


The Psychological Effects of the COVID-19 on Students Who Choose the Medical Profession With Different Motivational Factors: A Cross-Sectional Study

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Abstract

The COVID-19 pandemic has generated mental and psychological health problems worldwide. The aim of this study was to determine whether the psychological effects of COVID-19 were different in medical students who chose the medical profession with different motivational factors. In the study, there were 389 medical school students. The survey asks about sociodemographic features and the students' reasons for choosing the medical profession. The study also included a self-assessed Hospital Anxiety-Depression Scale and Beck Hopelessness Scale. While 41% of students chose the medical profession for economic reasons, the ratio of whom have an extrinsic and intrinsic source of motivation was 37% and 22%, respectively. It was found that there was a statistically significant difference in the distribution of motivational factors by gender. Almost 50% of males were affected by economic motivation factors. The difference in motivational factors between genders was found to be statistically significant. Anxiety in females, depression in students with low-income families, and hopelessness in students older than 22 years and interns were higher than in the others ($P < .05$). Median scores for anxiety, depression, and hopelessness were higher for students with extrinsic motivational sources. However, only the difference in scores of anxiety and hopelessness was found statistically significant ($P < .05$). We found that the psychological effects of the COVID-19 pandemic varied according to both sociodemographic characteristics of the medical students and reasons for choosing medical profession. According to our results, the idealistic students interested in the medical profession, who want to support others and prioritize economic benefits, had fewer psychological issues than those who chose the medical profession due to family pressure or external factors.

Keywords

medical professions, career choice, motivation, psychological effect, medical students, COVID-19, cross-sectional studies

What do we already know about this topic?

The COVID-19 pandemic has caused mental health problems among the medical students.

How does your research contribute to the field?

The students who chose the medical profession with external motivations had more hopelessness and anxiety complaints during the COVID-19 pandemic in contrary the students with intrinsic motivations such as helping the patients scored lower for anxiety, depression, and hopelessness during the COVID-19 pandemic.

What are your research's implications toward theory, practice, or policy?

Students should be supported to make their choices in accordance with their ideals, goals and future expectations, and curricula in medical schools should be changed to enable students to learn coping strategies, problem solving skills and stress management.

Introduction

The World Health Organization (WHO)¹ on March 11, 2020, has declared the novel coronavirus (COVID-19) outbreak a global pandemic. Heavy control measures are needed because of the risk of causing severe clinical pictures and

the death of the disease, asymptomatic infectivity, and high spread rate. Apart from masks and social distancing, other measures have been taken, such as tourism restrictions, lockdowns, and closure of businesses and schools. It has been reported that fundamental changes in daily routine,



financial difficulties, and uncertainty over the future of the pandemic are causing stress and resulting in psychological problems.² A published literature review indicated that anxiety and depression symptoms (16%-28%) and self-reported stress (8%) are the common psychological problems caused by the COVID-19 pandemic.³

Psychological and mental health problems related to COVID-19 affect all segments of society, and those effects are observed among health workers. A review investigating the effects of epidemics on the mental health of frontline health workers states that psychological problems have emerged such as severe acute stress disorder, anxiety, fatigue, depression, and post-traumatic stress disorder both during and after epidemics.⁴ Similarly, it has been shown that psychological problems have increased significantly in many societies and especially in healthcare workers after several epidemics such as SARS, Middle East Respiratory Syndrome-Coronavirus (MERS-CoV), Ebola, and H1N1, which emerged worldwide in the past 25 years.⁴⁻⁷ It was stated that this increase in the mental health problems of health workers during epidemics was caused by factors such as reduction in the number of healthcare personnel, excessive workloads, extended working hours, and exposure to physical or verbal abuse.⁸ Studies have shown that mental health problems such as anxiety, depression, fatigue, and even suicidal ideation are more common in medical students than in other students of the same age.⁹ In addition to that, public health emergencies such as natural disasters and epidemics impact their mental health further.¹⁰⁻¹² Chandrate¹³ reported that medical students had difficulty in developing their professional identities due to the disruptions in medical education during the Covid-19 pandemic.

Even though it is a challenging profession that may cause mental and physical health problems, the medical profession is still one of the most popular choices for youth.¹⁴ The expectation is to hope that something will happen, it may not be realistic, and when it does not happen, it can cause disappointing. The expectation that occurs for a career is usually determined by the experience of the individual or society for that career. For example, the fact that doctors in this society are respected, their well-paid salaries and satisfied with their lives can lead to the desire of many young people to choose a medical career. Therefore, the reason for choosing medicine can reflect the expectations of students.¹⁵ Although the reasons why students prefer medicine can be classified in various ways, they can be summarized under 2 main headings as intrinsic and extrinsic motivation.¹⁶ According to previously conducted studies, while the intrinsic motivation

of the students for choosing a medical program includes altruism (desire to help others without the expectation of reciprocity), interest in science, biology, or medicine, the sources of extrinsic motivation are listed as follows: desire for wealth, having a prestigious profession, family pressure/expectations, and witnessing the illness or death of a loved family member.¹⁶⁻¹⁸ Understanding motivation is crucial as it influences the outcome of the education such as the students' determination while studying, their academic success, learning behavior, career satisfaction, and career selection. It is stated that students who are highly motivated intrinsically and extrinsically perform considerably better compared to students who lack motivation.¹⁹ Students must decide why they want to become a medical doctor and have strong motivation after enrolling in a medical school to increase their ability to withstand various challenges that await them and cope with psychological problems.²⁰ Negative sentiments and experiences are related to medical students' declining interest in the career, increased career regret, and higher dropout rates for medical schools, and these affect the academic and professional development of students.²¹

As mentioned above, sources of motivation and possible changes in motivation have been researched and discussed. Medical literature features studies on the psychological problems and risk factors medical students face during the COVID-19 pandemic. However, we could not find a study that addressed the relationship between the psychological effect of facing such an enormous public health emergency and the motivation of choosing the medical profession. This study aims to evaluate the psychological effects of the COVID-19 pandemic such as anxiety, depression, and hopelessness on the medical students who have chosen the medical profession because of different motivational factors.

Method

Study Participants

The target population of the study was medical school students of Ondokuz Mayıs University, 18th largest state university of Turkey. In 2020, there were 2187 medicine students registered at this university. We used the formula of " $n = Nt^2pq/d^2(N-1) + t^2pq$ " to determine the minimum number of samples. The minimum sample size was calculated as 272 ($t=1.96$, $d=0.05$, $N=2187$, and the anxiety prevalence rate = 28%¹²). Before filling out the self-reported questionnaires, all volunteers had signed the online consent forms. In total, 412 students participated in the survey; after

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excluding 23 students who did not complete the survey, data on 389 students remained for analysis.

Data Collection Procedure

Data were collected on May 15 to 30, 2020, approximately 2 months after the COVID-19 pandemic began to spread in Turkey. By the time the students participated in the survey, face-to-face education was halted throughout the country, and all schools had switched to online education. Only final year students (interns) continued their practical internships at the university hospital. The data were collected through the e-port access portal (<https://eport.tip.omu.edu.tr/>), which was created to enable distance learning for students. The survey was sent online with a cover letter informing the participants about the objectives of the study and providing a web link to the survey in SurveyMonkey (SurveyMonkey, San Mateo, CA, USA). The cover letter explained the research and emphasized that answering the questionnaire was optional.

Measurement

In addition to questions about sociodemographic characteristics and students' reasons for choosing the medical profession, the survey included a self-assessed Hospital Anxiety and Depression Scale and Beck Hopelessness Scale. The survey consisted of 34 questions and it took approximately 8 minutes to answer them.

Independent Variables

- *Sociodemographic Characteristics:* Age, gender, socioeconomic status, residential area before and after COVID-19 pandemic, self-reported economic status of the student's family, and scholarship status.
- *Motivation for Choosing Medicine as a Career:* The item on motivation for choosing the medical profession was adapted from similar studies.^{22,23} The item on career choice motivation inquired about the respondents' main reason for applying for medical school among 8 possible response options: 1-Interest in the profession, 2-Altruism (help those who suffer), 3-Possibility of career advancement, 4-Prestige, 5-Parents' wishes, 6-Guidance of relatives and friends, 7-Job guarantee, 8-High-income. These options were associated with 3 components of career choice motivation: intrinsic motivation factors (item 1-3), extrinsic motivation factors (item 4-6), and economic motivation factors (item 7-8).

Dependent Variables

1-Hospital Anxiety and Depression Scale. Hospital Anxiety and Depression Scale (HADS) is a self-report scale that

was developed by Zigmond and Snaith to measure anxiety and depression levels.²⁴ The scale consists of 14 questions, 7 for anxiety and 7 for depression. Depending on the answer, each question affects the score by 0 to 3 points. The lowest score for depression or anxiety is 0 while the highest one is 21. A validity and reliability study for Turkish has been undertaken by Aydemir et al Cronbach alpha coefficient for anxiety subscale was .85 and for depression subscale it was .77.²⁵

2-Beck Hopelessness Scale. Beck Hopelessness Scale (BHS) is used for rating an individual's negative point of view about the future. The scale has been developed by Beck et al²⁶ It consists of 20 true/false questions. Each answer adds 0 or 1 point to the score. The highest possible score is 20. A higher score means that the individual is more hopeless. The scale measures many aspects such as the individual's point of view toward the future (hopeful-pessimist), anticipations of the future, and the confidence in achieving the goals. A validity and reliability study for Turkish has been undertaken by Durak and Palabıyıkoglu Cronbach alfa coefficient for BHS was .71.²⁷

Statistical Analysis

All of the analyses were performed using SPSS Version 22.0 (SPSS Inc, Chicago, IL). Results are given as mean \pm standard deviation (SD), median (range), or proportion (%) as appropriate. The Kolmogorov Smirnov test was used to assess the suitability of the data for normal distribution. Comparisons of categorical variables were performed by Chi-square test or Fisher's Exact Test where applicable. The Student's *t*-test and the Mann-Whitney *U* test were used to compare the groups with normal and non-normal distribution data, respectively. Comparison between 3 groups of non-normally distributed for was assessed by the Kruskal-Wallis variance analysis, and if necessary, Bonferroni corrected Mann-Whitney *U* test was used for post-hoc comparisons. Statistical significance was set at $P < .05$ ($P < .016$ for Bonferroni correction).

Results

The mean age of the 389 students who participated in the study voluntarily was 22.2 ± 1.9 years, and 61.2% of them were female. While 11.6% of the participants were in the first year, 14.7% were final year students (interns). Although 30.6% of them were living with their families before the COVID-19 pandemic, that number raised to 88.8% after the closure of the universities and the transition to distance learning. According to their self-report, 53.0% of them had middle-income families and 47.3% of them were receiving scholarships for education. Some sociodemographic characteristics of the students are presented in Table 1. When the motivation sources of

Table 1. Sociodemographic Characteristics of Medical Students (n: 389).

Variables		n (%)
Age (year)	22.2 ± 1.9 (min: 18- max: 32)	
Gender	Male	151 (38.8)
	Female	238 (61.2)
Grade	1	45 (11.6)
	2	81 (20.8)
	3	68 (17.5)
	4	73 (18.8)
	5	65 (16.7)
	6	57 (14.7)
The residential area before the COVID-19 pandemic	Dormitory	117 (30.1)
	Home alone	73 (18.8)
	With friend at home	77 (19.8)
	With family/relative	119 (30.6)
	Other*	3 (0.7)
The residential area after the COVID-19 pandemic	Home alone	20 (5.1)
	With friends	18 (4.6)
	With family/relative	345 (88.8)
	Other*	6 (1.5)
The economic status of the family	Good	149 (38.3)
	Middle	206 (53.0)
	Poor	34 (8.7)
Scholarship status	Yes	184 (47.3)
	No	205 (52.7)

*Motel, hostel etc.

the participants to choose the medical profession were examined, it was determined that the students most often made career choices for economic reasons (41%), followed by external motivation factors with 37% and internal motivation factors with 22%. While intrinsic motivation factors were found to be effective for 27% of females and 14% of males to prefer medical school, economic factors affected 37% of females and 48% of males. The difference between motivational factors by gender was found to be statistically significant ($P = .007$). However, there was no significant difference between motivational factors by age group, social class, parents' education level, economic status of the family, and scholarship status ($P > .05$). The scores of the scales used to assess the psychological problems experienced by medical students during the COVID-19 pandemic are presented in Table 2. The mean of the scale results obtained by all students was 9.7 ± 4.5 for anxiety, 8.2 ± 4.0 for depression, and 7.4 ± 5.2 for hopelessness. Anxiety (HAD-A) score in females ($P < .001$); depression (HAD-D) score in students with low-income families ($P = .024$), hopelessness (BHS) score in students older than 22 years old and are intern ($P = .037$) were higher and statistically significant.

In Table 3, the scores of scales were compared according to the source of motivation for choosing the medical profession. It has been observed that median scores for anxiety, depression,

and hopelessness were higher for students with extrinsic motivational sources. However, only the anxiety and hopelessness scale scores were found different statistically ($P = .036$, and $P = .039$, respectively) (Table 3).

Discussion

We found differences in the psychological problems of medical students according to their motivation to choose the medical profession, in addition to their sociodemographic characteristics during the COVID-19 pandemic. Our results revealed that students whose extrinsic motivational factors affected their career choice experienced more anxiety and felt more hopeless during the COVID-19 pandemic.

Studies on both medical students and health workers have shown that the female gender is a risk factor for psychological effects of COVID-19 such as anxiety, depression, and hopelessness.^{4,11,28,29} In recent years, during the MERS-CoV epidemic, a higher prevalence of anxiety has been observed among female medical students.³⁰ Regardless of the COVID-19 pandemic, it has been observed in previous studies that gender has an effect on psychological problems and this has been associated with cognitive differences, psychosocial factors, or increased frequency of hormonal fluctuations in females compared to males.³¹⁻³³ However, there are also studies stating that gender causes no difference psychological effects on medical students.^{23,34} Therefore, there is no full consensus on the effect of gender. Further studies with different designs and a larger scope may help in determining the psychological effect of gender. We think that this subject is of great importance as females' interest in the medical profession is increasing. For females, medicine is the second most preferred healthcare profession worldwide, after nursing. In some medical schools, females make up 60% of the student body.^{20,35} This percentage is in line with the number of females in our sample and the target population of our study. On the other hand, according to our study, females tend to choose to be doctors for intrinsic reasons compared to males, though it is not certain if it is just a matter of "perception" or "reality." This situation may also be related to societal perception on gender. Compassion and caregiving have been associated with females since childhood. As a result, while in the past nursing was seen as the ideal profession for females, nowadays medicine has taken this role. Because of believing that they should pick professions with higher status, in recent years, more parents have been encouraging their daughters for higher education.³⁵ We considered that since females spend their formative years learning these kinds of associations, it is not certain whether their career choices are as a result of intrinsic motivation.

We found that the hopelessness score was higher in older students and the interns. Hope can be defined as a "feeling of security that stems from hoping" and shows the feeling of positive expectation toward the future. Thus, hope has a

Table 2. According to the Sociodemographic Characteristics the Psychological Impact of the COVID-19 on Medical Students.

Variables		Hospital Anxiety Scale	Hospital Depression Scale	Beck Hopelessness Scale
Age (year)	18-21	9.9 ± 4.4	8.0 ± 4.2	6.4 ± 4.9
	≥22	9.6 ± 4.6	8.4 ± 3.9	7.8 ± 5.4
	<i>p</i> *	.69	.28	.01
Gender	Male	8.7 ± 4.6	8.3 ± 4.1	7.6 ± 5.2
	Female	10.4 ± 4.3	8.2 ± 4.0	6.9 ± 5.3
	<i>p</i> *	<.001	.76	.12
Grade	1-3 (Basic)	10.2 ± 4.5	8.5 ± 4.0	6.9 ± 5.0
		10 (7-13)**	9 (5-12)**	6 (3-9)**
	4-5 (Intermediate)	9.0 ± 4.3	7.9 ± 4.0	7.2 ± 5.5
		9 (6-12)**	8 (5-11)**	6 (2-11)**
	6 (Internship)	9.9 ± 4.9	8.1 ± 4.1	8.7 ± 5.1
	9 (6-13)**	9 (5-11)**	8 (4-12)**	
	<i>p</i> **	.08	.44	.037
The residential area after the COVID-19 pandemic	Home alone	10.8 ± 3.8	10.1 ± 4.7	9.5 ± 5.7
		11 (8-14)**	11 (7-13)**	10 (4-14)**
	With friend at home	10.5 ± 5.4	7.7 ± 4.3	5.1 ± 4.2
		10 (7-15)**	7 (5-12)**	4 (2-7)**
	With family /relative	9.5 ± 4.5	8.1 ± 4.0	7.2 ± 5.2
	9 (6-13)**	8 (5-11)**	6 (3-10)**	
Other	14.1 ± 4.9	10.8 ± 2.7	8.8 ± 4.3	
	14 (10-19)**	11 (8-13)**	8 (4-12)**	
	<i>p</i> **	.066	.097	.055
The economic status of the family	Good	9.3 ± 4.6	7.8 ± 4.1	6.8 ± 5.1
		9 (6-13)**	8 (5-11)**	6 (3-10)**
	Middle	9.7 ± 4.4	8.2 ± 3.8	7.4 ± 5.2
		10 (6-13)**	8 (5-11)**	6 (4-11)**
Poor	11.6 ± 4.5	10.2 ± 4.6	8.9 ± 5.5	
	11 (8-16)**	10 (7-14)**	6 (4-11)**	
	<i>p</i> **	.057	.024	.101
Scholarship status	Yes	9.6 ± 4.2	8.2 ± 3.8	7.5 ± 5.2
	No	9.8 ± 4.8	8.3 ± 4.2	7.1 ± 5.3
	<i>p</i> *	.82	.95	.49

Note. Data are expressed as mean ± standard deviation and median (range). Statistical analyses performed: *Independent t-Test, **Kruskal-Wallis Test. *P* value <.05 is statistically significant.

A bold *P* value indicates a significant difference between groups.

Table 3. According to the Source of Motivation the Psychological Impact of the COVID-19 on Medical Students.

	Hospital Anxiety Scale	Hospital Depression Scale	Beck Hopelessness Scale
Intrinsic motivation factors (n:85) ^a	10 (7-12)	8 (5-11)	6 (3-9)
Extrinsic motivation factors (n:144) ^b	12 (7-14)	9 (6-12)	8 (4-12)
Economic motivation factors (n:160) ^c	9 (6-12)	8 (5-11)	6 (3-10)
<i>p</i> *	.036	.193	.039
	a-b < .05		a-b < .05
<i>p</i> **	a-c > .05		a-c > .05
	b-c < .05		b-c < .05

Note. Data are expressed as mean ± standard deviation and median (range). Statistical analyses performed: *Kruskal Wallis Test and **Bonferroni corrected Mann Whitney *U* test. *P* value <.05 is statistically significant. In pairwise comparisons, the group with bold letter is statistically different from the others.

^aIntrinsic motivation factors; ^bExtrinsic motivation factors; ^cEconomic motivation factors.

positive effect on mental health as it instills the idea that people can cope with negative experiences in the future. One of the major causes of hopelessness toward the future in university students is the possibility of unemployment. Unlike their peers in other faculties, interns are not expected to worry about future unemployment. Because they have to work in public health institutions for 1.5 years as a legal obligation immediately after graduating.³⁶ We believe that through their hands-on training at the hospital, the interns who participated in our study had a better understanding of the circumstances that healthcare workers face such as obligatory work in a high-risk environment during a pandemic, high workload, night shifts, and lack of sleep. Some fears and worries such as working in such an intense environment, having to diagnose and decide on treatment on their own, being professionally unqualified for unforeseen emergencies, etc. after graduation may have driven the students to hopelessness. Another study showed that interns who had experiences that harmed their trust and faith in the medical profession were more depressed and stressed.⁸ The scientific literature indicated that while doctors who contacted patients infected have the worst psychological results, receiving adequate education about the epidemic and being prepared, lessens the stress and anxiety.^{37,38}

We determined that 90% of students have started to live with their families during the COVID-19 epidemic. These students had lower scale scores compared to those living with friends or alone, however, the difference was not significant. Some studies suggest that living with parents and receiving social support help combat the psychological effects of COVID-19.^{39,40}

In line with other studies about university students, our findings showed that medical students with low-income families had higher scores for depression.^{12,39} Population-based studies showed the correlation between negative psychological outcomes and lockdowns set in place to combat recent SARS and MERS-CoV epidemics.^{7,41} This situation may have resulted due to the effects of lockdown on both social and economic lives. Socioeconomic issues of individuals are shown to be correlated with affective disorders, anxiety, depression, and even suicide.⁴² As our study showed that medical students frequently choose their profession for its income and job guarantee (41.0%), we can conclude that students have high economic expectations for their future. Almost half of the male students (48.0%) stated they have chosen medicine for economic reasons. This finding shows that male students prioritized potential earnings and job opportunities in the future.²⁰ The reason for this phenomenon may be societal expectations or male students' desire to provide a future assurance for their spouses and children.⁴³ A study on approximately 1500 students conducted by one of the largest public agencies in the United States showed that, due to COVID-19, the percentage of students who worry about finding employment has risen compared to previous years. The same study determined that 29% of university

students expect a lower income when they are 35 years old.⁴⁴ We may conclude that the pandemic had a significant effect on university students in different fields of studies' expectations about the situation in the labor market will be in after their graduation. Because, although Turkey has a huge young population, problems such as conflicts between the education system and the labor market, difficulties to establish new jobs, economic instability, and migration increases the youth unemployment figures.⁴⁵ The reason for the lower anxiety scores during the pandemic for students who prioritize income and job guarantees, may have been their beliefs that they have chosen the right profession to meet their expectations on job security and level of income. We are of the opinion that the importance of health service providers and especially of doctors has been understood and the need for health service has been solidified for every part of society during the pandemic.

About one-third of the students stated that they have chosen their profession due to parental pressure, the desire of their relatives and friends, or the perceived prestige of medicine. According to a study conducted on medical students, 59% of the students had been pressured to study medicine by their parents.⁴⁶ In another study, it has been shown the correlation between having relatives in the health sector and choosing to study medicine.⁴⁷ A similar study conducted in Spain reported that 70% of the students have chosen their profession due to extrinsic factors such as family, friends, teachers, and media.⁴⁸ Being informed about the profession, having the ability to care for sick relatives, and receiving good grades during high school may also have affected this choice. The medical profession is one of the most prestigious professions. While it does not have a clear definition, prestige is shaped by personal judgments and is defined as an important "lifestyle evaluation" affecting students.⁴⁹ Reasons such as being a prominent member of society, reaching challenging professional goals, being seen as a part of the elite, and believing that prestige brings power may be perceived as prestige by students. Different areas of specialization in the medical profession have different levels of prestige and this affects students' career choices. Medical students tend not to prefer to work in primary care as it is perceived to be less prestigious.⁴³ Our study showed that students who have chosen the medical profession due to extrinsic motivational factors such as prestige or guidance from parents, friends, and family members had higher scores for anxiety and hopelessness significantly. Similarly, Karaoglu and Seker showed that students who receive external pressure had higher levels of anxiety and depression compared to other students.²³

Medical literature indicates that conscientious medical students are at higher risk for mental health problems.^{50,51} However, in our study, students with intrinsic motivations such as helping the patients had lower scores for anxiety, depression, and hopelessness during the COVID-19 pandemic compared to those with extrinsic motivations. A study conducted on the effects of the COVID-19 pandemic on the

career choices of pediatric medical students reported that the pandemic had a positive effect on the students and that it reinforced their belief in medicine and pediatrics.²¹ The study suggested that despite the high occupational pressure and intensity of their work, they considered that becoming a doctor who saves lives is a great honor, and this attitude may be the reason for this positive outcome. Health professionals stated that during the COVID-19 pandemic they felt that they had to provide medical care for infected patients without adequate protection, and they can be considered to be “heroes.”⁵² We think that people who choose their profession due to intrinsic factors such as interest in medicine, ideals toward the future, and desire to help patients have suffered fewer psychological problems compared to others. The desire to help others is closely related to altruism. The correlation between a positive emotional state and helping others has been proven by various studies.⁵³⁻⁵⁶

Conclusions

As a result, this study showed that both sociodemographic factors such as age, gender, and economic status and sources of motivation that encouraged the students to choose the medical profession were factors that had psychological effects on medical students during the COVID-19 pandemic. We determined that the students who are idealistic, interested in the profession, and desired to help others or the students who prioritized job guarantee and economic benefits suffered fewer psychological problems compared to students who have chosen the medical profession due to family pressure and external reasons.

We believe that close attention should be given to students who are perceived to be in the risk group for the psychological effects of COVID-19. After the end of the COVID-19 pandemic and returning to old normal, we suggest that education personnel, in particular, those attendants in university and faculty management should elaborate on the possible preventive actions toward the medical students. Considering the rising of epidemics and pandemics, the medical curriculum should be expanded in a way that ensures the students not only gain the necessary skills to diagnose, treat these diseases and protect themselves, but also gain coping strategies, problem-solving, and stress management skills. These skills, which are necessary for career-long professionalism, and resilience, should be considered basic competence for medical school graduates. New education strategies can be developed to make sure that medical students can control their reactions, evaluate their problems and realize when they need help. Educators can become positive role models and share their experiences to help achieve this goal.

Lastly, it is important to block the act of parents and other external factors in an oppressive and controlling manner when it comes to students' career choices. We should support the students to make their choices in accordance with their ideals, goals, and future expectations. Being enthusiastic and

happy about the career path chosen is important for mental health. Also, we believe it will increase the level of social welfare and productivity.

Our study has some limitations. First, we used some psychometric scales for scoring the level of depression, anxiety, and hopelessness instead of clinically evaluation due to lockdown and limitations of finance. Second, data on previous histories of mental disorders or treatment were not collected in this study, so it largely remains unknown whether these symptoms are associated with the COVID-19 outbreak or whether they pre-existed. Third, we preferred to analyze motivational factors for career choices in 3 groups (intrinsic/extrinsic/economic). One should be careful during evaluation to avoid misunderstandings about other groupings (eg, internal/external). Fourth, the results of this study are limited to medical students and cannot be generalized to all university students. Fifth, due to its cross-sectional nature, this study does not allow causal inference, and further longitudinal studies are needed. Sixth, this study was performed in Turkey and the results may not apply to other countries with different schools of medical curricula.

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Author Contributions

OT proposed the topic and main idea. OT, HNA, and OM carried out the investigation and collected data. OT, and HNA wrote the initial draft. OT, HNA, OM, and CD commented on and revised the manuscript. OT, CD, and OM made the final version. All authors contributed to the final draft of the manuscript. The authors read and approved the final manuscript.

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Availability of Data and Materials

The datasets generated and/or analyzed during the current study are not publicly available due to this type of use not being included in the written consent form but are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

All the study procedures were approved by the Human Research Ethics Committee (OMUKAEK 2020/270) of Ondokuz Mayıs University and informed consent was obtained from all subjects.

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