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RESEARCH ARTICLE

The Psychological Impact of COVID-19 Pandemic on the Students of Saudi Arabia

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Abstract:

Background:

Since the beginning of the coronavirus disease 2019 (COVID-19) pandemic, the numbers of cases and deaths worldwide have begun to increase, the closure of schools, universities, shops, workplaces, and the vast degree of precautionary actions, have left students feeling helpless, isolated, bored, and uncertain of what would happen to their academic advancement. Our study aims to assess the degree of the psychological impact of the COVID-19 pandemic on students in Saudi Arabia.

Methods:

During the early days of the pandemic, the survey sample was based on non-probability sampling. We conducted an online-based survey using a snowball sample technique. The survey collected data on several aspects of the participants, including the psychological impact of COVID-19, using the Impact of Event Scale-Revised (IES-R) and the Depression, Anxiety and Stress Scale (DASS-21). The current study shows an extensive analysis of the survey with a focus on the impact of the pandemic on students.

Results:

A total of 336 students were recruited for the study and responded to the survey. The IES-R showed that 7.1% and 23.8% of the students experienced moderate and severe symptoms, respectively. On the DASS stress subscale, 13.4% and 10.7% of students experienced severe and extremely severe stress symptoms, respectively. With regards to anxiety, 6.0% and 15.8% of students experienced severe and extremely severe symptoms, respectively. As much as 11.6% and 17.6% of the students experienced severe and extremely severe symptoms of depression, respectively. Females were more likely to experience symptoms of Post-traumatic Stress Disorder (PTSD), stress, anxiety, and depression. Having a family member working in the field of health/medicine was significantly associated with depression; poor to average health and previous diagnosis of a psychiatric disorder was associated with a higher chance of developing PTSD, stress, anxiety, and depression.

Conclusion:

During the early days of the pandemic, nearly one-fourth of students experienced moderate to severe symptoms of PTSD. Our findings could help guide schools and universities in implementing a clear, effective strategy for students to navigate the coming academic year and expand the efforts made on academic and psychological counseling, especially for the vulnerable populations.

Keywords: COVID-19, Stress, Pandemic, Depression, Students, Anxiety, IES, Saudi Arabia.

Article History

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1. INTRODUCTION

Since the beginning of 2020, we have faced the worldwide spread of coronavirus disease 2019 (COVID-19). The numbers of cases and deaths from COVID-19 are increasing everywhere, and the closure of schools, universities, shops, workplaces,

and the vast degree of precautionary action have left students feeling helpless, isolated, bored, and unsure of what would happen to their academic advancement.

On March 9, 2020, the Saudi Ministry of Education closed all schools and universities nationwide in response to increased concern about the spread of COVID-19, and all educational activities were shifted to online platforms. Ten days later, quarantine was imposed on the whole country [1].

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The mental health of students has been an area of interest. Combined with the vulnerability of their age groups, the disruption of the current pandemic on their studies could have long-term consequences in their lives.

Previous studies have reported the degree of the psychological impact this pandemic has had on the general population. Alkhamees et al. reported that 23.6% of people experienced moderate or severe psychological impact and that 28.3%, 24%, and 22.3% of people experienced moderate to severe depressive, anxiety, and stress symptoms, respectively [2].

A previous study conducted among university students in Bangladesh during the pandemic reported that 69.31% of students reported mild to severe level of psychological impact caused by the outbreak [3]. Also, other studies carried out in China and Greece during the current pandemic have reported that students are at higher risk of developing depression and suicidality in relation to the COVID-19 outbreak [4, 5]. Most of the studies were either related to the general population or medical students, with only very limited studies involving the general student population.

As far as we know, no previous research has investigated the degree of the psychological impact this pandemic has had on students in Saudi Arabia. Thus, the study objective is to evaluate the psychological impact of the COVID-19 pandemic on students in Saudi Arabia.

2. MATERIALS AND METHODS

2.1. Design, Setting, and Procedure

The study shows further analysis of a cross-sectional study as part of a larger survey conducted to assess the psychological effect on the general population during the early phase of the COVID19 pandemic in Saudi Arabia [2]. This study shows an extensive analysis of that study with a focus on the impact on students; adult (>18 years old) were included as the earlier study included adult only, individual who identified themselves as a student were included in the analysis, whether they are attending morning or night school, academic level of the sampled students ranges from primary to Ph.D., during early phases of the pandemic. The survey sample was collected based on non-probability sampling, which was available on commonly used social media platforms, including Twitter and WhatsApp. The responses were collected using the online google survey (Google LLC, Mountain View, California, USA). This analysis includes 336 students who were sampled in the original study. The survey was conducted for a period of four days (April 2–5 April 2020). The study protocol was approved by the health researches ethical committee of Qassim University (No.19–08-01)

2.2. Study Instruments

The data collection tool used during the survey was adapted from a previous study carried out in several Chinese cities [6]. The self-administered survey covered many aspects related to respondents' sociodemographics including, age, gender, marital status, number of children, residential location in the past 14 days, whether the respondent or a family member

is a health care worker, family income, housing type, and number of individuals in the house. Self-reported health status, reported chronic medical or psychiatric disorders were covered in the study tool. In addition, it included items on health services use in the last 14 days, including visiting a hospital, admission in a hospital, being quarantined or tested for COVID-19, and if the respondent or his/her relatives was diagnosed with COVID19. Furthermore, aspects related to concerns in response to COVID-19, including perceived susceptibility and severity of SARS-CoV-2 and opinion regarding a statement stating that "there was too much concern regarding COVID-19," were included. It also covered the history of contacting COVID-19 cases through contaminated surfaces and respondents

were asked to pick the symptoms they have suffered during the last 14 days from a list of physical symptoms that might be related to COVID-19.

To assess the psychological impact of COVID-19, the Impact of Event Scale-Revised (IES-R) and Depression, Anxiety, and Stress Scale (DASS-21) were used. The Arabic versions of IES-R and DASS have been validated and used in previous studies. The IES-R aims to assess the past week experience of posttraumatic stress disorder PTSD symptoms after a traumatic event, while DASS was used to assess mental health status.

Scoring for scales was done as follows: The IES-R total score was divided into normal(0–23), mild (24–32), moderate (33–36), and severe (> 37) psychological impact of an event. The cut-off score for IES-R was >32(2). While for DASS subscales; depression, anxiety, and stress, each one of them included seven questions, and responses were graded as "did not apply to me"(0) and "applied to me most of the time"(3). The DASS subscales grading for depression was(0–9) for normal, (10–12) for mild, (13–20) for moderate, (21–27) for severe, and (28–42) for an extremely severe form of the disease. Scoring for anxiety subscale was 0-6, 7-9, 10-14, 15-19, and 20-42 for the normal, mild, moderate, severe, and extremely severe form of the disease, respectively. For stress, it was categorized as 0-10, 11-18, 19-26, 27-34, and 35-42 for normal, mild, moderate, severe, and extremely severe disease, respectively. Cut-off scores for DASS: stress (score >18), anxiety (score >9), and depression (score >13) were considered as a moderate or more severe form of the disease [7, 10]. Further details on the study instrument are described elsewhere [2]

2.3. Statistical Analysis

After data processing and sorting, descriptive and analytical analyses were done. Descriptive analysis was done for the various groups of variables such as sociodemographic, health status, health service utilization, and symptoms/contact history, and the results were presented in tables. Univariate statistics was also carried out to assess the presence and magnitude of associations between each factor, including sociodemographic, self-reported health status, health services use, symptoms/contact history variables, and PTSD, stress, anxiety, and depression. The bulk of the univariate analyses consisted of chi-square with Fischer's exact test conducted where relevant.

Table 1. Participants’ performance on the revised impact of event scale (IES-R), and the three subscales of the Depression, Anxiety and Stress Scale - 21 Items (DASS-21).

	IES-R	Stress*	Anxiety*	Depression*
Score, Mean ± SD	23.4 ± 16.3	14.4± 12.5	8.2 ± 9.5	14.1 ± 12.3
Categories, N (%)				
Normal	182 (54.2%)	199 (59.2%)	201 (59.8%)	147 (43.8%)
Mild	50 (14.9%)	24 (7.1%)	19 (5.7%)	44 (13.1%)
Moderate	24 (7.1%)	32 (9.5%)	43 (12.8%)	47 (14.0%)
Severe	80 (23.8%)	45 (13.4%)	20 (6.0%)	39 (11.6%)
Extremely severe	NA	36 (10.7%)	53 (15.8%)	59 (17.6%)

*subscales of the DASS

Based on the results of univariate analyses, variables with $p < 0.25$ were selected, and logistic regression models were drawn for each of PTSD, stress, anxiety, and depression to determine the main predictors of each. Statistical analysis was conducted using IBM SPSS Statistics, version 22.0 for Windows (IBM Corporation, Armonk, New York, USA).

3. RESULTS

3.1. Psychological Impacts of the Coronavirus Disease

As presented in Table 1, a large proportion of the students experienced symptoms of PTSD, stress, anxiety, and depression, respectively. Using the IES-R, 14.9% of the total population had mild symptoms of PTSD, with 7.1% and 23.8% experiencing moderate and severe symptoms, respectively. On the DASS-stress subscale, increased proportions of the students had mild (7.1%), moderate (9.5%), and severe (13.4%) symptoms, respectively. Another 10.7% experienced extremely severe stress. With regards to anxiety, the proportion of students experiencing mild, moderate, severe, and extremely severe symptoms were 5.7%, 12.8%, 6.0%, and 15.8%, respectively. As much as 13.1% of the students experienced

mild depression, and 14.0% had moderate symptoms of depression. Severe and extremely severe symptoms were experienced by 11.6% and 17.6%, respectively.

3.2. Sociodemographic Characteristics and Impact of COVID-19 Pandemic on the Psychological Responses

The total population of students was split into males (31.0%) and females (69.0%, Table 2). The majority were in the 18-30 years category (97.6%), with only a few older students (2.4%). A total of 67.9% were undergoing training for a bachelor’s degree, with another sizeable proportion with only a high school education (26.8%). Most were single (93.8%), and few are the married ones, 47.6% had children between one to three. The majority of the students lived in Qassim (44.3%), followed by those who lived in Riyadh (23.2%), Makkah (16.4%), Eastern province (8.3%), and other places. Up to 21.7% of the total participants worked in the field of health and medicine, and 31.8% had a family member that worked in the health sector. The majority of the students earned between 5,000 SAR to 19,999 SAR (44.5%) and lived in villa-type apartments (68.2%). Also, most of the students lived in houses containing six or more people (72.6%).

Table 2. Association between Sociodemographic characteristics and impact of COVID-19 pandemic on the psychological responses (n = 336).

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Sex													
Female	232 (69.0%)	82 (35.3%)	150 (64.7%)	0.009	90 (38.8%)	142 (61.2%)	0.003	93 (40.1%)	139 (59.9%)	0.001	105 (45.3%)	127 (54.7%)	0.245
Male	104 (31.0%)	22 (21.2%)	82 (78.8%)		23 (22.1%)	81 (77.9%)		23 (22.1%)	81 (77.9%)		40 (38.5%)	64 (61.5%)	
Age													
18-30 years	328 (97.6%)	100 (30.5%)	228 (69.5%)	0.259*	109 (33.2%)	219 (66.8%)	0.450*	112 (34.1%)	216 (65.9%)	0.455*	141 (43.0%)	187 (57.0%)	0.730*
31-40 years	8 (2.4%)	4 (50.0%)	4 (50.0%)		4 (50.0%)	4 (50.0%)		4 (50.0%)	4 (50.0%)		4 (50.0%)	4 (50.0%)	
Educational level													
Primary school	3 (0.9%)	0 (0.0%)	3 (100.0%)	0.411*	0 (0.0%)	3 (100.0%)	0.302*	0 (0.0%)	3 (100.0%)	0.903*	1 (33.3%)	2 (66.7%)	0.305*
Middle school	4 (1.2%)	0 (0.0%)	4 (100.0%)		0 (0.0%)	4 (100.0%)		1 (25.0%)	3 (75.0%)		0 (0.0%)	4 (100.0%)	
High school	90 (26.8%)	25 (27.8%)	65 (72.2%)		29 (32.2%)	61 (67.8%)		33 (36.7%)	57 (63.3%)		44 (48.9%)	46 (51.1%)	

(Table 2) contd.....

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Sex													
Diploma	4 (1.2%)	0 (0.0%)	4 (100.0%)		1 (25.0%)	3 (75.0%)		1 (25.0%)	3 (75.0%)		1 (25.0%)	3 (75.0%)	
Bachelor	228 (67.9%)	78 (34.2%)	150 (65.8%)		82 (36.0%)	146 (64.0%)		80 (35.1%)	148 (64.9%)		98 (43.0%)	130 (57.0%)	
Master	6 (1.8%)	1 (16.7%)	5 (83.3%)		1 (16.7%)	5 (83.3%)		1 (16.7%)	5 (83.3%)		1 (16.7%)	5 (83.3%)	
PhD	1 (0.3%)	0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)	
Marital status													
Single	315 (93.8%)	98 (31.1%)	217 (68.9%)	0.395*	108 (34.3%)	207 (65.7%)	0.135*	107 (34.0%)	208 (66.0%)	0.365*	139 (44.1%)	176 (55.9%)	0.081*
Married	20 (6.0%)	5 (25.0%)	15 (75.0%)		4 (20.0%)	16 (80.0%)		8 (40.0%)	12 (60.0%)		5 (25.0%)	15 (75.0%)	
Widowed	1 (0.3%)	1 (100.0%)	0 (0.0%)		1 (100.0%)	0 (0.0%)		1 (100.0%)	0 (0.0%)		1 (100.0%)	0 (0.0%)	
Number of children													
4-6	3 (14.3%)	1 (33.3%)	2 (66.7%)	0.443*	0 (0.0%)	3 (100.0%)	0.384*	1 (33.3%)	2 (66.7%)	0.850*	0 (0.0%)	3 (100.0%)	0.130*
1-3 children	10 (47.6%)	4 (40.0%)	6 (60.0%)		4 (40.0%)	6 (60.0%)		5 (50.0%)	5 (50.0%)		5 (50.0%)	5 (50.0%)	
No child	8 (38.1%)	1 (12.5%)	7 (87.5%)		1 (12.5%)	7 (87.5%)		3 (37.5%)	5 (62.5%)		1 (12.5%)	7 (87.5%)	
Location of residence													
Asir	3 (0.9%)	1 (33.3%)	2 (66.7%)	0.036*	1 (33.3%)	2 (66.7%)	0.011*	0 (0.0%)	3 (100.0%)	0.021*	1 (33.3%)	2 (66.7%)	0.236*
Eastern Province	28 (8.3%)	9 (32.1%)	19 (67.9%)		13 (46.4%)	15 (53.6%)		12 (42.9%)	16 (57.1%)		13 (46.4%)	15 (53.6%)	
Ha'il	5 (1.5%)	2 (40.0%)	3 (60.0%)		1 (20.0%)	4 (80.0%)		2 (40.0%)	3 (60.0%)		2 (40.0%)	3 (60.0%)	
Jawf	2 (0.6%)	1 (50.0%)	1 (50.0%)		1 (50.0%)	1 (50.0%)		1 (50.0%)	1 (50.0%)		1 (50.0%)	1 (50.0%)	
Jizan	1 (0.3%)	0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)	
Madinah	5 (1.5%)	2 (40.0%)	3 (60.0%)		3 (60.0%)	2 (40.0%)		2 (40.0%)	3 (60.0%)		3 (60.0%)	2 (40.0%)	
Makkah	55 (16.4%)	25 (45.5%)	30 (54.5%)		24 (43.6%)	31 (56.4%)		27 (49.1%)	28 (50.9%)		26 (47.3%)	29 (52.7%)	
Northern Borders	1 (0.3%)	1 (100.0%)	0 (0.0%)		0 (0.0%)	1 (100.0%)		0 (0.0%)	1 (100.0%)		1 (100.0%)	0 (0.0%)	
Qassim	149 (44.3%)	33 (22.1%)	116 (77.9%)		37 (24.8%)	112 (75.2%)		38 (25.5%)	111 (74.5%)		52 (34.9%)	97 (65.1%)	
Riyadh	78 (23.2%)	25 (32.1%)	53 (67.9%)		26 (33.3%)	52 (66.7%)		28 (35.9%)	50 (64.1%)		40 (51.3%)	38 (48.7%)	
Tabuk	2 (0.6%)	1 (50.0%)	1 (50.0%)		2 (100.0%)	0 (0.0%)		2 (100.0%)	0 (0.0%)		2 (100.0%)	0 (0.0%)	
More than one region	7 (2.1%)	4 (57.1%)	3 (42.9%)		5 (71.4%)	2 (28.6%)		4 (57.1%)	3 (42.9%)		4 (57.1%)	3 (42.9%)	
Work in the medical field													
Yes	73 (21.7%)	22 (30.1%)	51 (69.9%)	0.865	30 (41.1%)	43 (58.9%)	0.127	23 (31.5%)	50 (68.5%)	0.540	29 (39.7%)	44 (60.3%)	0.504
No	263 (78.3%)	82 (31.2%)	181 (68.8%)		83 (31.6%)	180 (68.4%)		93 (35.4%)	170 (64.6%)		116 (44.1%)	147 (55.9%)	
Family member works in the medical field													
Yes	107 (31.8%)	33 (30.8%)	74 (69.2%)	0.976	43 (40.2%)	64 (59.8%)	0.082	43 (40.2%)	64 (59.8%)	0.136	57 (53.3%)	50 (46.7%)	0.010
No	229 (68.2%)	71 (31.0%)	158 (69.0%)		70 (30.6%)	159 (69.4%)		73 (31.9%)	156 (68.1%)		88 (38.4%)	141 (61.6%)	

(Table 2) contd.....

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Sex													
Family monthly income													
<5,000 SAR	27 (8.0%)	10 (37.0%)	17 (63.0%)	0.034	10 (37.0%)	17 (63.0%)	0.466	13 (48.1%)	14 (51.9%)	0.121	10 (37.0%)	17 (63.0%)	0.249
5,000-9,999 SAR	62 (18.5%)	22 (35.5%)	40 (64.5%)		21 (33.9%)	41 (66.1%)		26 (41.9%)	36 (58.1%)		27 (43.5%)	35 (56.5%)	
10,000-14,999 SAR	57 (17.0%)	13 (22.8%)	44 (77.2%)		17 (29.8%)	40 (70.2%)		16 (28.1%)	41 (71.9%)		23 (40.4%)	34 (59.6%)	
15,000-19,999 SAR	64 (19.0%)	29 (45.3%)	35 (54.7%)		28 (43.8%)	36 (56.3%)		23 (35.9%)	41 (64.1%)		36 (56.3%)	28 (43.8%)	
20,000-24,999 SAR	44 (13.1%)	10 (22.7%)	34 (77.3%)		12 (27.3%)	32 (72.7%)		9 (20.5%)	35 (79.5%)		15 (34.1%)	29 (65.9%)	
>25,000 SAR	82 (24.4%)	20 (24.4%)	62 (75.6%)		25 (30.5%)	57 (69.5%)		29 (35.4%)	53 (64.6%)		34 (41.5%)	48 (58.5%)	
Housing type													
Apartment	56 (16.7%)	25 (44.6%)	31 (55.4%)	0.036	25 (44.6%)	31 (55.4%)	0.153	26 (46.4%)	30 (53.6%)	0.119	27 (48.2%)	29 (51.8%)	0.696
Villa	229 (68.2%)	62 (27.1%)	167 (72.9%)		71 (31.0%)	158 (69.0%)		73 (31.9%)	156 (68.1%)		97 (42.4%)	132 (57.6%)	
Floor in a villa	51 (15.2%)	17 (33.3%)	34 (66.7%)		17 (33.3%)	34 (66.7%)		17 (33.3%)	34 (66.7%)		21 (41.2%)	30 (58.8%)	
Number of individuals residing in the household													
6 or more people	244 (72.6%)	70 (28.7%)	174 (71.3%)	0.343	81 (33.2%)	163 (66.8%)	0.445	80 (32.8%)	164 (67.2%)	0.540	104 (42.6%)	140 (57.4%)	0.444
3-5 people	81 (24.1%)	30 (37.0%)	51 (63.0%)		30 (37.0%)	51 (63.0%)		32 (39.5%)	49 (60.5%)		38 (46.9%)	43 (53.1%)	
2 people	11 (3.3%)	4 (36.4%)	7 (63.6%)		2 (18.2%)	9 (81.8%)		4 (36.4%)	7 (63.6%)		3 (27.3%)	8 (72.7%)	

Bolded p-values are significant at p<0.05; *Fischer's exact test IES-R: Revised Impact of Event Scale (IES-R); DASS-21: Depression, Anxiety and Stress Scale

The extent to which these sociodemographic factors influenced the expression of PTSD, stress, anxiety, and depression was tested using contingency tables (Table 2). With regards to PTSD, sex (p = 0.009), family monthly income (p = 0.034), location of residence (p = 0.036), and housing type (p = 0.036) were the only sociodemographic factors that had statistically significant relationships with PTSD. Females, students with a family income of 15,000-19,999 SAR, and those living in an apartment stand a greater chance of developing PTSD (p < 0.05).

From the DASS stress subscale, sex and location of residence were the only sociodemographic factors that were significantly associated with stress. Up to 38.8% of those who were females experienced stress as compared with only 22.1% of males (p = 0.003). Similarly, those who resided outside Qassim were more likely to have stress (p = 0.011). Also, on the DASS-anxiety subscale, sex and location of residence were again the only sociodemographic factors that significantly influenced the experience of anxiety related to COVID-19 as more females than males actually experienced symptoms of anxiety (p = 0.001), and those who lived in other regions outside Qassim were more likely to have anxiety (p = 0.021). On depression, having a family member working in the field of health/medicine was found to be significantly associated with depression (p < 0.05). As much as 53.3% of those who had family members/relatives that worked in the medical field

experienced depression compared with 38.4% of those who did not (p = 0.010).

3.3. Health Status and Influence on the Psychological Responses of COVID-19

Participants in the study were also asked to self-assess their current health status (Table 3). The majority of the students felt their health was in a “good” or “very good” shape (83.3%), and only a small proportion (3.3%) believed that their health was very poor. About 8.3% of the students suffer from a chronic illness, and 16.4% of the total population had been previously diagnosed with a psychiatric disorder. The most prevalent psychiatric disorders among the students were depressive (10.1%) and anxiety disorders (9.2%). Others are obsessive-compulsive disorders (3.9%), bipolar disorders (2.1%), eating disorders (1.5%), personality disorders (1.5%), sleep disorders (0.9%), and psychotic disorders (0.6%).

The health status of the participants was found to be statistically significantly associated with the expression of PTSD, stress, anxiety, and depression. Across the scales/subscales used, students who were in poor to average health were significantly more likely to have PTSD (p = 0.003), stress (p < 0.001), anxiety (p < 0.001), and depression (p < 0.001). Similarly, being previously diagnosed with a psychiatric disorder is associated with a higher chance of developing PTSD (p = 0.001), stress (p < 0.001), anxiety (p <

0.001), and depression ($p < 0.001$). Across the spectrum of mental illnesses, some of the students had, there were some statistically significant associations with the expression of stress, anxiety, and depression. Those who had been diagnosed with anxiety disorders, depression disorders, obsessive-compulsive disorders, and/or bipolar disorders were

significantly more likely to experience stress, anxiety, and/or depression due to the ongoing COVID-19 pandemic ($p < 0.05$). Eating disorders were significantly associated with stress ($p = 0.046$) and depression ($p = 0.014$), and personality disorders were only significantly associated with stress ($p = 0.046$).

Table 3. Association between health status and the psychological responses/adverse mental health status of COVID-19 (n = 336).

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Self-evaluation of health status													
Poor/very poor	11 (3.3%)	5 (45.5%)	6 (54.5%)	0.003	7 (63.6%)	4 (36.4%)	0.001	8 (72.7%)	3 (27.3%)	0.001	8 (72.7%)	3 (27.3%)	0.000
Average	45 (13.4%)	23 (51.1%)	22 (48.9%)		28 (62.2%)	17 (37.8%)		29 (64.4%)	16 (35.6%)		33 (73.3%)	12 (26.7%)	
Good/very good	280 (83.3%)	76 (27.1%)	204 (72.9%)		78 (27.9%)	202 (72.1%)		79 (28.2%)	201 (71.8%)		104 (37.1%)	176 (62.9%)	
Suffering from chronic disease													
Yes	28 (8.3%)	13 (46.4%)	15 (53.6%)	0.064	10 (35.7%)	18 (64.3%)	0.807	12 (42.9%)	16 (57.1%)	0.333	16 (57.1%)	12 (42.9%)	0.119
No	308 (91.7%)	91 (29.5%)	217 (70.5%)		103 (33.4%)	205 (66.6%)		104 (33.8%)	204 (66.2%)		129 (41.9%)	179 (58.1%)	
Diagnosed with a psychiatric disorder													
Yes	55 (16.4%)	27 (49.1%)	28 (50.9%)	0.001	34 (61.8%)	21 (38.2%)	0.001	37 (67.3%)	18 (32.7%)	0.001	40 (72.7%)	15 (27.3%)	0.001
No	281 (83.6%)	77 (27.4%)	204 (72.6%)		79 (28.1%)	202 (71.9%)		79 (28.1%)	202 (71.9%)		105 (37.4%)	176 (62.6%)	
Anxiety disorders													
Yes	31 (9.2%)	14 (45.2%)	17 (54.8%)	0.072	20 (64.5%)	11 (35.5%)	0.000	23 (74.2%)	8 (25.8%)	0.001	26 (83.9%)	5 (16.1%)	0.001*
No	305 (90.8%)	90 (29.5%)	215 (70.5%)		93 (30.5%)	212 (69.5%)		93 (30.5%)	212 (69.5%)		119 (39.0%)	186 (61.0%)	
Depression disorders													
Yes	34 (10.1%)	14 (41.2%)	20 (58.8%)	0.174	19 (55.9%)	15 (44.1%)	0.004	21 (61.8%)	13 (38.2%)	0.001	24 (70.6%)	10 (29.4%)	0.001
No	302 (89.9%)	90 (29.8%)	212 (70.2%)		94 (31.1%)	208 (68.9%)		95 (31.5%)	207 (68.5%)		121 (40.1%)	181 (59.9%)	
Obsessive-compulsive disorders													
Yes	13 (3.9%)	7 (53.8%)	6 (46.2%)	0.069	9 (69.2%)	4 (30.8%)	0.013*	10 (76.9%)	3 (23.1%)	0.002*	9 (69.2%)	4 (30.8%)	0.083*
No	323 (96.1%)	97 (30.0%)	226 (70.0%)		104 (32.2%)	219 (67.8%)		106 (32.8%)	217 (67.2%)		136 (42.1%)	187 (57.9%)	
Sleep disorders													
Yes	3 (0.9%)	1 (33.3%)	2 (66.7%)	0.929*	1 (33.3%)	2 (66.7%)	0.991*	2 (66.7%)	1 (33.3%)	0.275*	2 (66.7%)	1 (33.3%)	0.580*
No	333 (99.1%)	103 (30.9%)	230 (69.1%)		112 (33.6%)	221 (66.4%)		114 (34.2%)	219 (65.8%)		143 (42.9%)	190 (57.1%)	
Bipolar disorders													
Yes	7 (2.1%)	3 (42.9%)	4 (57.1%)	0.681*	7 (100.0%)	0 (0.0%)	0.001*	7 (100.0%)	0 (0.0%)	0.001*	7 (100.0%)	0 (0.0%)	0.003*
No	329 (97.9%)	101 (30.7%)	228 (69.3%)		106 (32.2%)	223 (67.8%)		109 (33.1%)	220 (66.9%)		138 (41.9%)	191 (58.1%)	

(Table 3) contd.....

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Self-evaluation of health status													
Eating disorders													
Yes	5 (1.5%)	1 (20.0%)	4 (80.0%)	0.963*	4 (80.0%)	1 (20.0%)	0.046*	3 (60.0%)	2 (40.0%)	0.345*	5 (100.0%)	0 (0.0%)	0.014*
No	331 (98.5%)	103 (31.1%)	228 (68.9%)		109 (32.9%)	222 (67.1%)		113 (34.1%)	218 (65.9%)		140 (42.3%)	191 (57.7%)	
Personality disorders													
Yes	5 (1.5%)	2 (40.0%)	3 (60.0%)	0.647*	4 (80.0%)	1 (20.0%)	0.046*	3 (60.0%)	2 (40.0%)	0.345*	3 (60.0%)	2 (40.0%)	0.655*
No	331 (98.5%)	102 (30.8%)	229 (69.2%)		109 (32.9%)	222 (67.1%)		113 (34.1%)	218 (65.9%)		142 (42.9%)	189 (57.1%)	
Psychotic disorders													
Yes	2 (0.6%)	0 (0.0%)	2 (100.0%)	0.855*	2 (100.0%)	0 (0.0%)	0.112*	2 (100.0%)	0 (0.0%)	0.119*	2 (100.0%)	0 (0.0%)	0.186*
No	334 (99.4%)	104 (31.1%)	230 (68.9%)		111 (33.2%)	223 (66.8%)		114 (34.1%)	220 (65.9%)		143 (42.8%)	191 (57.2%)	
Neurodevelopmental disorders													
No	336 (100.0%)	104 (31.0%)	232 (69.0%)	NA	113 (33.6%)	223 (66.4%)	NA	116 (34.5%)	220 (65.5%)	NA	145 (43.2%)	191 (56.8%)	NA
PTSD													
No	336 (100.0%)	104 (31.0%)	232 (69.0%)	NA	113 (33.6%)	223 (66.4%)	NA	116 (34.5%)	220 (65.5%)	NA	145 (43.2%)	191 (56.8%)	NA
Other disorders													
Yes	5 (1.5%)	3 (60.0%)	2 (40.0%)	0.174*	2 (40.0%)	3 (60.0%)	0.761*	2 (40.0%)	3 (60.0%)	0.795*	3 (60.0%)	2 (40.0%)	0.655*
No	331 (98.5%)	101 (30.5%)	230 (69.5%)		111 (33.5%)	220 (66.5%)		114 (34.4%)	217 (65.6%)		142 (42.9%)	189 (57.1%)	

Bolded p-values are significant at p<0.05; *Fischer's exact test IES-R: Revised Impact of Event Scale (IES-R); DASS-21: Depression, Anxiety and Stress Scale - 21 Items

3.4. Health Service Use and Effect on the Psychological Implications of COVID-19

A total of 13.7% of the students had visited a hospital facility within 14 days from the point of data collection, and 0.6% of the total had been admitted (Table 4). With regards to testing for COVID-19, 2.4% of the students had been tested, but none was positive for the disease even though about 1.2% had to be quarantined on the basis of suspicion of COVID-19. Six of the students (1.8%) had relatives who had been

diagnosed with the disease. When asked about their chances of being infected and/or recovering, the majority (64.0%) believed their likelihood of being infected with the coronavirus was unlikely, and 73.5% believed that even if infected, their chances of recovering was very or extremely likely. Also, 77.7% of the students disagreed/strongly disagreed with the statement: "I feel that there is a lot of unnecessary worrying regarding COVID-19," indicating their agreement that there is a lot of necessary worrying relating to the COVID-19 crisis.

Table 4. Association between health service use variables and the psychological impact/adverse mental health status of COVID-19 (n = 336).

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Visited a hospital in the past 14 days													
Yes	46 (13.7%)	19 (41.3%)	27 (58.7%)	0.102	21 (45.7%)	25 (54.3%)	0.063	24 (52.2%)	22 (47.8%)	0.007	25 (54.3%)	21 (45.7%)	0.099
No	290 (86.3%)	85 (29.3%)	205 (70.7%)		92 (31.7%)	198 (68.3%)		92 (31.7%)	198 (68.3%)		120 (41.4%)	170 (58.6%)	
Admitted to a hospital within the last 14 days													
Yes	2 (0.6%)	0 (0.0%)	2 (100.0%)	0.855*	0 (0.0%)	2 (100.0%)	0.552*	0 (0.0%)	2 (100.0%)	0.547*	0 (0.0%)	2 (100.0%)	0.508*

(Table 4) contd....

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Visited a hospital in the past 14 days													
Yes	46 (13.7%)	19 (41.3%)	27 (58.7%)	0.102	21 (45.7%)	25 (54.3%)	0.063	24 (52.2%)	22 (47.8%)	0.007	25 (54.3%)	21 (45.7%)	0.099
No	334 (99.4%)	104 (31.1%)	230 (68.9%)		113 (33.8%)	221 (66.2%)		116 (34.7%)	218 (65.3%)		145 (43.4%)	189 (56.6%)	
Tested for COVID in the past 14 days													
Yes	8 (2.4%)	4 (50.0%)	4 (50.0%)	0.259*	3 (37.5%)	5 (62.5%)	0.815*	4 (50.0%)	4 (50.0%)	0.455*	3 (37.5%)	5 (62.5%)	0.744*
No	328 (97.6%)	100 (30.5%)	228 (69.5%)		110 (33.5%)	218 (66.5%)		112 (34.1%)	216 (65.9%)		142 (43.3%)	186 (56.7%)	
Quarantined on suspicion of COVID in the past 14 days													
Yes	4 (1.2%)	2 (50.0%)	2 (50.0%)	0.590*	1 (25.0%)	3 (75.0%)	0.713*	3 (75.0%)	1 (25.0%)	0.121*	1 (25.0%)	3 (75.0%)	0.637*
No	332 (98.8%)	102 (30.7%)	230 (69.3%)		112 (33.7%)	220 (66.3%)		113 (34.0%)	219 (66.0%)		144 (43.4%)	188 (56.6%)	
Relative diagnosed with the emerging coronavirus													
Yes	6 (1.8%)	3 (50.0%)	3 (50.0%)	0.378*	2 (33.3%)	4 (66.7%)	0.988*	3 (50.0%)	3 (50.0%)	0.419*	3 (50.0%)	3 (50.0%)	0.733*
No	330 (98.2%)	101 (30.6%)	229 (69.4%)		111 (33.6%)	219 (66.4%)		113 (34.2%)	217 (65.8%)		142 (43.0%)	188 (57.0%)	
Diagnosed with COVID													
No	336 (100.0%)	104 (31.0%)	232 (69.0%)	NA	113 (33.6%)	223 (66.4%)	NA	116 (34.5%)	220 (65.5%)	NA	145 (43.2%)	191 (56.8%)	NA
Chances of recovering if diagnosed with COVID-19													
Not likely	3 (0.9%)	1 (33.3%)	2 (66.7%)	0.025*	1 (33.3%)	2 (66.7%)	0.031*	2 (66.7%)	1 (33.3%)	0.002*	2 (66.7%)	1 (33.3%)	0.007*
Slightly	13 (3.9%)	8 (61.5%)	5 (38.5%)		9 (69.2%)	4 (30.8%)		9 (69.2%)	4 (30.8%)		11 (84.6%)	2 (15.4%)	
Moderately	73 (21.7%)	26 (35.6%)	47 (64.4%)		29 (39.7%)	44 (60.3%)		30 (41.1%)	43 (58.9%)		36 (49.3%)	37 (50.7%)	
Very likely	124 (36.9%)	41 (33.1%)	83 (66.9%)		35 (28.2%)	89 (71.8%)		30 (24.2%)	94 (75.8%)		51 (41.1%)	73 (58.9%)	
Extremely likely	123 (36.6%)	28 (22.8%)	95 (77.2%)		39 (31.7%)	84 (68.3%)		45 (36.6%)	78 (63.4%)		45 (36.6%)	78 (63.4%)	
Perceived likelihood of infection with COVID													
Extremely likely	17 (5.1%)	6 (35.3%)	11 (64.7%)	0.021	9 (52.9%)	8 (47.1%)	0.008	5 (29.4%)	12 (70.6%)	0.150	11 (64.7%)	6 (35.3%)	0.007
Very likely	18 (5.4%)	7 (38.9%)	11 (61.1%)		9 (50.0%)	9 (50.0%)		8 (44.4%)	10 (55.6%)		14 (77.8%)	4 (22.2%)	
Moderately	86 (25.6%)	36 (41.9%)	50 (58.1%)		37 (43.0%)	49 (57.0%)		37 (43.0%)	49 (57.0%)		37 (43.0%)	49 (57.0%)	
Slightly	90 (26.8%)	29 (32.2%)	61 (67.8%)		28 (31.1%)	62 (68.9%)		32 (35.6%)	58 (64.4%)		37 (41.1%)	53 (58.9%)	
Not likely	125 (37.2%)	26 (20.8%)	99 (79.2%)		30 (24.0%)	95 (76.0%)		34 (27.2%)	91 (72.8%)		46 (36.8%)	79 (63.2%)	
Opinion about COVID-concerns													
Strongly disagree	215 (64.0%)	75 (34.9%)	140 (65.1%)	0.169	83 (38.6%)	132 (61.4%)	0.021	80 (37.2%)	135 (62.8%)	0.328	99 (46.0%)	116 (54.0%)	0.483
Disagree	46 (13.7%)	12 (26.1%)	34 (73.9%)		14 (30.4%)	32 (69.6%)		10 (21.7%)	36 (78.3%)		16 (34.8%)	30 (65.2%)	

(Table 5) contd.....

Variables	N (%)	PTSD (IES-R)			Stress (DASS)			Anxiety (DASS)			Depression (DASS)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Symptoms of COVID													
Yes	1 (0.3%)	1 (100.0%)	0 (0.0%)	0.310*	0 (0.0%)	1 (100.0%)	0.476*	1 (100.0%)	0 (0.0%)	0.345*	1 (100.0%)	0 (0.0%)	0.432*
No	335 (99.7%)	103 (30.7%)	232 (69.3%)		113 (33.7%)	222 (66.3%)		115 (34.3%)	220 (65.7%)		144 (43.0%)	191 (57.0%)	
Nothing happened													
Yes	275 (81.8%)	82 (29.8%)	193 (70.2%)	0.340	86 (31.3%)	189 (68.7%)	0.052	90 (32.7%)	185 (67.3%)	0.141	112 (40.7%)	163 (59.3%)	0.056
No	61 (18.2%)	22 (36.1%)	39 (63.9%)		27 (44.3%)	34 (55.7%)		26 (42.6%)	35 (57.4%)		33 (54.1%)	28 (45.9%)	
I don't know													
Yes	88 (26.2%)	32 (36.4%)	56 (63.6%)	0.201	40 (45.5%)	48 (54.5%)	0.006	41 (46.6%)	47 (53.4%)	0.006	48 (54.5%)	40 (45.5%)	0.012
No	248 (73.8%)	72 (29.0%)	176 (71.0%)		73 (29.4%)	175 (70.6%)		75 (30.2%)	173 (69.8%)		97 (39.1%)	151 (60.9%)	

Bolded p-values are significant at p<0.05; *Fischer's exact test IES-R: Revised Impact of Event Scale (IES-R); DASS-21: Depression, Anxiety and Stress Scale - 21

4. DISCUSSION

The main aim of this study was to evaluate the early psychological impact of COVID-19 in Saudi Arabia among students. Our results showed that 7.1% and 23.8% of students experienced moderate and severe post-traumatic stress disorder (PTSD) symptoms, respectively, while 13.4% and 10.7% of the students had severe to extremely severe stress symptoms, respectively. Regarding anxiety, 6.0% and 15.8% of the students experienced severe and extremely severe symptoms, respectively. Furthermore, as much as 11.6% and 17.6% of students experienced severe and extremely severe symptoms of depression, respectively. Our findings are in line with studies conducted among college students in Spain and China during the early days of the pandemic, which reported that 7.7% of the students had anxiety symptoms, and 12.2% reported symptoms of depression [11, 12]. The higher prevalence in the present study could be attributed to the uncertainty that most students faced during the early days of the curfew and the precautionary measures by governments: at that time, the Ministry of Education had not released a clear statement on how students would be able to complete their present academic year and how they would be evaluated, so students were left with doubts and speculations that increased by the day.

In the present study, females were more likely to experience symptoms of PTSD, stress, anxiety, and depression; this is consistent with a previous study conducted in the general population during the current pandemic [2]. Moreover, having a family member working in the field of health/medicine was found to be significantly associated with depression, and this finding is consistent with similar studies conducted among medical students during the current pandemic [13]; this finding could not only be attributed to the significant change every student endured in addition to the disruption of their clinical teaching activity but also to the fact that some of them carry the burden of worrying about his family being infected. On the other hand, being in the Al-Qassim region in the last 14 days shown to have less PTSD, stress, and anxiety than being in other regions; this could be attributed to the lower perceived

risk of COVID19 infection, as the region has less crowdedness than many of other regions. However, this could not be ascertained as the Al-Qassim region is oversampled in this study compared to other regions.

Poor self-reported health status can reflect overall psychological distress: the pandemic has been associated with negative psychological effects among the general population; similar findings have been observed among students in China, particularly depressive and anxiety symptoms. The opposite is also true, where a higher perceived level of health has been associated with lower psychological impact [6, 11, 14]. The present study demonstrates a similar effect among students in Saudi Arabia with poor/very poor self-reported health status. Likewise, a history of psychiatric disorders, including anxiety, depression, and bipolar disorder, showed a similar effect. The stress effect of the pandemic could trigger existing psychiatric disorders. Moreover, this finding is consistent with a previous study that compared people with and without psychiatric illness during the COVID-19 pandemic [15]. This emphasizes the need to identify students at risk of psychiatric disorders during non-pandemic times and provide them with the increased support they need in difficult times by expanding the existing psychological services for students.

Exploring some components of the health belief model during the pandemic in different countries showed that higher perceived severity and higher perceived susceptibility of the event was associated with worse psychological impact [14]. In the present study, high perceived susceptibility was associated with higher rates of depression and stress on the DASS subscales, coupled with the negative psychological impact. A similar effect was observed with higher perceived severity in all DASS subscales and the IES-R. In addition, reporting one or more somatic symptoms was associated with a negative effect on the anxiety subscale, as this might trigger worrying and increase the perceived likelihood of contracting the infection.

As universities prepare to re-open the coming academic year, they should implement a clear, effective strategies for

students and also expand efforts on academic and psychological counseling, especially for the vulnerable populations.

5. LIMITATIONS

Our study has limitations related to the time, procedure, and study design. The study demonstrates the effect during the early stage of the outbreak on students before possible adaptation or intervention, either psychological or academic, is in place, so a longitudinal study might address the question of whether the effect is transient or whether it will be demonstrated as long-term after interventions are implemented. Moreover, the non-probability sampling of the respondents may limit the generalizability of our findings. Further, we did not address the students' field of study and academic performance, which might not address possible differences among students in different fields and levels. Nearly half of the sample was from the al Qassim region alone, limiting the generalizability of the study findings to other regions with different densities of cases. Additionally, the study did not survey students younger than 18 years old, which needs to be assessed in further studies. Nevertheless, our findings provide insight into their psychological status during the early pandemic stage before possible interventions are in place. Self-reported mental status measures have limited accuracy when compared with an interview by a psychiatrist; however, they are presumed valid and are used in several surveys for assessing mental status.

CONCLUSION

During the early days of the pandemic, nearly one-fourth of the students experienced moderate to severe PTSD symptoms. Females were more likely to experience symptoms of PTSD, stress, anxiety, and depression; working in medicine was significantly associated with depression; and poor to average health and previous diagnosis of a psychiatric disorder were associated with a higher chance of developing PTSD, stress, anxiety, and depression. Our findings could help guide schools and universities in implementing a clear, effective strategy for students for the coming academic year and also expand efforts on academic and psychological counseling, especially for the vulnerable populations.

AUTHOR'S CONTRIBUTION

Conceptualization was done by A.K and M.J. Data curation was done by M.J. Formal analysis was conducted by A.K. Investigation was done by A.K. Methodology was selected by A.K and M.J. Project administration was done by A.K and supervision was done by A.K and M.J. Writing the original draft was done by A.K and M.J, and review & editing were done by A.K and M.J. All authors have read and agreed to the published version of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was approved by the health researches ethical committee of Qassim University, Saudi Arabia (No.19-08-01).

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available from corresponding author [A.A.A] upon reasonable request.

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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