (15.9 %)	0.98	1.916	0	9	0.00	0.116
No	311 (84.1 %)	1.54	2.853	0	18	0.00	
Have you diagnosed with Covid-19?							
Yes	44 (11.9 %)	2.43	3.967	0	18	1.00	*0.051
No	326 (88.1 %)	1.32	2.497	0	16	0.00	
Have your relatives or friends diagnosed with Covid-19?							
Yes	326 (88.1 %)	1.44	2.715	0	18	0.00	0.659
No	44 (11.9 %)	1.50	2.873	0	15	0.00	
Have you got psychological support because of Covid-19?							
Yes	13 (3.5 %)	1.25	2.450	1	14	7.00	*0.000
No	357 (96.5 %)	7.08	3.968	0	18	0.00	

Mann Whitney U test of significance was used in order to compare of different demographic data with CAS scores. SD (Standard Deviation), CAS (Coronavirus Anxiety Scale)
*A value of $p < 0.05$ was considered statistically significant.

evaluated according to the classes, anxiety levels decreased as the academic level progressed (Table 3). Being infected with Covid-19 was a determining factor for the development of anxiety among medical students based on CAS scores, although not according to BAI. As expected, we found a strong positive relation between anxiety levels according to BAI and CAS scores. Both BAI and CAS were complementary to each other in determining the level of anxiety (Table 4).

Table 3. Anxiety levels according to grades

	BAI Anxiety Levels (N)						
	Total	**Minimal**	**Mild**	**Moderate**	**Severe**	**df**	**P value**
1st Grade	42	13	12	7	10	15	0.049*
2nd Grade	84	30	24	15	15		
3rd Grade	80	25	17	24	14		
4th Grade	52	16	15	15	6		
5th Grade	81	34	31	13	3		
6th Grade	31	13	8	8	2		

Chi square ($\chi 2$) test of significance was used in order to compare of grades with BAI anxiety levels. df (degrees of freedom), BAI (Beck Anxiety Inventory), *A value of $p < 0.05$ was considered statistically significant.

Table 4. Comparison between CAS scores and BAI Anxiety Levels

	CAS Scores						
BAI Anxiety Level	**Total**	**Mean**	**SD**	**Min**	**Max**	**Median**	**P**
Minimal	131	0.48	1.025	0	6	0.00	0.000*
Mild	107	1.16	2.001	0	14	0.00	
Moderate	82	1.48	1.900	0	8	1.00	
Severe	50	4.58	5.103	0	18	2.50	

Kruskal-Wallis Test of significance was used in order to compare of CAS scores and BAI anxiety levels. SD (Standard Deviation), df (degree of freedom), BAI (Beck Anxiety Inventory), CAS (Coronavirus Anxiety Score).
*A value of $p < 0.05$ was considered statistically significant.

Discussion

The number of researches concerning the psychological effect of the pandemic increased to be published because of the current outbreak; yet, there were limited studies concerning the psychological effect of the pandemic on medical students. The knowledge, attitude and behavior of medical students can be crucial to protect their mental health. The main purpose of this study was to determine the anxiety levels of medical students during the Covid-19 outbreak. In addition, our aim is to evaluate how different variables affect medical students' anxiety levels. This study showed that the outbreak has impacted on anxiety levels among medical students in Turkey, with 13.5 % of them reporting severe anxiety levels. However, only 3.5 % of them received psychological support. As experienced in previous outbreaks, anxiety, post-traumatic stress symptoms, suicide attempt and depression are among the psychological effects of the pandemic [15–17]. Psychological reactions to traumatic effects will primarily be experienced at different levels in each individual, group or social class. Fear of being sick, uncertainty, thoughts that the illness will affect an individuals may cause intense anxiety [18].

The rate of transmission and spread of coronavirus is much faster than other viral infections. Great emphasis was placed on reducing this effect of the virus and providing treatment; however, determining the mental needs of healthcare workers affected by the pandemic has been somewhat neglected [19]. Healthcare professionals may experience difficult working conditions and suffer a high rate of infection, which may lead to a higher anxiety level than in the general population [20,21].

The Covid-19 outbreak has an unprecedented impact on medical students as well as everyone else [9]. Moreover, there are also studies showing that medical students have higher levels of anxiety compared to their peers [10]. The psychological effect of outbreaks on medical students is inevitable and these psychological consequences may continue for a long time after the outbreak ends. Therefore, further studies are needed to be conducted in the late stages of the current Covid-19 outbreak [3].

A significant relationship was found in the our study between gender and anxiety where more females than males experienced severe anxiety. Both BAI and CAS scores in medical students were found to be higher in female students than male. Before the outbreak, anxiety levels were higher in female, showing that the psychiatric impact during the Covid-19 outbreak may be greater on female [22,23]. In many studies conducted in different countries in the literature, it has been reported that the anxiety levels were higher in female during outbreak [24–26]. Female gender was reported as a one of the common risk factors for mental

health problems. Such findings may indicate males and females respond differently to Covid-19 outbreak related stress factors. High anxiety levels in female medical students in current study is not an unexpected finding.It is obvious that a significant gender difference in responses to the outbreak in terms of anxiety has been revealed by different studies from all around the world [1,9,27–29]. Conversely, there are also some studies reported that gender was not associated with anxiety levels of student [30–33].

Regarding year of study, preclinical students had a higher BAI scores than clinical students. As shown in other studies, medical students at later academic year had lower anxiety than those at earlier academic year [9,27]. In another study, it was observed that senior students working with Covid-19 patients were more comfortable with their anxiety than students who had never seen patients [28]. This can be explained that senior students have better knowledge of illness, medical skills and prevention measures, which may make them less concerned about Covid-19 infection. It should be noted that a higher level of knowledge of the Covid-19 could have a positive impact on the medical students' behavioral response to the outbreak, boosting a feeling of safeness [34]. Adequate knowledge of medical students about the current illness reduces their anxiety. In addition, clinical students working in the university hospital have the opportunity to come to work and socialize, even part-time, while pre-clinical students only take online classes. As they progress in their medical education, they are faced with higher levels of responsibility and higher levels of stress. While the clinical years are the years when many medical students faced patient death for the first time and dealt with the unpleasant situation, students seem to be accustomed to this situation [35].

Several studies show a positive relation between smoking and mental illness, on the other hand the literature remains uncertain regarding the direction of this association [36]. In our study, the anxiety levels of non-smoking students were found to be high. Contrary to this, there are studies showing that people with higher anxiety are more likely to smoke [27,37].

The presence of infected family member during the outbreak may increase anxiety. In this regard, when the anxiety levels of the students were evaluated according to the presence of relatives diagnosed with Covid-19, no significant association was found. Our finding is in line with a previous study conducted in 422 individuals in Turkey [38]. The results of this study indicated medical students' anxiety regarding the outbreak was not associated with whether a relative or an acquaintance was infected with Covid-19.

Being infected with Covid-19 was a determining factor for the development of anxiety among medical students based on CAS scores. Some studies revealed the same results with our findings [28]. As predicted, getting infected with Covid-19 has increased the level of anxiety.

Receiving psychological support is also associated with wellbeing and it can reduce the stress [6]. Previous research has shown that psychosocial stressors during Covid-19 have a low impact on individuals receiving psychological and social support [39]. Our study shows that the students are aware the importance of psychological support. As the anxiety level increased, the psychological support received by the students increased significantly.

BAI is a common and self-rating scale used to measure individual's subjective feelings about their anxiety [13]. CAS is a brief mental health screener to determine probable cases of dysfunctional anxiety associated with the Covid-19 outbreak [11]. In our study, the results of two different anxiety scales were found to be very close to each other.

Finally, some limitations of the current study should be mentioned. The main limitation of the present study is that anxiety levels were evaluated with self-reported scales (BAI and CAS) rather than clinical interviews. Therefore, prevalence rates may change. Secondly, the sample size was small as the study was conducted in only one medical school.

Conclusion

Our study revealed the anxiety levels of medical students and different variables that may be related to their anxiety level during outbreak in Turkey. The negative emotions experienced during this period may cause medical students to distance themselves from the medical profession. Hence, medical students should be provided with high quality and crisis-oriented psychological services against to unexpected worldwide crises like outbreaks. Determining the anxiety levels of medical students and offering possible solutions for this is of vital importance as a healthy workforce will be maintained future global outbreaks. Adequate knowledge of the current disease reduces the anxiety of medical students. For medical students, it is necessary to develop correct information, awareness and coping strategies in the current situation. This study highlights the need for training to help medical students cope better with crisis situations. Similar studies with larger samples should be conducted in the future to design and evaluate the effectiveness of psychological interventions.

Conflict of interests
The authors declare that they have no competing interests.

Financial Disclosure
All authors declare no financial support.

Ethical approval
Ethical approval for the study was obtained from Afyonkarahisar Health Sciences University Clinical Research Ethics Committee with the protocol number 2011-KAEK-2 meeting number 2020-13.

References

1. Yakar B, Ozturk Kaygusuz T, Pirincci E et al. Knowledge, attitude and anxiety of medical students about the current COVID-19 outbreak in Turkey. Fam Pract Palliat Care. 2020;5:36–44.
2. Kurt O, Oguzoncul AF. Levels of anxiety and depression related to COVID-19 among physicians: An online cross-sectional study from Turkey. Ann Clin Anal Med. 2020;11:S288–93.
3. Sogut S, Dolu I, Cangol E. The relationship between COVID-19 knowledge levels and anxiety states of midwifery students during the outbreak: A cross-sectional web-based survey. Perspect Psychiatr Care. 2021;57:246–52.
4. Nickell LA, Crighton EJ, Tracy CS et al. Psychosocial effects of SARS on hospital staff: Survey of a large tertiary care institution. CMAJ 2004;170:793–8.
5. Marjanovic Z, Greenglass ER, Coffey S. The relevance of psychosocial variables and working conditions in predicting nurses' coping strategies during the SARS crisis: An online questionnaire survey. Int J Nurs Stud. 2007;44:991–8.

6. Elbay RY, Kurtulmus A, Arpacioglu S et al. Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. Psychiatry Res. 2020;290:1–5.
7. Porten K, Faensen D, Krause G. SARS outbreak in Germany 2003: Workload of local health departments and their compliance in quarantine measures-implications for outbreak modeling and surge capacity? J Public Heal Manag Pract. 2006;12:242–7.
8. Guo YR, Cao QD, Hong ZS, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak- A n update on the status. Mil Med Res. 2020;7:11.
9. Xiao H, Shu W, Li M et al. Social distancing among medical students during the 2019 coronavirus disease pandemic in china: Disease awareness, anxiety disorder, depression, and behavioral activities. Int J Environ Res Public Health. 2020;17:1–13.
10. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med. 2006;81:354–73.
11. Lee SA. Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. Death Stud. 2020;44.
12. Evren C, Evren B, Dalbudak E et al. Measuring anxiety related to COVID-19: A Turkish validation study of the Coronavirus Anxiety Scale. Death Stud. 2020;0:1–7.
13. Beck AT, Epstein N, Brown G, et al. An inventory for measuring clinical anxiety: Psychometric properties. J Consult Clin Psychol. 1988;56:893–7.
14. Ulusoy M, Sahin NH, Erkmen H. Turkish version of the Beck Anxiety Inventory: Psychometric properties. J Cogn Psychother An Int Q 1998;12.
15. Lee SA, Mathis AA, Jobe MC et al. Clinically significant fear and anxiety of COVID-19: A psychometric examination of the Coronavirus Anxiety Scale. Psychiatry Res. 2020;290:113112.
16. Wheaton MG, Abramowitz JS, Berman NC et al. Psychological predictors of anxiety in response to the H1N1 (swine flu) pandemic. Cognit Ther Res. 2012;36:210–8.
17. Wu P, Fang Y, Guan Z et al. The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk. Can J Psychiatry. 2009;54:302–11.
18. Kaya B. Effects of pandemic on mental health. Klin Psikiyatr Derg 2020;23:123–4.
19. Xiang YT, Zhao YJ, Liu ZH et al. The COVID-19 outbreak and psychiatric hospitals in China: Managing challenges through mental health service reform. Int J Biol Sci. 2020;16:1741–4.
20. Sancak B, Ozer U, Kilic C et al. Covid-19-related anxiety levels in physicians : A preliminary study. Dusunen Adam J Psychiatry Neurol Sci. 2020;33:366–75.
21. Huang C, Wang Y, Li X et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020;395:497–506.
22. Bobevski I, Clarke DM, Meadows G. Health anxiety and its relationship to disability and service use: Findings from a large epidemiological survey. Psychosom Med. 2016;78:13–25.
23. Alexander JL, Dennerstein L, Kotz K et al. Women, anxiety and mood: a review of nomenclature, comorbidity and epidemiology. Expert Rev Neurother. 2007;7:S45-58.
24. Liu N, Zhang F, Wei C et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. Psychiatry Res. 2020;287.
25. Wang Y, Di Y, Ye J et al. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. Psychol Heal Med. 2021;26:13–22.
26. Ozdin S, Bayrak Ozdin S. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. Int J Soc Psychiatry. 2020;66:504–11.
27. Nguyen HT, Do BN, Pham KM et al. Fear of COVID-19 scale—associations of its scores with health literacy and health-related behaviors among medical students. Int J Environ Res Public Health. 2020;17:1–14.
28. Nakhostin-Ansari A, Sherafati A, Aghajani F et al. Depression and anxiety among iranian medical students during COVID-19 pandemic. Iran J Psychiatry. 2020;15:228–35.
29. Al-Rabiaah A, Temsah MH, Al-Eyadhy AA et al. Middle East Respiratory Syndrome-Corona Virus (MERS-CoV) associated stress among medical students at a university teaching hospital in Saudi Arabia. J Infect Public Health. 2020;13:687–91.
30. Cao W, Fang Z, Hou G et al. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Res. 2020;287:112934.
31. Tayefi B, Eftekhar M, Tayefi M et al. Prevalence and socio-demographic correlates of mental health problems among iranian health sciences students. Acad Psychiatry. 2020;44:73–7.
32. Akhtarul Islam M, Barna SD, Raihan H et al. Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. PLoS One. 2020;15:1–12.
33. Liu J, Zhu Q, Fan W et al. Online mental health survey in a medical college in China during the COVID-19 outbreak. Front Psychiatry 2020;11:1–6.
34. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 Pandemic. JAMA - J Am Med Assoc. 2020;323:2133–4.
35. Quek TTC, Tam WWS, Tran BX et al. The global prevalence of anxiety among medical students: A meta-analysis. Int J Environ Res Public Health . 2019;16:2735.
36. Fluharty M, Taylor AE, Grabski M et al. The association of cigarette smoking with depression and anxiety: A systematic review. Nicotine Tob Res. 2017;19:3-13.
37. Stubbs B, Veronese N, Vancampfort D et al. Perceived stress and smoking across 41 countries: A global perspective across Europe, Africa, Asia and the Americas. Sci Rep. 2017;7:7597.
38. Colgecen Y, Colgecen H. Covid- 19 pandemisine bagli yasanan kaygi duzeylerinin degerlendirilmesi : Türkiye ornegi.Turkish Stud. 2020;15:261–75.
39. Hossain M, Tasnim S, Sultana A et al. Epidemiology of mental health problems in COVID-19 : A review. F1000Res. 2020;9:636.