

## Anxiety and Psychological Stress during COVID-19 Pandemic among the Students of Faculty of Medicine, Suez Canal University, Egypt

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### Abstract:

**Background:** Outbreaks can impose considerable psychological stress that may lead to unpredictable negative outcomes on learning, performance, and overall psychological well-being. **Objectives:** This study aimed to investigate anxiety and psychological stress during the COVID-19 pandemic among the students of Faculty of Medicine, Suez Canal University, Egypt. **Methods:** A cross-sectional analytic descriptive design was used. About 381 medical students from Suez Canal University agreed to complete an anonymous online survey to collect demographic data, 7-item Generalized Anxiety Disorder questionnaire (GAD-7), and General Health Questionnaire-12 (GHQ-12) to assess anxiety and psychological stress, respectively. The survey was conducted during the summer of 2020. **Results:** Out of the study participants, 82.4% and 64% were screened positive for anxiety and psychological stress, respectively. The students in clinical years have a higher level of anxiety ( $P=0.017$ ) and stress ( $P=0.004$ ) compared to the students in pre-clinical years. **Conclusion:** COVID-19 has harmful psychological consequences on medical university students.

**Keywords:** Anxiety; Covid-19; Stress; Medical students.

### Introduction:

The World Health Organization (WHO) declared the novel coronavirus disease 2019 (COVID-19) as a global health emergency and pandemic in January 2020. This virus has led to dramatic harmful consequences on life style, family dynamics as well as physical, mental, and social health. This virus is unpredictable, causing stress, anxiety, fear, and depression in children and adults, especially healthcare providers.<sup>(1)</sup>


Most of the countries facing this pandemic have established obligatory preventive precautions to decrease viral infection spread including the closure of shopping malls, religious ceremonies, cinemas, sports venues, schools, universities, and staying at home to decrease the number of infections.<sup>(2)</sup> Since

then, many universities across the world have decided to shift most of their existing learning plans to online/e-learning courses. Medical faculties were not an exception as they also experienced this transition where activities were confined to distance and digital learning and clinical rotations were suspended.<sup>(3)</sup>

This transition from normal daily educational activities at university to staying at home along with curfews and social distance could affect students.<sup>(4)</sup> Therefore, medical students are living through exceptional hard times where their education is interrupted and they begin to experience stress, anxiety, and confusion.<sup>(5)</sup>

It has been established that outbreaks can impose considerable psychological

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stress that may lead to negative effects on learning and the overall psychological well-being of students.<sup>(6)</sup>

While the world has drawn global intensive attention to fighting this virus, taking care of people's mental health should not be ignored.<sup>(7)</sup> Therefore, this present study aims to examine anxiety and psychological stress among medical students facing the COVID-19 pandemic.

### **Methods:**

#### **Design, setting, and time of research:**

A cross-sectional, descriptive, and analytic design was used for the present study which was conducted at Suez Canal University in the summer of 2020.

#### **Study population:**

The study was conducted among Suez Canal University students in the summer of 2020 using the convenience sampling technique. We used [www.openepi.com](http://www.openepi.com) to calculate the sample size which resulted in 344 students, maintaining an expected frequency of 33.8% based on a research which estimated the global prevalence rate of anxiety among medical students to be 33.8%, while confidence interval was 95% and absolute precision was 5%.<sup>(8)</sup> The sample size extended to be 381 students.

#### **Inclusion and exclusion criteria:**

Medical undergraduate students (from both genders in Suez Canal University who

can submit the research were included. We excluded any student aged less than 18 years old.

#### **Tools of the study:**

The survey consisted of 2 sections. The first section is a consent form and the second section is divided into 3 parts; the first part contained sociodemographic data questions (age, gender, study year, smoking status, illicit drug use, presence of any chronic illness, and current contact with suspected COVID-19 patients), and the second part contained the generalized anxiety disorder scale (GAD-7).

This scale is a 7-question scale asking university medical students how often they felt each symptom such as feeling nervous, trouble relaxing, irritable, and afraid that something awful might happen during the last 2 weeks related to COVID-19.<sup>(9)</sup> "Not at all or never," "several or most days," "more than half the days," and "nearly every day" received scores of 0, 1, 2, and 3, respectively. A score of 10 or higher represents a reasonable cutoff point for identifying the cases of anxiety with sensitivity of 89% and specificity of 82%.

The questionnaires proved to be valid and reliable where the internal consistency represented by Cronbach  $\alpha$  was 0.92 and test-retest reliability represented by intra class correlation was 0.83. In our study, the GAD-7 score was tested for each

participant as well as the cut-off points for each level, respectively (0-4 minimal anxiety level, 5-9 mild anxiety level, 10-14 moderate anxiety level, and 15-21 severe anxiety level).<sup>(9)</sup>

Lastly, the third part included the General Health Questionnaire-12 (GHQ-12); a widely used questionnaire to assess mental health and measure stress. It works as a screening tool for many psychiatric disorders.<sup>(10)</sup> This scale consists of 12 items with 4 response options. The GHQ-12 has satisfactory reliability as well as good sensitivity and specificity. It was applied to different populations in different countries to study its reliability and validity, and to explore the mental disorders characteristics of the populations in previous studies. The scoring method in this study will be a binary scoring method (0, 0, 1, 1).

A previous study has considered participants who scored 4 or more as having significant distress.<sup>(11)</sup> A pilot study was conducted on 20 medical students who were not included in the study to assess the feasibility and reliability of the survey, with an acceptable Cronbach's  $\alpha$  of 0.7.

**Outcome variables:** Anxiety level, psychological stress.

#### **Data Collection:**

Data were collected using an online semi-structured questionnaire using Google

forms with a consent included. The consent form was approved by the Vice-dean of the Faculty of Medicine, Suez Canal University where the link of the survey was sent to students through faculty students' Facebook and WhatsApp groups.

#### **Data management:**

The Statistical Package for Social Sciences (SPSS V24.0) was used in statistical analysis. The Shapiro Wilk test checked the normality of data. Mean (standards deviation), frequencies, and percentages were used for descriptive data. Independent student t-test was used for comparisons. Pearson's correlation assessed the correlation between GAD-7 and GHQ-12 scores. P-value < 0.05 was considered statistically significant.

#### **Ethical considerations:**

The ethical committee of Faculty of Medicine, Suez Canal University approved the study (Code 4256#). After explaining the study purpose and rationale, all students signed written informed consent before participating in the study and without taking any monetary rewards.

#### **Results:**

The study included 381 subjects; the majority of them were females (59.1%). Age of the participants ranged from 18 to 28 years old, with mean of 20.5 years. Pre-clinical years' students fulfilled two thirds of the sample (n=262, 68.8%) and those

who had contact with suspected COVID cases were 49 (12.9%) Table 1.

In table 2, the mean anxiety score was 9.5, while the mean stress score was 15.4. A number of 136 students (35.7%) fell into mild anxiety in the previous 2 weeks, 112 (29.4%) fell into moderate anxiety, and 66 students (17.3%) had severe anxiety. Regarding psychological stress, about two-thirds of the students (n= 244, 64.0%) had more stress in the past 4 weeks.

The students in clinical years experienced more anxiety (P=0.017) and stress (P=0.004) compared to the students in pre-clinical study years and those in contact with suspected cases of COVID-19 have more stress (P=0.001) (Table 3). There is a significant moderate correlation between anxiety and stress scores among study participants ( $r= 0.566$  and  $P < 0.001$ ) (Table 4).

### Discussion:

This study has examined anxiety and psychological stress among medical university students during the COVID-19 pandemic. Psychological stress assessment using the GHQ-12 stress questionnaire reported that students experienced high levels of psychological stress (64%).

A recent study in Canada found that medical students are frequently subjected to psychological distress and burnout.<sup>(12-14)</sup> Furthermore, the evolution of the pandemic

was found to add more pressure on them, affecting their mental and psychological well-being.<sup>(15)</sup>

Interestingly, a British student published his experience in the midst of the pandemic, pointing out to his distress and suffer with sleep and interaction with others in addition to his worries and also the worries his medical peers.<sup>(7)</sup>

For the anxiety level, the GAD-7 score estimated a mean score of 9.5 where 35.7% of students were found to have mild anxiety levels, 29.4% and 17.3% of them had moderate and severe levels of anxiety, respectively. This result showed good congruence with a recent Brazilian study where the average GAD-7 score for anxiety was 9.18 among their medical students.<sup>(16)</sup>

However, this result is greater than that found among Chinese medical students by Liu et al. where 29.5% of the participants showed mild level of anxiety, 11.9% showed moderate levels, and only 2.2% showed severe ones.<sup>(17)</sup>

This variation may be attributed to the Chinese study's smaller sample size (217 participants) and the research timing as it was conducted shortly after the disease's emergence during the outbreak period when it was not yet a pandemic and the fear of the disease was not at its peak.

Regarding gender, it was found that it has a significant effect on anxiety and

stress. While Liu et al. and Cao et al. found no significant differences in anxiety prevalence between different genders in their studies among Chinese medical students<sup>(17,18)</sup>, other studies conducted among Brazilian and Vietnamese students found that females had a higher prevalence of anxiety than males.<sup>(16,19)</sup>

In contrast to gender, a significant difference in the prevalence of stress was found among those who had contact with suspected infection ( $P=0.001$ ) which could be attributed to the virus's highly contagious nature.<sup>(20)</sup>

Similarly, the differences in the prevalence of anxiety and stress were statistically significant ( $P=0.017$  and  $P=0.004$ , respectively) between preclinical and clinical years students where senior students were found to have a higher prevalence rate.

This may be linked to the fact that clinical students are in more contact with patients than pre-clinical ones which might impose more stress on them in addition to the uncertainty regarding their final exams and anticipated graduation. This finding is quite similar to the previous finding of Chandavarkar et al., who found that anxiety symptoms increase when the students move from pre-clinical to clinical years.<sup>(21)</sup> However, it is opposing to the results found among Turkish and Chinese students<sup>(5,17)</sup> as

differences were not significant regarding the anxiety prevalence between students in different years ( $P= 0.220$ ).

On studying the correlation between anxiety and stress, the study found that higher stress scores among medical students are associated with more anxiety. This is in agreement with previous literature which mentioned stress as a proposed factor for being depressed and anxious<sup>(22)</sup> and that the stressful environment impacted the mental health of medical students where anxiety prevails.<sup>(13)</sup>

#### **Study Limitations:**

The study involved students of only one university, so generalization of the results to all medical students cannot be done.

#### **Conclusions:**

The COVID-19 pandemic had a dramatic psychological impact among medical university students. The most affected groups with anxiety and stress were females, students in senior clinical years, and students in contact with suspected COVID-19 cases.

#### **Declaration:**

**Authors' Contributions:** All authors were equally contributing to this work.

**Competing interests:** All authors have no competing interests.

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**Table (1): Socio-demographic characteristics of the sample (No.= 381)**

Variable		No.	%
<b>Gender</b>	▪ Male	156	40.9
	▪ Female	225	59.1
<b>Age (years)</b>	▪ Mean± SD (Range)	20.5 ± 1.9 (18-28)	
<b>Faculty Year</b>	▪ Pre-clinical	262	68.8
	▪ Clinical	119	31.2
<b>Current contact with suspected COVID-19 patients</b>	▪ Yes	49	12.9
	▪ No	0.00	0.00



**Table (2): Generalized Anxiety Disorder (GAD-7) and Generalized Health Questionnaire (GHQ-12) among medical students (No.=381)**

Over the last 2 weeks, how often have you been bothered by the following problems	Minimal (Not at all) No. (%)	Mild (Several days) No. (%)	Moderate (More than half the days) No. (%)	Severe (Nearly every day) No. (%)
▪ Feeling nervous, anxious, or on edge	61 (16.0)	135 (35.4)	101 (26.5)	84 (22.0)
▪ Not being able to stop or control worrying	104 (27.3)	147 (38.6)	83 (21.8)	47 (12.3)
▪ Worrying too much about different things	67 (17.6)	139 (36.5)	100 (26.2)	75 (19.7)
▪ Trouble relaxing	89 (23.4)	145 (38.1)	96 (25.2)	51 (13.4)
▪ Being so restless that it is hard to sit still	136 (35.7)	118(31.0)	78(20.5)	49 (12.9)
▪ Becoming easily annoyed or irritable	80 (21.0)	128 (33.6)	90 (23.6)	83 (21.8)
▪ Feeling afraid as if something awful might happen	79 (20.7)	126 (33.1)	94 (24.7)	82 (21.5)
▪ <b>Total Anxiety level</b>	67(17.6)	136 (35.7)	112(29.4)	66 (17.3)
▪ <b>Total GAD 7 score (mean ± SD) (Range)</b>	9.5 ± 5.5 (0-21)			
▪ <b>Total GHQ-12 score (mean ± SD) (Range)</b>	4.7± 3.1 (0-12)			
▪ <b>Stress (according to GHQ-12)</b>				
▪ No	137 (36%)			
▪ Yes	244 (64%)			

**Table (3): Generalized Anxiety Disorder (GAD-7) and Generalized Health Questionnaire (GHQ-12) among medical students according to socio-demographic characteristics**

Variable		GAD-7 Mean (SD) Range (0-21)	t- test P- value	GHD-12 Mean (SD) Range (0-36)	t- test P- value
Gender	▪ Male	8.9 (5.3)	1.9	14.9 (6.6)	1.1
	▪ Female	10 (5.5)	0.05	15.7(6.2)	0.27
Faculty Year	▪ Pre-Clinical	9.1 (5.2)	2.4	14.7(6.1)	2.9
	▪ Clinical	10.5 (5.9)	0.017*	16.7 (6.7)	0.004*
Contact with suspected cases	▪ No	9.5 (5.3)	0.82	15.0 (6.2)	3.2
	▪ Yes	10.1 (6.2)	0.40	18.1 (6.9)	0.001*

\*statistically significant (P&lt;0.05)

**Table 4. Correlation between Generalized Anxiety Disorder (GAD-7) and Generalized Health Questionnaire (GHQ-12)**

Studied variables	GHQ-12
GAD-7	
R	0.566
P-value	<0.001**

Pearson's correlation \*statistically significant (P&lt;0.05)

## الملخص العربي

القلق والضغط النفسي أثناء جائحة كوفيد-19 بين طلاب كلية الطب – جامعة قناة السويس- في مصر

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**الخلفية:** الأوبئة تسبب ضغوطاً نفسية كبيرة قد تؤدي إلى نتائج سلبية غير متوقعة على التعلم والأداء الصحة النفسية بشكل عام. **الأهداف:** هدفت هذه الدراسة الى تقييم القلق المرتبط بكوفيد-19 والضغط النفسي لدى طلاب كليات الطب. **طرق البحث:** هذه الدراسة وصفية مقطعية ، وافق حوالي 381 على إكمال الاستطلاع عبر الإنترنت ، تم إجراؤه خلال صيف 2020. **النتائج:** كشفت درجة القلق العام أن 136 (35.7%) من الطلاب يعانون من قلق خفيف ، و 112 (29.4%) لديهم قلق متوسط ، بينما 66 (17.3%) لديهم قلق شديد. فيما يتعلق بالضغط النفسي ، يعاني حوالي ثلثي الطلاب 244 (64.0%) من ضغط نفسي أكبر في الأسابيع الأربعة الماضية. الطلاب في السنوات الاكلينيكية لديهم مستوى أعلى من القلق ( $P = 0.017$ ) والتوتر ( $P = 0.004$ ) مقارنة بالطلاب في السنوات الأكاديمية. علاوة على ذلك ، فإن الطلاب الذين هم على اتصال بحالة مشتبه فيها الإصابة بكوفيد-19 لديهم مستوى أعلى من الضغط النفسي ( $P = 0.001$ ). **الخلاصة والأستنتاجات:** وباء كوفيد-19 له عواقب نفسية ضارة على طلاب كلية الطب.