The influence of the COVID-19 pandemic on the psychological well-being of college students: a cross-sectional study

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Abstract. – **OBJECTIVE:** Even before the outbreak of the COVID-19 pandemic, concerns regarding college students' mental health were on the rise due to the increasing number of students afflicted with mental health issues. Exposure to numerous pandemic-related measures exacerbated existing issues with anxiety, depression, and stress. This study aimed to assess depression, anxiety, and stress levels among university students in the Aseer region in Saudi Arabia.

SUBJECTS AND METHODS: Data were collected from eligible individuals using a web-based, self-administered DASS-21 questionnaire. This questionnaire consists of 21 questions with a rating scale of 0-3. Each of the psychological factors of depression, anxiety, and stress was categorized as normal, mild, moderate, severe, and extremely severe. Results were expressed using descriptive statistics as proportions, and the Mann-Whitney/Kruskal-Wallis' test was used to evaluate the presence of a significant difference between each of the socio-demographic factors of the respondents and the psychological outcomes.

RESULTS: Respondents aged between 18-24 years reported higher rates of extremely severe depression than other age groups. Females had higher rates of depression, especially severe and extremely severe forms. Extremely severe anxiety had a relatively high prevalence across all age groups. Extremely severe stress was more common among respondents aged between 18-24 years, while respondents older than 34 years reported the highest prevalence of severe stress. The Mann-Whitney/Kruskal-Wallis' tests showed statistically significant differences between participants in the different groups.

CONCLUSIONS: The COVID-19 pandemic had a high psychological impact on university students, which indicates that a psychological support program should be implemented to reduce this impact.

Key Words:
Psychological impact, Mental health, Psychological well-being, Depression, Anxiety, Stress, COVID-19, University students.

Introduction

On March 11, 2020, the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) a global pandemic. Control measures taken on a global scale resulted in travel restrictions and prohibitions. All job- and school-related activities were on hold indefinitely due to the outbreak of the pandemic[1]. To ensure the safety of their students and the surrounding community, colleges in Saudi Arabia changed to an online-only system for the 2019-2020 academic year. The abrupt transformation in the learning environment, the quality of the education, and other factors had a negative effect on the students' mental health[2]. Anxiety, depression, low self-esteem, psychosomatic illnesses, substance abuse, and suicidal thoughts had increased among students worldwide even before the pandemic. However, students' mental health deteriorated, and stress levels increased due to the pandemic. A study involving college students in India found that anxiety and depression were common in that group, especially among women[3,4]. They also noted sleep disruption, which is

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common among those suffering from anxiety and depression. Some of the recognized mental consequences of the pandemic on college students were brought to light in a recent review[5]. Many college students suffer from increased depression, anxiety, and stress due to the uneven delivery of university education, technical difficulties with online courses, seclusion from home and social activities, and a decrease in income. Students at academic institutions globally experienced these outcomes[6,7]. Due to the sudden shift in teaching methods caused by the potential danger posed by COVID-19, isolation, and lockdown, students and the broader public have experienced an increase in their concerns about the pandemic and substantial stress[8-10]. In addition to impacting students' academic performance negatively, high levels of stress and depression have been linked to an increase in suicide and self-harming ideation. As a result, it is crucial to monitor students' emotional well-being, weigh the risks associated with anxiety, and consider effective preventative strategies[11-14]. There is a lack of research that has examined the effects of the pandemic on the mental health of college students in the Kingdom of Saudi Arabia. Therefore, the purpose of this research was to measure the psychological burden and to emphasize the stress, depression, and anxiety experienced by Saudi university students.

Subjects and Methods

Study Design, Study Population, and Study Setting

A three-month cross-sectional study was conducted using an online questionnaire with undergraduate university students from the Aseer region in Saudi Arabia.

Sample Size and Sampling Criteria

There are approximately 29 undergraduate colleges in the Aseer region that cover various subject areas for males and females and accommodate approximately 79,498 students in levels 1 to 10 and interns. Non-probabilistic convenience sampling was used to recruit eligible individuals for the study. The inclusion criteria were students of both genders (level 3 to internship) from different colleges of the King Khalid University, Abha. Students with significant mental disabilities were excluded.

Research Instrument and Data Collection

The research instrument was a web-based self-administered structured standard DASS-21 questionnaire that measures distress quantitatively along the three axes of stress, anxiety, and depression. It does not measure clinical diagnoses categorically. There are 21 questions, and the responses range from 0 to 3. The data were scored and categorized as follows: depression, normal: 0-4, mild: 5-6, moderate: 7-10, severe: 11-13, and extremely severe: 14+; anxiety, normal: 0-3, mild: 4-5, moderate: 6-7; severe: 8-9, and extremely severe 10+; stress: normal 0-7; mild 8-9; moderate 10-12; severe 13-16; and extremely severe 17+. The questionnaire was also available in Arabic for convenience and clarity.

Ethical Considerations

This work at the King Khalid University received approval from the research Ethics Committee, with approval code ECM#2021-3604. Participants' consent was obtained through a question on the first page of the survey, which indicates their voluntary participation.

Statistical Analysis

Responses were downloaded to an MS-Excel file and blindly assessed after data collection. We used the Statistical Package for Social Sciences version 20 (IBM Corp., Armonk, NY, USA) to conduct statistical analyses. Results were expressed using descriptive statistics as proportions. The Mann-Whitney/Kruskal-Wallis' test was performed to examine whether the sociodemographic characteristics and psychological factors of the respondents differed significantly. A *p*-value of <0.05 was considered statistically significant.

Results

We found that depression, anxiety, and stress occurred frequently among the research population. As shown in Tables I, II, III the majority of the respondents were female, single, and aged between 18-24 years. The majority lived with two or more people and had no history of psychological disorders. Eighty-one percent reported they had not contracted a COVID-19 infection at the time of the study. Descriptive statistics were reported as proportions, whereas the Mann-Whitney/ Kruskal-Wallis' tests were used to evaluate the presence of a significant difference between the respondents' socio-demographic factors and the psychological outcomes.

Table I. Factors associated with depression.

		Depression											
		Normal		Mild		Moderate		Severe		Extremely Severe		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Age	<18	11	30%	8	22%	6	16%	4	11%	8	22%	37	100%
	18-24	113	25%	43	10%	96	21%	53	12%	146	32%	451	100%
	25-34	11	44%	1	4%	8	32%	2	8%	3	12%	25	100%
	>34	4	67%	0	0%	0	0%	2	33%	0	0%	6	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**
Gender	Female	124	25%	50	10%	103	21%	60	12%	151	31%	488	100%
	Male	15	48%	2	6%	7	23%	1	3%	6	19%	31	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**
Marital status	Single	127	26%	49	10%	99	20%	57	12%	151	31%	483	100%
	Married	10	36%	2	7%	7	25%	4	14%	5	18%	28	100%
	Divorced	2	25%	1	13%	4	50%	0	0%	1	13%	8	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**
Live with	Alone	4	18%	0	0%	5	23%	4	18%	9	41%	22	100%
	One person	7	30%	3	13%	5	22%	5	22%	3	13%	23	100%
	2-4 people	17	23%	6	8%	15	20%	8	11%	28	38%	74	100%
	5 or more people	111	28%	43	11%	85	21%	44	11%	117	29%	400	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**
Previous or currently any psychological or psychiatric treatment taken	No	130	28%	49	10%	103	22%	58	12%	128	27%	468	100%
	Yes	9	18%	3	6%	7	14%	3	6%	29	57%	51	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**
Tested positive for COVID 19	No	113	27%	45	11%	83	20%	52	12%	125	30%	418	100%
	Yes	26	26%	7	7%	27	27%	9	9%	32	32%	101	100%
	Total	**139**	**27%**	**52**	**10%**	**110**	**21%**	**61**	**12%**	**157**	**30%**	**519**	**100%**

N, number of participants; %, percentage of participants.

Depression

Factors associated with depression were age, gender, and a history of psychological disorders. Respondents aged between 18-24 years reported higher rates of extremely severe depression than other age groups. Females had higher rates of depression, especially severe and extremely severe forms. Extremely severe depression was more frequently reported by those with a history of psychological disorders or on psychoactive agents (Table I). Mann-Whitney/Kruskal-Wallis' tests were used to determine whether there was an association between the socio-demographic variables of the participants and the psychological factor of depression. We found statistically significant differences between participants in different groups regarding age, any previous or current psychological or psychiatric treatment, and a positive COVID-19 test (0.005, 0.012, 0.001, respectively; p-value <0.05; Table II).

Anxiety

Factors associated with anxiety were age, a history of a psychological disorder, and a positive test for COVID-19. Extremely severe anxiety was relatively highly prevalent across all the age groups (27-37%). Extremely severe anxiety was reported by 53% of the respondents with a history of a psychological disorder and 50% of those who had tested positive for COVID-19 (Table III).

Table II. Comparison between socio-economic variables and depression.

		Depression			
		18-24	25-34	>34	*p*-value
Age	<18	0.061	0.426	0.263	0.005*
	18-24		0.01	0.048	
	25-34			0.528	
Gender	Female				0.012*
	Male				
Marital status	Single				0.129
	Married				
	Divorced				
Live with	Alone				0.225
	One person				
	2-4 people				
	5 or more people				
Previous or currently any psychological or psychiatric treatment taken	No				0.001*
	Yes				
Tested positive for COVID-19	No				0.906
	Yes				

*p-value is significant at <0.05

Mann-Whitney and Kruskal-Wallis' tests were performed to assess whether or not there was a correlation between the socio-demographic factors of the participants and the psychological factor of anxiety. We found statistically significant differences between participants in different groups regarding age, any previous or current psychological or psychiatric treatment, and a positive test for COVID-19 (0.046, 0.002, <0.0005, respectively; *p*-value <0.05; Table IV).

Stress

Factors associated with stress were age, gender, and a history of psychological disorders. Extremely severe stress was more common among respondents aged between 18-24 years; they also reported a relatively high prevalence of severe stress. However, respondents older than 34 years reported the highest prevalence of severe stress, despite being underrepresented in the current study. Females and respondents with a history of psychological disorders reported a higher frequency of severe and extremely severe stress than males (Table V). Mann Whitney/Kruskal Wallis' tests were used to determine whether there was an association between the socio-demographic variables of the participants and the psychological factor stress. We found statistically significant differences between participants in different groups regarding age, gender, and any previous or current psychological or psychiatric treatment (0.009, 0.042, 0.04, respectively; *p*-value <0.05; Table VI).

Discussion

The COVID-19 pandemic is one of the extreme public health emergencies in the world. It has impacted the mental health of the global community and of university students, who are part of this community. This study assessed the influence of the COVID-19 pandemic on the psychological well-being of university students of the Aseer region in Saudi Arabia.

This study shows that the prevalence of depression among the participants was 73%, which is higher than what previous studies[15-19] conducted in Ethiopia (21.3%), Spain (34.1%), Pakistan (45%), India (13.97%), and Iran (15%) found. It is also higher than what was found in a review of the literature (16-28%)[20].

Table III. Factors associated with anxiety.

		Normal		Mild		Moderate		Severe		Extremely Severe		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Age	<18	17	46%	7	19%	2	5%	1	3%	10	27%	37	100%
	18-24	139	31%	61	14%	49	11%	36	8%	166	37%	451	100%
	25-34	12	48%	1	4%	2	8%	2	8%	8	32%	25	100%
	>34	3	50%	1	17%	0	0%	0	0%	2	33%	6	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**
Gender	Female	156	32%	68	14%	50	10%	39	8%	175	36%	488	100%
	Male	15	48%	2	6%	3	10%	0	0%	11	35%	31	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**
Marital status	Single	158	33%	64	13%	51	11%	36	7%	174	36%	483	100%
	Married	9	32%	6	21%	2	7%	1	4%	10	36%	28	100%
	Divorced	4	50%	0	0%	0	0%	2	25%	2	25%	8	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**
Live with	Alone	5	23%	0	0%	5	23%	1	5%	11	50%	22	100%
	One person	6	26%	4	17%	0	0%	3	13%	10	43%	23	100%
	2-4 people	21	28%	9	12%	7	9%	4	5%	33	45%	74	100%
	5 or more people	139	35%	57	14%	41	10%	31	8%	132	33%	400	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**
Previous or currently any psychological or psychiatric treatment taken	No	162	35%	69	15%	43	9%	35	7%	159	34%	468	100%
	Yes	9	18%	1	2%	10	20%	4	8%	27	53%	51	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**
Tested positive for COVID 19	No	146	35%	63	15%	39	9%	34	8%	136	33%	418	100%
	Yes	25	25%	7	7%	14	14%	5	5%	50	50%	101	100%
	Total	**171**	**33%**	**70**	**13%**	**53**	**10%**	**39**	**8%**	**186**	**36%**	**519**	**100%**

N, number of participants; %, percentage of participants.

Table IV. Comparison between socio-economic variables and anxiety.

		Anxiety			p-value
		18-24	25-34	>34	
Age	<18	0.047	0.994	0.586	0.046*
	18-24		0.1	0.158	
	25-34			0.595	
Gender	Female				0.148
	Male				
Marital status	Single				0.367
	Married				
	Divorced				
Live with	Alone				0.229
	One person				
	2-4 people				
	5 or more people				
Previous or currently any psychological or psychiatric treatment taken	No				0.002*
	Yes				
Tested positive for COVID 19	No				<0.0005*
	Yes				

*p-value is significant at <0.05

Table V. Factors associated with stress.

		Normal		Mild		Moderate		Severe		Extremely Severe		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Age	<18	18	49%	6	16%	5	14%	4	11%	4	11%	37	100%
	18-24	164	36%	42	9%	54	12%	97	22%	94	21%	451	100%
	25-34	13	52%	1	4%	4	16%	3	12%	4	16%	25	100%
	>34	4	67%	0	0%	0	0%	2	33%	0	0%	6	100%
	Total	**199**	**38%**	**49**	**9%**	**63**	**12%**	**106**	**20%**	**102**	**20%**	**519**	**100%**
Gender	Female	181	37%	47	10%	59	12%	103	21%	98	20%	488	100%
	Male	18	58%	2	6%	4	13%	3	10%	4	13%	31	100%
	Total	**199**	**38%**	**49**	**9%**	**63**	**12%**	**106**	**20%**	**102**	**20%**	**519**	**100%**
Marital status	Single	181	37%	49	10%	60	12%	96	20%	97	20%	483	100%
	Married	16	57%	0	0%	2	7%	5	18%	5	18%	28	100%
	Divorced	2	25%	0	0%	1	13%	5	63%	0	0%	8	100%
	Total	**199**	**38%**	**49**	**9%**	**63**	**12%**	**106**	**20%**	**102**	**20%**	**519**	**100%**
Live with	Alone	11	50%	0	0%	2	9%	5	23%	4	18%	22	100%
	One person	8	35%	2	9%	4	17%	5	22%	4	17%	23	100%
	2-4 people	27	36%	3	4%	8	11%	19	26%	17	23%	74	100%
	5 or more people	153	38%	44	11%	49	12%	77	19%	77	19%	400	100%
	Total	**199**	**38%**	**49**	**9%**	**63**	**12%**	**106**	**20%**	**102**	**20%**	**519**	**100%**
Previous or currently any psychological or psychiatric treatment taken	No	182	39%	45	10%	61	13%	96	21%	84	18%	468	100%
	Yes	17	33%	4	8%	2	4%	10	20%	18	35%	51	100%
	Total	**199**	**38%**	**49**	**9%**	**63**	**12%**	**106**	**20%**	**102**	**20%**	**519**	**100%**
Tested positive for COVID 19	No	163	39%	41	10%	50	12%	84	20%	80	19%	418	100%
	Yes	36	36%	8	8%	13	13%	22	22%	22	22%	101	100%
	Total	*199*	*38%*	*49*	*9%*	*63*	*12%*	*106*	*20%*	*102*	*20%*	*519*	*100%*

N, number of participants; %, percentage of participants.

Table VI. Comparison between socio-economic variables and stress.

		Stress			
		18-24	25-34	>34	*p*-value
Age	<18	0.036	0.926	0.237	0.009*
	18-24		0.063	0.033	
	25-34			0.275	
Gender	Female				0.042*
	Male				
Marital status	Single				0.243
	Married				
	Divorced				
Live with	Alone				0.706
	One person				
	2-4 people				
	5 or more people				
Previous or currently any psychological or psychiatric treatment taken	No				0.04*
	Yes				
Tested positive for COVID-19	No				0.195
	Yes				

*p-value is significant at <0.05

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This study also revealed that the prevalence of anxiety was 67%; this finding was supported by studies done in France (60.2%), Jordan (69.5%), and Turkey (69.9%)[21-23]; although this finding was higher than that of a literature review (16-28%)[20] and of studies conducted in China (24.9%)[9] and Ethiopia (27.1%)[15]. In addition, the prevalence of stress in this study was 61%, which aligns with studies conducted in France (61.6%) and Jordan (69.5%)[21,22] and is higher than what studies done in Ethiopia (32.5%), Spain (28.14%), and India (15.57%) found[15,16,18]. Differences in the prevalence may be due to differences in the rate of COVID-19 cases in these countries and the differences in strict quarantine.

Factors associated with depression were age, gender, and a history of psychological disorders. Gender had a significant association with depression. This finding supports research[15,20] conducted in Ethiopia and India, which found that females had higher rates of depression than males, especially in severe and extremely severe forms. According to one study[24], females may be more frequently exposed to mental illness, societal influences, economic hardship, or hormonal changes. A higher level of depression was reported among respondents aged between 18-24 years; they reported higher rates of extremely severe depression than the other age groups. Students who had a history of psychological disorders or were on psychoactive agents had a higher risk of developing extremely severe depression, as a history of physical illness may exacerbate the influence of COVID-19; this finding is supported by a systematic review[15] of the literature related to the mental health consequences of the COVID-19 pandemic and a study done in Ethiopia[25].

Factors associated with anxiety were age, a history of psychological disorders, and a positive test for COVID-19. In this study, all age groups reported a high prevalence of extremely severe anxiety; this finding supports a study conducted in Bangladesh[26], whereas the opposite was found in a study in China[9]. Extremely severe anxiety was reported by 53% of the respondents with a history of psychological disorders and 50% of those who had tested positive for COVID-19. A previous study[27] found that the increasing numbers of COVID-19 cases and the increasing numbers of countries affected by the COVID-19 pandemic elevated the population's concerns regarding being infected, which increased the prevalence of anxiety.

Regarding stress, factors associated with stress were age, gender, and a history of psychological disorders. A study conducted in Ethiopia found that students who had depression and anxiety had a 2.3 and 2.8 higher risk of developing stress compared to those who had no depression and anxiety. In addition, a systematic review[15,25] of the literature related to the mental health consequences of the COVID-19 pandemic has the same finding. In this study, severe and extremely severe stress was more common among respondents aged between 18-24 years. Females reported a higher frequency of severe and extremely severe stress than males; furthermore, respondents with a history of psychological disorders reported a higher frequency of severe and extremely severe stress. Evidence showed that higher stress levels are associated with the youth and the female gender[28].

Limitations

The following study limitations should be addressed in future research. Because the participants were selected with a convenience sampling technique, the sample may not represent the entire population accurately. Unlike longitudinal studies, the study's design was cross-sectional, which prevents inferences about causes and effects. A longitudinal study was not an option because of the social isolation and lockdown that was in force nationwide at the time of the survey, which should be noted.

Conclusions

COVID-19 pandemic-related consequences, such as the closure of colleges, the transition to an online learning system, the loss of part-time jobs, the cancellation of graduation ceremonies, and the loss of close relatives, led to high rates of anxiety, depression, and stress among university students. This suggests that there is a requirement to implement psychological support programs to help students to cope with such events.

Ethics Approval

The Research Ethics Committee has approved this study at King Khalid University, approval number ECM#2021-3703.

Informed Consent

Participants' consent was obtained through a question on the surveys' first page indicating their voluntary participation.

Authors' Contributions

All authors are equally involved in collecting the data and writing the manuscript.

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