

Impact of COVID-19 on psychological and academic performance of medical students in Saudi Arabia

Ahmad A Allah⁴, Nada E. Algethami², Rahma A. Algethami²,
Raghad H. ALAyyubi², Wahaj A. Altalhi³, Aymen A. Ahmed Atalla¹

¹Consultant, Department of Family Medicine, ²Medical Intern, ³Medical Student, Taif University, Kingdom of Saudi Arabia, ⁴Consultant Family Medicine & Diabetology, National Guard Primary Health Car, Taif, KSA

ABSTRACT

Background and Objectives: The COVID-19 pandemic affected the mental health and psychosocial conditions of everyone worldwide according to the WHO. Public health emergencies affect college students and are expressed as anxiety, worry, and fear. The aim of this study was to assess the impact of COVID-19 on the psychological health and performance of medical students. **Design and Settings:** A cross-sectional study using an online survey was done. **Participants and Methods:** Participants were 1591 Saudi medical students. A predesigned questionnaire included questions on demographic characters, GPA, having a relative got COVID-19, how to face sad news and stressors, and satisfaction with online lectures. The Generalized Anxiety Disorder (GAD-7) scale was used that included seven items asking about the degree the participant was bothered by feeling anxious in the last 2 weeks. **Results:** A total of 59.4% of students had various degrees of anxiety. Participant age, unsteady family income, high grade point average (GPA,) satisfaction with the online lectures, and being female were associated with higher GAD-7 scores. **Conclusion:** Mental health of medical students was significantly affected by the COVID-19 pandemic. Psychological support programs for medical students during the pandemic and provision of high-quality distance learning is essential for psychological well-being during the pandemic.

Keywords: Academic, COVID-19, impact, medical, performance, psychological

Introduction

The novel coronavirus (COVID-2019) is an outbreak. It is viral pneumonia of unknown etiology, which originated at the end of December 2019 in Wuhan, China.^[1-3] The pathogens of this illness were enveloped positive-stranded RNA viruses belonging to the coronavirus (CoV) family.^[4,5] It is a highly contagious disease with a long incubation period; it is transmitted by respiratory droplets.^[1,6] The main clinical manifestations of the disease are dry cough, dyspnea, fever (which occur in 99% of the affected persons), and patchy infiltration (bilateral upon imaging).^[6,7]

Address for correspondence: Dr. Wahaj A. Altalhi, Saudi Arabia -Taif, Alsadad Stress, Postal Code: 26514, Ta'if, KSA.
E-mail: wahaj_a@icloud.com

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Initially, there were no specific therapeutics or vaccines available; only supportive treatment was used.^[4,8] All countries implemented social distancing, quarantine, and isolation to reduce the chance of contact between infected and noninfected persons.^[9] Closure of the educational institutions was found to reduce the spread of the infectious disease in the community by breaking critical chains of transmission.^[10-12] During the COVID-19 pandemic, many universities worldwide postponed or canceled all university activities and changed the education format from face-to-face to online courses.^[13,14]

According to the World Health Organization (WHO) (2020), the COVID-19 pandemic can affect the mental health and psychosocial conditions of everyone.^[10] Moreover, outbreaks can cause undesirable effects on the psychological health of students, which results in unfavorable effects on learning.^[11,12]

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Similarly, some studies indicate that the psychological effects on college students by public health emergencies are expressed as anxiety, worry, and fear.^[13]

Strict measures of isolation and delays in the starting dates of studies at colleges affected the mental health of students.^[15] Quarantine increases the distance between people, which subsequently leads to the absence of interpersonal communication and affects student anxiety.^[14]

The Kingdom of Saudi Arabia (KSA) started introducing decisive social distancing before the first case of COVID-19 was established. These measures ranged from the suspension of religious and sporting mass gatherings, entertainment, and events (e.g., the temporary closure of Umrah, mosques, educational establishments, and postponing all unnecessary meetings) to imposing a curfew.^[10] A study was performed on students of the medical school of King Saud University in Riyadh in 2020 to investigate the impact of quarantine on the medical students' mental wellbeing and learning behavior. The above-mentioned study determined that medical students stated that quarantine caused them to feel emotionally detached from family, classmates, and friends and decrease their overall work and study performance. In addition, one-fourth of them felt disheartened during the quarantine period.^[16]

To our knowledge, there are no studies available yet that assess the effect of COVID-19 on the psychological health and performance of medical students in KSA. Therefore, this study aimed to assess the effect of COVID-19 on the psychological health and performance of medical students.

Methodology

This study was a cross-sectional study that used an online-based survey from 22 May to 22 Jun 2020. The target sample size of participating medical students was determined using the formula:

$$N = \frac{Z_{1-\frac{\alpha}{2}}^2 P(1-P)}{d^2}$$

In which, the estimated acceptable margin of error for proportion was 0.05, and 95% confidence level. So, the sample size was 379 students according to the formula. It increased according to the response of the participants to 1591 students. The inclusion criteria were all Saudi medical students who lived in Saudi Arabia, and the exclusion criteria were nonmedical students, nonSaudi medical students, Saudi medical students not living in Saudi Arabia. We used a predesigned questionnaire that had a first section containing items to collect data about the participants' demographic characters and their GPA in the 1st and 2nd semesters. The second section included items on having a relative or acquaintance got COVID-19, psychological questions such as how to face unwanted sad news, any of the related stressors, and their satisfaction with online lectures. The third section included the Generalized Anxiety Disorder (GAD-7) scale that was designed by Spitzer *et al.*^[17] It is a scale of seven

items that asks about the degree to which the participant was bothered by feeling anxious in the last 2 weeks. GAD7 is a patient health questionnaire (PHQ)-generalized anxiety disorder item that was validated previously in a Saudi study where the Arabic version of the PHQ was approved to be a valid and reliable measure to screen depression, anxiety, somatic, and panic disorders in a Saudi sample.^[18] Ethical approval was obtained from the Research and Ethics committee of Taif University (Application no: 41-00188. The data were analyzed using the (SPSS) version 25, where qualitative data were expressed as numbers and percentages. Quantitative data were expressed as mean and standard deviation (Mean \pm SD), where the Mann-Whitney (U) test and Kruskal Wallis tests were applied for nonparametric variables. Correlation analysis using Spearman's test was done, and a *P* value of <0.05 was considered as statistically significant.

Results

Table 1 shows that the mean age of the studied medical students was 23.36 \pm 4.01 years. Of them, 55.1% were males, 29.7% were from the Western region of KSA, and 60.5% were senior students in the 4th, 5th and 6th grades. Of the participants, 81.55% had a steady family income, and 77.2% lived with parents.

It was found that 31.6% of the students knew a relative or acquaintance who got COVID-19 [Figure 1]. When we assessed the behavior of the students, it was found that 49.3% of the participants faced unwanted bad news by thinking, 31.7% were worried about academic delays, and 57.1% thought that technology supports psychology [Table 2].

Table 3 shows that most of the students (59.6%) had a GPA of more than 3.5 in the 1st semester, compared to 62.3% in

Table 1: Distribution of the studied participants according to their characters

Variable	No. (%)
Age (mean \pm SD)	23.36 \pm 4.01
Gender	
Male	876 (55.1)
Female	715 (44.9)
Region	
Eastern	254 (16)
Western	472 (29.7)
Northern	248 (15.6)
Southern	259 (16.3)
Central	358 (22.5)
Educational level	
Junior (1 st -2 nd -3 rd)	628 (39.5)
Senior (4 th -5 th -6 th)	963 (60.5)
Do you have a steady family income?	
Yes	1296 (81.5)
No	295 (18.5)
Do you live with your parents?	
Yes	1228 (77.2)
No	363 (22.8)

Table 2: Distribution of the studied participants according to their behaviour

Variable	No. (%)
How do you face unwanted bad news?	
Crying	174 (10.9)
Carless	371 (23.3)
Thinking	785 (49.3)
Increase productivity	261 (16.4)
Do you have any of these related stressors?	
Worry about academic influences	440 (27.7)
Worry about academic delays	505 (31.7)
Influence on daily life	474 (29.8)
Social support	172 (10.8)
Is technology supporting psychology?	
Yes	908 (57.1)
No	683 (42.9)
Score of Generalized Anxiety Disorder Scale (GAD-7) (mean±SD)	5.66±4.16

The table represents how the participants face bad news, type of stressors, having psychiatric illness, and their opinion of technology supporting psychology

Table 3: Distribution of the studied participants according to their GPA and their satisfaction with online lectures

Variable	No. (%)
GPA in 1 st semester	
<3	118 (7.4)
3-3.5	525 (33)
>3.5	948 (59.6)
GPA in 2 nd semester	
<3	122 (7.7)
3-3.5	478 (30)
>3.5	991 (62.3)
Satisfaction about online lectures	
Not satisfied at all	417 (26.2)
Moderate	638 (40.1)
Satisfied	391 (24.6)
Very satisfied	145 (9.1)

the 2nd semester. According to their satisfaction with the online lectures, 40.1% had moderate satisfaction, and 26.2% were not satisfied at all. On the other hand, 24.6% and 9.1% were so satisfied and very satisfied, respectively. The anxiety level of the students showed that 40.2%, 16.7%, and 2.5%, had mild, moderate, and severe anxiety respectively [Figure 2].

Table 4 shows that a significant positive correlation was found between the participants' age and their GAD-7 scores ($r= 0.59$, $P = 0.01$). GAD-7 score was significantly higher among female students, inhabitants of the eastern region, and those with unsteady family income ($P<0.05$). However, a nonsignificant difference was found between the GAD scores and the participants' educational level or having a relative or acquaintance got COVID-19. Table 5 shows that the participants with a GPA score of (3–3.5) had a significantly higher GAD-7 score ($P<0.05$). The participants who were very satisfied with online lectures had a significantly higher level of GAD-7 scores (<0.001).

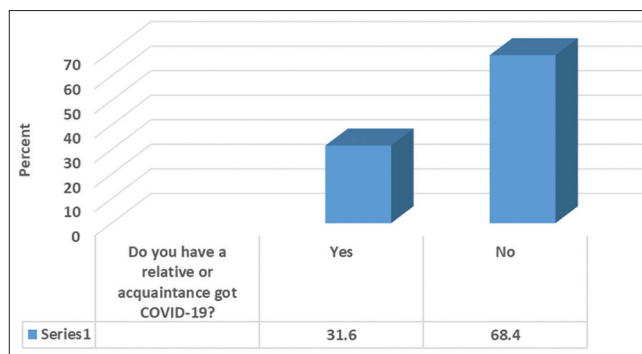


Figure 1: Percentage of participants who know a relative (s) or acquaintance (s) infected with COVID-19

Discussion

Health is a state of physical, mental, and social prosperity and not only the absence of illness.^[19] The COVID-19 outbreak has initiated a worldwide mental wellbeing emergency; simultaneously, it is a tremendous psycho-social experiment.^[20] The COVID-19 pandemic has caused stress and changes within the learning behaviors of medical students.^[16]

Globally, the prevalence of anxiety among medical students is higher than that among the general population, which globally ranges from 29.2% to 38.7% and is 17% in KSA.^[21] Medical students were determined to be more susceptible to academic stress owing to academic requirements.^[16,22,23] High stress among medical students impairs the learning ability that may eventually affect the quality of patient care they provide after graduation.^[24]

The main goal of this study was to assess the impact of COVID-19 on the psychological and academic performance of medical students. This survey indicated that 59.4% of the studied students had anxiety because of the COVID-19 pandemic. Of these students, 2.5% experienced severe anxiety, 16.7% experienced moderate anxiety, and 40.2% experienced mild anxiety. Recent studies have also reported a significant association between COVID-19 and anxiety level.^[21,25,26]

This study identified a significant positive correlation between the age of medical students and their GAD-7 scores. In contrast, other studies done on Brazilian students did not consider age as a predictor for psychological distress. The first study found that medical students will be affected more than intern students due to the health knowledge of the medical interns which was considered a protective factor. And in the second study, a nonsignificant difference was present between age and anxiety score.^[27] In this study, the female students had a significantly higher score of GAD compared to the males; this result has been confirmed by other studies.^[28] These studies demonstrate that women have a higher prevalence of anxiety among the general population as well as among medical students. However, a study done in China showed there is no difference between gender.^[29] This could be due to the frequent exposure of the Chinese people to natural disasters.^[30]

Table 4: Relationship between GAD-7 anxiety scores and the GPA of the participants

Variable	GAD score (mean±SD)	Test	P
Age (mean±SD)	---	0.05*	0.01
Gender			
Male	5.38±4.05	2.74**	0.006
female	6±4.27		
Region			
Eastern	7.36±3.84	4***	< 0.001
Western	5.08±4.34		
Northern	6.16±4.33		
Southern	4.22±3.62		
Central	5.91±3.9		
Educational level			
Junior (1 st -2 nd -3 rd)	5.74±4.02	0.92**	0.35
Senior (4 th -5 th -6 th)	5.61±4.26		
Do you have a steady family income?			
Yes	5.54±4.14	2.59**	0.009
No	6.2±4.24		
Do you live with your parents?			
Yes	5.35±4.08	5.67**	< 0.001
No	6.71±4.28		
Do you have a relative or acquaintance who got COVID-19?			
Yes	5.69±4.01	0.32**	0.74
No	5.64±4.23		

N.B.: * Spearman's correlation, **Mann-Whitney test, ***Kruskal Wallis Test, The table represents the relationship between GAD-7 anxiety scores and the GPA of the students in the 1st and 2nd semester and their and their satisfaction with online lectures

Table 5: Relationship between GAD-7 anxiety scores and the GPA of the participants including Kruskal Wallis test

Variable	GAD score (mean±SD)	Kruskal Wallis Test	P
GPA in 1 st semester			
<3	4.67±4.39	2	0.004
3-3.5	5.84±3.8		
>3.5	5.68±4.31		
GPA in 2 nd semester			
<3	4.77±4.84	2	0.004
3-3.5	5.94±3.84		
>3.5	5.63±4.34		
Satisfaction about online lectures			
Not satisfied at all	5.19±4.2	3	< 0.001
Moderate	5.55±4.08		
Satisfied	5.83±3.9		
Very satisfied	7.05±4.79		

-Relationship between GAD-7 anxiety scores and the GPA of the students in the 1st and 2nd semester and their and their satisfaction with online lectures

In the present study, the students who lived in the eastern region had more anxiety scores than others who lived in the western, northern, southern, and central regions. In our opinion, this might be because the first cases discovered in Saudi Arabia were in the eastern region, a matter that can affect anxiety scores.^[31] The stability of family income showed a significant correlation with anxiety scores during the COVID-19 crisis, because

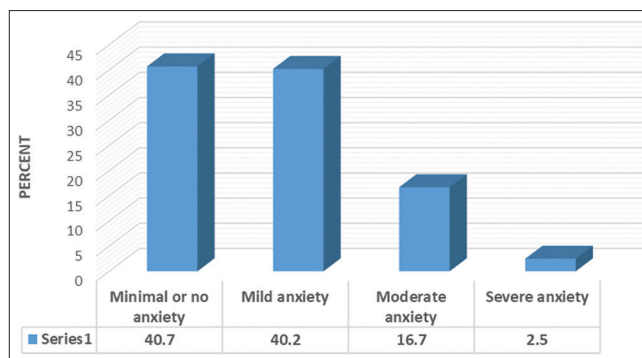


Figure 2: Anxiety level of the participants

students who did not have a steady family income had a higher GAD-7 scores compared to students who had a steady family income. A previous study showed that students who had higher income had less stress than students who had lower income because financial constraints could be a source of stress among students.^[24,25]

The results of this study identified a positive correlation between anxiety and a high GPA. In contrast to a previous study, there was a negative correlation between academic achievement and student stress, as when the level of stress increases, academic performance decreases.^[24] This can be explained by the considerable efforts exerted by the Arab ministries of higher education by proving e-learning teaching facilities and by starting various campaigns to promote distance learning/online classes.^[32]

Regarding the online lectures, 24.6% and 9.1% of the students were satisfied and very satisfied with them, respectively; 40.1% had moderate satisfaction, and 26.2% were not satisfied. A previous study revealed that in Arab countries, there was unreadiness and incompetence associated with pandemic e-learning that might compromise education. Staying home leads to problems such as pandemic-related stress, anxiety, depression, domestic violence, and preventing students and teachers from learning and teaching.^[32] Another study performed in Saudi Arabia determined that many students complained about coursework and described it as very difficult and not possible to be self-studied. In addition, they reported that many assignments were pending owing to the lack of study materials.^[33]

The pandemic of COVID-19 has had an impact on the psychological health of all university students (medical and nonmedical). One of the most crucial roles to enabling people to cope with their anxiety about the virus was the role of primary health care, which correct misperception in addition to the early diagnosis for its significance. As well as, it reduces their need for hospitalization in huge numbers. Which reflected positively to the country's response to the pandemic.

Limitations

This study had some limitations. Firstly, the study used a cross-sectional design, which usually cannot offer strong

affirmation for causality. Secondly, the authors were enforced to use an online survey in this pandemic and the lockdown circumstances and the commitment to the precautionary measures. Finally, one of the major restriction points is that we did not have a recorded baseline data about medical student's psychological health in our region. So, if we want to consider this study for the assessment of the accurate medical student situation, we must recognize other variables affecting their psychological health with consideration to the COVID-19 pandemic.

Conclusion

Of the studied medical students, 59.4% had anxiety during the COVID-19 pandemic. The age of the participant, unsteady family income, high GPA, satisfaction with the online lectures, and being female were associated with higher GAD-7 scores. So, the mental health of medical students was significantly affected by the pandemic. The study calls colleges, health authorities, and the ministry of education to establish psychological support programs for medical students during the pandemic. In addition, the collaboration between them to resolve this problem to provide a high quality of learning and psychological well-being during the timely crisis is suggested.

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Conflicts of interest

There are no conflicts of interest.

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