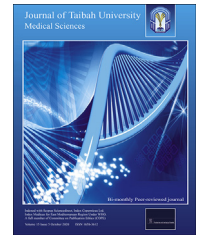




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Original Article

Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA



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المخلص

**أهداف البحث:** كوفيد-19 هو مرض فيروس كورونا المعدي المستجد الذي أصبح مؤخرًا جائحة. نظرًا لأن تفشي المرض يمكن أن يكون له عواقب على الصحة النفسية، فقد هدفت هذه الدراسة إلى استكشاف مستوى التوتر النفسي بين الطلبة أثناء تفشي مرض فيروس كورونا المستجد وتعليق التعليم التقليدي في المملكة العربية السعودية.

**طرق البحث:** أجريت هذه الدراسة المقطعية لعينة تتكون من 367 طالبًا وطالبة يعيشون في المملكة العربية السعودية، حيث تم تقييم الخصائص الاجتماعية والديموغرافية، والتوتر النفسي، والمشاعر والمخاوف أثناء تفشي المرض.

**النتائج:** غالبية المشاركين من الإناث (74.7%)، وفي المرحلة الدراسية الثانوية (79.8%). أظهر أكثر من نصف المشاركين مستويات توتر متوسطة (55%)، وأظهر 30.2% منهم توترًا مرتفعًا. كما ظهر ارتباط ملحوظ بارتفاع مستوى التوتر لدى الطالبات الإناث وطالبة المرحلة الجامعية.

**الاستنتاجات:** هناك مستويات عالية إلى معتدلة من التوتر النفسي لدى الطلبة في المملكة العربية السعودية أثناء فترة بداية فترة تفشي مرض فيروس كورونا مع ارتفاع خطورة التوتر عند الطالبات الإناث وعند طلبة المرحلة الجامعية. قد يكون من المفيد دمج الاستشارات عبر الإنترنت وبرامج إدارة التوتر مع عملية التعليم عن بُعد.

**الكلمات المفتاحية:** التوتر؛ الطلبة؛ مرض فيروس كورونا المستجد؛ جائحة؛ التعليم عن بُعد

Abstract

**Objectives:** COVID-19 is a newly discovered infectious Coronavirus that became pandemic. Since disease outbreaks can have mental health consequences, this study explored the perceived stress level among students during the Coronavirus Disease Outbreak and suspension of in-person teaching in Saudi Arabia.

**Methods:** A cross-sectional survey of a sample consisting of 367 students living in Saudi Arabia assessed socio-demographic characteristics, Perceived Stress Scale (PSS) and their emotions and concerns during the outbreak.

**Results:** Most participants were female (74.7%) and secondary school (79.8%) students. More than half of the participants showed moderate levels of stress (55%), while 30.2% registered high levels. Females and university students showed a significant association with stress level ( $p$ -value = 0.003 and 0.049, respectively).

**Conclusions:** There was a moderate to high level of stress among students in KSA at the start of the COVID-19 outbreak. This study found a significant correlation between a high level of stress and female university students. The integration of online counselling and stress management programs would help mitigate the stress of students during distance learning.

**Keywords:** COVID-19; Distance learning; Pandemic; Stress; Students

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## Introduction

The World Health Organization (WHO) defined *pandemic* as the spread of a certain disease worldwide or across international borders, affecting a large number of people.<sup>1</sup> COVID-19 is a newly discovered infectious coronavirus that spreads from one person to another through droplets.<sup>2</sup> The virus emerged in December 2019 and was first discovered in Wuhan, China. It was declared as a public health emergency of international concern in January 2020.<sup>1,2</sup>

Among other countries, KSA implemented strict precautions on its citizens in an attempt to control the spread. The country transferred its in-person educational system to virtual learning, closing public places of aggregation, invoking travel bans and curfews, and even suspending the Umrah pilgrimage.<sup>3,4</sup>

The literature on recent outbreaks, such as Ebola, the Severe Acute Respiratory Syndrome (SARS), and Middle Eastern Respiratory Syndrome (MERS), showed unique consequences of mental health burden during pandemics. Several factors were identified in the process of understanding how the public would respond during disease outbreaks, including disease course, media and misinformation, quarantine, neuropsychological sequelae of the infected individual, and the mental health burden among health care workers. During a quarantine, people face many consequences of physical and emotional social distancing, including isolation and future uncertainty. Degrees of isolation vary between individuals, ranging from physical (i.e., contact) or symbolic (i.e., separation from loved ones), and affect the human psyche.<sup>5</sup>

Previous studies showed that disease outbreaks impacted individual mental health and well-being. Multiple risk factors were addressed. It was found that women and those aged between 16 and 24 years exhibited a great risk of developing psychological distress.<sup>6</sup> Similarly, recent studies showed a positive response to feeling panicked, depressed, or emotionally disturbed during the H1N1 pandemic.<sup>7</sup> During the SARS outbreak, a population-based survey showed post-crisis mental distress.<sup>8</sup> Comparably, during MERS, the level of stress was high in medical students in KSA.<sup>9</sup> To our knowledge, there are currently no studies that have assessed stress among students during the quarantine related to the COVID-19 pandemic. Therefore, this study aimed to explore the perceived stress level among students due to the coronavirus disease outbreak and the resulting suspension of in-person teaching in KSA.

## Materials and Methods

### Study design

The data for this study were obtained using a cross-sectional survey, which was distributed from 18th until 28th of March 2020, during the coronavirus disease outbreak.

### Sample population

This study included both male and female Arabic speaking students, over 12 years old, living in KSA.

### Recruitment

An online survey was distributed using non-probability convenient sampling to students from different levels living in KSA. Google Forms was used to create a link for the survey, which was posted in an announcement on the Noon Academy platform; a reminder was sent five days later. Noon Academy is an online educational platform in the Middle East and North Africa (MENA), where users can study live with their facilitators and friends in an interactive and engaging manner. Six million students are registered on the platform, from seven countries: KSA, Kuwait, Jordan, Iraq, Oman, Egypt, and India.<sup>10</sup>

### Data collection

The online survey consisted of three components: 1) Socio-demographic characteristics that included age, gender, level of education, and region of residence. 2) Perceived Stress Scale (PSS) of Sheldon Cohen.<sup>11</sup> The scale consists of ten questions that are used to measure the perception of stress experienced by the participants over the past month. It includes a 5-point Likert scale that capture responses ranging from never (0) to very often.<sup>4</sup> Total mean scores of 0–13 are considered to be low stress, 14–26 indicate moderate stress, and 27–40 indicate high stress. The PSS is an easily and widely used tool with acceptable psychometric properties.<sup>12–14</sup> An Arabic-validated version was used.<sup>15</sup> 3) A qualitative exploratory question was also included: ‘Describe your emotions and concerns during the current outbreak’.

### Statistical analysis

A statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 23.0 software (SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as percentages. The Chi-square test was used to compare between perceived stress scales (low, moderate, and high perceived stress). Mann–Whitney U and Kruskal–Wallis tests were also used. When *p*-values were less than 0.05, the differences were considered statistically significant.

## Results

### Sociodemographic characteristics

A total of 367 students responded to the survey. The demographic characteristics of the surveyed population are presented in Table 1. The students had an average age of  $17.292 \pm 2.321$  years. Most responders were female (74.7%) and in secondary school (79.8%). The participants

**Table 1: Socio-demographic characteristics of participants (N = 367).**

	Low stress (n = 54)	Moderate stress (n = 202)	High stress (n = 111)	Total (n = 367)	P-value <sup>a</sup>
<b>Age groups</b>					
13 – 15 y	6 (10.7%)	26 (46.4%)	24 (42.9%)	56 (15.3%)	0.006 <sup>b</sup>
16 – 18 y	46 (17.6%)	150 (57.3%)	66 (25.2%)	262 (71.4%)	
>18 y	2 (4.1%)	26 (53.1%)	21 (42.9%)	49 (13.3%)	
<b>Gender</b>					
Female	36 (13.1%)	145 (52.9%)	93 (33.9%)	274 (74.7%)	0.022 <sup>b</sup>
Male	18 (19.4%)	57 (61.3%)	18 (19.4%)	93 (25.3%)	
<b>Educational levels</b>					
Intermediate school	7 (13.7%)	21 (41.2%)	23 (45.1%)	51 (13.9%)	0.024 <sup>b</sup>
Secondary school	47 (16%)	167 (57%)	79 (27%)	293 (79.8%)	
University	0 (0%)	14 (60.9%)	9 (39.1%)	23 (6.3%)	
<b>Regions</b>					
Southern	13 (17.1%)	38 (50.0%)	25 (32.9%)	76 (20.7%)	0.888
Eastern	8 (13.8%)	36 (62.1%)	14 (24.1%)	58 (15.8%)	
Northern	6 (19.4%)	15 (48.4%)	10 (32.3%)	31 (8.4%)	
Western	13 (15.5%)	46 (54.8%)	25 (29.8%)	84 (22.9%)	
Central	14 (11.9%)	67 (56.8%)	37 (31.4%)	118 (32.2%)	

<sup>a</sup> By Chi-square test.

<sup>b</sup> Significant p value <0.05.

were from the five regions of KSA: Central (32.2%), Western (22.9%), Southern (20.7%), Eastern (15.8%), and Northern (8.4%).

#### Perceived stress level

Table 2 displays the responses to the 10 items of the PSS provided by the participants. Through the month preceding

the survey, the following trends were observed: 58.1% of the students (fairly or very) often felt nervous and stressed; 58% were often angered due to things that happened outside of their control; 50.5% often felt that difficulties were piling up so high that they could not overcome them; 43% often found that they could not cope with all the things that they had to do; 42.2% often felt that they were unable to control the important things in their life; 34.9%

**Table 2: Responses to the perceived stress scale (N = 367).**

Perceived stress scale	Never	Almost never	Sometimes	Fairly often	Very often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	56 (15.3%)	64 (17.4%)	119 (32.4%)	67 (18.3%)	61 (16.6%)
2. In the last month, how often have you felt that you were unable to control the important things in your life?	65 (17.7%)	52 (14.2%)	95 (25.9%)	79 (21.5%)	76 (20.7%)
3. In the last month, how often have you felt nervous and stressed?	33 (9.0%)	41 (11.2%)	80 (21.8%)	96 (26.2%)	117 (31.9%)
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	30 (8.2%)	53 (14.4%)	103 (28.1%)	87 (23.7%)	94 (25.6%)
5. In the last month, how often have you felt that things were going your way?	80 (21.8%)	83 (22.6%)	107 (29.2%)	56 (15.3%)	41 (11.2%)
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	49 (13.4%)	66 (18.0%)	94 (25.6%)	87 (23.7%)	71 (19.3%)
7. In the last month, how often have you been able to control irritations in your life?	49 (13.4%)	88 (24.0%)	117 (31.9%)	65 (17.7%)	48 (13.1%)
8. In the last month, how often have you felt that you were on top of things?	75 (20.4%)	105 (28.6%)	93 (25.3%)	53 (14.4%)	41 (11.2%)
9. In the last month, how often have you been angered because of things that happened that were outside of your control?	32 (8.7%)	56 (15.3%)	66 (18.0%)	90 (24.5%)	123 (33.5%)
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	47 (12.8%)	63 (17.2%)	72 (19.6%)	89 (24.3%)	96 (26.2%)

**Table 3: Total scores of the perceived stress scale (N = 367).**

Perceived stress scale	Frequency (%)
Low stress (0–13)	54 (14.7%)
Moderate stress (14–26)	202 (55%)
High stress (27–40)	111 (30.2%)

were often upset because of something that happened unexpectedly. Conversely, 49.3% of the students often felt confident in their ability to handle personal problems, 30.8% often were able to control irritations in their lives, 26.5% often felt that things were going their way, and 25.6% often felt that they were on top of things. The mean value of the total PSS scores was  $22.12 \pm 7.33$ , with an absolute range of 1–38, median of 23, and inter-quartile range of 17–27. The cut off limits for the 25th, 50th, and 75th percentiles were 17, 23, and 27, respectively. In general, 55% of the students had moderate stress, and 30.2% had high stress (Table 3). As shown in Table 1, there were significant associations between the level of stress and three sociodemographic variables: gender, age, and educational level. Females had a significantly higher mean score of perceived stress level compared to males (22.75 versus 20.27;  $p$ -value = 0.003). However, more than half of them (52.9%) had moderate levels of stress, whereas 33.9% had high stress levels. University students had a significantly higher mean score of perceived stress compared to intermediate and secondary school students (25.30 versus 22.98 and 21.72, respectively;  $p$ -value = 0.049). However, more than half of them had moderate levels of stress (60.9%), whereas 39.1% had high stress levels.

#### *Exploring students' emotions and concerns*

The qualitative exploratory question regarding the emotions and concerns of the participants showed diversity. Students reported feeling depressed, stressed, anxious, fearful, angry, and unmotivated. Difficulties related to studying, problem solving, and time management were also reported. Secondary school students who were aiming for high scores to secure admissions in universities were worried about their grades and their future. One student reported that she was diagnosed with anxiety and was currently taking an antidepressant for her symptoms, which helped her feel that she was able to control things, although she believed that she might panic in a given situation.

#### **Discussion**

This study is the first to explore the level of perceived stress during the COVID-19 outbreak in KSA. Students were included from all five regions of the country and various educational levels of both secondary and tertiary education. The mean score of the perceived stress scale in this study was  $22.12 \pm 7.33$ , and a high-moderate perceived stress was endorsed by 30.2–55% of the participating students. These scores are comparable to other national and international studies that were conducted in KSA,<sup>16–18</sup> India,<sup>19,20</sup> Iran,<sup>21</sup> and Malaysia.<sup>22</sup> However, these studies were conducted among students from competitive specialties, such as

medicine and dentistry. The result is not surprising as, at the time of conducting the survey, the total number of confirmed cases of COVID-19 in KSA reached 900, with two coronavirus-related-deaths. The curfew measures have been extended in terms of the total amount of hours, and a prohibition was placed on both entering and exiting Riyadh, Makkah, and Almadinah Almunawwarah.<sup>23</sup>

Furthermore, three items on the 5-point Likert scale of perceived stress (in Table 2) were endorsed by more than half of the sample, which are often (fairly or very) felt nervous, stressed, and angered and unable to overcome piled up difficulties. Similar results were recently found in other studies, which evaluated the mental health of university students during COVID-19 in China<sup>24</sup> and Spain<sup>25</sup> and reported anxiety, stress, and depression. These psychological responses are more likely to occur and worsen due to the lack of interpersonal communication during the social distancing.<sup>26,27</sup> In addition, distance learning was also found to be associated with stress, which is due to academic, financial, and social difficulties.<sup>28</sup> Coping with the online mode might become a challenge for students. This includes students' ability to deal with technology, sufficient home resources facilitating online learning, or stable internet connection.<sup>29</sup>

Previous studies regarding mental health during the pandemic have studied general populations in other regions of the world.<sup>30–32</sup> The outbreak of the virus and the implementation of sudden control measures may cause excessive fear and social isolation, while the lack of infectious disease knowledge can foster widespread panic.<sup>30</sup> The novelty of the virus itself and the unpredictability and uncertainty of when the situation will be entirely controlled has put people under excessive stress, especially when social face-to-face interactions are lost.<sup>31</sup> Patients infected by the virus or who are suspected to have contracted the illness experience the fear of its potential fatality.<sup>32</sup>

In our study, university students scored significantly higher in terms of levels of stress compared to students from intermediate and secondary schools. This is most likely because university students are emerging adults who pursue identity exploration, work toward independence, and have different roles to fulfil.<sup>33</sup> Other sources of stress include the frequency of and performance on examinations, broad curriculums, parental pressure, loneliness, and worrying about the future.<sup>34</sup> Finally, female students reported significantly higher levels of stress, which may be due to female participants representing the majority of the sample. However, similar results were reported in previous related surveys.<sup>18,19,21,34</sup> High levels of stress among females have been attributed to various factors, including hormonal changes and expression of emotions and thoughts regarding their social situation.<sup>35,36</sup>

#### **Limitations**

Although our study represents the first survey of stress levels during the COVID-19 outbreak in KSA, we acknowledge several limitations. One of them is a convenient sample using an online platform, which limits the generalisability of the results. Another possible limitation is reporting bias, as the study depends on self-reported

information that may be affected by participants' interpretation of the items or their tendency to report their emotions in a certain manner. Finally, the cross-sectional design precludes the ability to make causal conclusions.

### Conclusions

This study showed high to moderate levels of stress among students in KSA during the COVID-19 outbreak. This is most likely due to the mandatory curfew and distance learning. Female and university students showed a higher level of stress. Online stress management programs are recommended to improve stress and coping strategies, as well as prevent further psychological consequences. Further studies are necessary to conduct longitudinal assessments of psychiatric disorders, such as depression and anxiety, to produce evidence-based mental health interventions during crises. Furthermore, as this is the first survey on the psychological impact of COVID-19 on Saudi students, these results could be used as a baseline to investigate the stressors and the extent of their impact.

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### Conflict of interest

The author have no conflict of interest to declare.

### Ethical approval

Ethical approval was obtained from the Institutional Review Board at Princess Nourah bint Abdulrahman University (PNU) in Riyadh, KSA. Informed consent was obtained from the participants after the aims of the study were explained.

### Authors contributions

DAA conceptualised and designed the study. DDA, SAA, and DHA drafted the questionnaire. DAA and SAA analysed and interpreted the data. DAA, SAA, and DHA wrote the manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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