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Impact of COVID-19 Pandemic on Students' Mental Health: A Case Study of Jordanian Universities

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ABSTRACT

Aims The impact of the COVID-19 pandemic spans all aspects of life. This study aimed to investigate the mental health situation of Jordanian university students during the COVID-19 pandemic.

Instrument & Methods This cross-sectional study on 1000 university students from April to May 2020. A web-based survey that investigates students' psychological distress and anxiety was conducted. Google Form was used to create the survey, and it was published using Facebook and WhatsApp applications over university students' groups. SPSS 19 software was used for analysis. Nonparametric tests (Mann-Whitney and Kruskal-Wallis) were used to examine the significant associations between psychological distress and anxiety; an ordinal regression analysis was also performed.

Findings Of the 1000 students who filled the questionnaire, 39.3% were male, and 60.7% were female. The Mean±SD age of the student was 22±3.8 years old. 42.1% suffer from distress, and 72.6% suffer from anxiety. Furthermore, male gender and family income stability were protective factors against psychological distress and anxiety. Regions (Irbid, Balqa, Jerash, Ajloun, Alzarqa, Tafila, Amman, Aqaba, Karak, Maan) were considered as a risk factor.

Conclusions Covid-19 pandemic affects students' mental health, primarily distress and anxiety. Male gender and family income stability are protective factors. Some regions are considered as risk factors.

Keywords COVID-19; Anxiety; Psychological Distress; Mental Health; Pandemic; Jordan

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Introduction

On January 30, 2020, the World Health Organization (WHO) declared COVID-19 a "Public Health Emergency of International Concern" [1]. WHO reported that as a natural result of the fluctuating and ambiguous situation that coronavirus put people in, the pandemic was causing widespread concern, fear, grief, and stress [1]. WHO takes the impact of the pandemic on people's mental health very seriously and is following the situation, together with national authorities, while providing information and guidance to governments and the public [1]. More responsibility and precautions need to be taken [2], which increases the possibility of stress, depression, and anxiety for uninfected people as well as for infected people who are subject to societal rejection. This pandemic affected all sectors, and this study concentrates on the education sector. The coronavirus disease 2019 (COVID-19) pandemic has caused more than 1.6 billion children and young adults to drop out of education in most countries; more than 91% of students are enrolled in schools worldwide [3].

On May 20, 2020, 672 cases of COVID-19 were confirmed in Jordan, according to the statistics of the Jordanian National Center for Security and Crisis Management [4]. According to a statement by the Jordanian Minister of Health, the epidemiological situation in Jordan compared to the region is under control during a live broadcast organized by the Washington Institute for Near East Policy (WINEP). Jordan is one of the few countries that recorded the fewest cases and deaths during the pandemic due to strict government measures in dealing with the situation [5].

Students in Jordan were forced to replace physical classes with online learning, facing all the challenges related to a situation that most of them had to face for the first time. Mental health professionals need to provide the necessary support to those exposed and deliver care.

Shigemura *et al.* predicted mental health consequences, such as extreme fear and negative societal behaviors, might evolve to include a broad range of public mental health concerns, including distress reactions (insomnia, anger, intense fear of illness even in those not exposed), health risk behaviors (increased use of alcohol and tobacco, social isolation), mental health disorders (post-traumatic stress disorder, anxiety disorders, depression, somatization), and lowered perceived health. Therefore, they recommended that mental health professionals provide the necessary support to such groups. Also, a particular concentration should be directed to categories that are more likely to suffer mentally than others, such as infected patients, their families, healthcare professionals, and aid workers [6].

Kim *et al.* highlighted several points regarding their mental health concerns for infected patients, non-infected people, and mental health care providers. These included patients with severe mental illness that are very vulnerable to infections due to a lack of awareness. Patients free from COVID-19 infection may have psychosocial sequelae due to increasing public fears. Mental healthcare professionals are also at risk of mental health problems due to their efforts to prevent virus infection, which leads to exhaustion [7].

A review of several literature papers that examine the psychological impact of quarantine and protective behaviors concluded that most studies listed adverse psychological impacts while some researchers have suggested long-lasting impact [8-12]. The review presented some advice for officials in situations where quarantine is necessary to reduce any psychological impact. This advice included reducing the quarantine period as much as possible, ensuring enough supplies, and providing a clear rationale about the benefits of quarantine [8]. Since physical meetings are forbidden and may cause infections [13], Kameg *et al.* [14] and Wind *et al.* [13] encourage experts to start using e-mental health care applications promptly. These applications can be used both as methods to continue their care to current patients in need and as interventions to cope with the imminent upsurge in mental health symptoms due to the coronavirus [13-17]. Kameg *et al.* also state that psychiatric nurses must act as leaders to improve the virus's impact [14].

College students form a significant part of communities; thus, mental health is prioritized. Cao *et al.* [18] investigated and analyzed the mental health status of college students in China. Cao *et al.* concluded that almost a fourth of the students were experiencing anxiety. However, several factors seemed to reduce stress, such as living in an urban area, family income stability, and living with parents. On the other hand, having relatives or acquaintances infected with COVID-19, economic pressures, effects on daily life, and delays in academic activities positively relate to increased anxiety. This research includes the same questions used in the research context by Cao *et al.* [18] to study mental health, spec anxiety, in students enrolled in Jordanian universities.

Hussain *et al.* [19] investigated the physical and mental health issues for first-year Australian rural university students and their perception of access to available health and support services. Eight mental health items were examined using a four-point response scale (never, sometimes, often, always). Results of the study stated that mental health problems included anxiety (25%), coping difficulties (19.7%), and diagnosed depression (8%). The same distress questions used in Hussain *et al.* [19] were included in this research to ascertain whether or not university students were experiencing distress.

This paper aimed to study the impact of COVID-19 on students' mental health.

Instrument and Methods

This cross-sectional study was carried out on 1000 university students from April 13, 2020, to May 21, 2020. The authors conducted a web-based survey covering public and private universities in Jordan (28 universities). The online application, Google Form, was used to create the survey, and it was published using Facebook and WhatsApp applications over university students' groups. The inclusion criterion was that the participant should be a student in one of the Jordanian universities and fill all the required questions; otherwise, it will be excluded. One thousand students completed the survey, and all 1,000 were used in the analysis because all survey questions were answered.

The study survey consisted of two main parts: demographic information, which contained seven questions, and mental health indicators which contained 15 questions. The demographic information included gender, age, a residency with family, district, marital status, income source, and whether or not a relative or acquaintance contracted COVID-19. The 15-item survey content was based on two questions related to mental health (psychological distress and students' anxiety). The psychological distress questions contained eight items used previously in the literature [19]. The main aim of this research was to measure whether there was any level of distress; the authors did not focus on the distress level (mild, moderate, or severe). Therefore, while Hussain *et al.* [19] used a four-point Likert scale that measured the level of psychological distress, the authors used a five-point Likert scale, where five means "strongly agree" and one means "strongly disagree". Students' anxiety questions were based on the Generalized Anxiety Disorder 7 (GAD-7) questions [20] and included seven worry and anxiety symptoms items. Although Spitzer *et al.* [20] used a four-point Likert scale, the authors used a five-point Likert scale to measure anxiety levels. The main aim of this research was to measure whether there was any level of anxiety; therefore, the authors did not focus on the anxiety level (mild, moderate, or severe), which was the reason for using a five-point Likert scale.

The study was approved by the Research Ethics Division/ Institutional Review Board of Yarmouk University. Ethical considerations in this study include obtaining the written consent of participants, the confidentiality of participants' information, a full explanation of research objectives for participants, and reservation of exclusion rights for participants.

IBM SPSS version 19.0 software was used to analyze survey responses. Firstly, a descriptive statistics analysis was performed to explain the demographic and other features of the respondents. Nonparametric tests (Mann-Whitney and Kruskal-Wallis) were then used to examine the significant associations among sample features and the psychological distress and students' anxiety over the COVID-19 pandemic. Finally, an ordinal logistic regression analysis was performed for the statistically significant variables, focusing on the odds ratio (OR) with a 95% confidence interval (CI).

A reliability test was measured to show Cronbach's Alpha for psychological distress (Cronbach's Alpha=0.806) and students' anxiety (Cronbach's Alpha=0.819), which were considered acceptable values to continue the analyses (above 0.7).

Findings

Although 28 universities exist in Jordan, one thousand responses were collected, only forming a very low response rate. Responses consisted of 607 (60.7%) females and 393 (39.3%) males, as shown in Table 1. Most of the participants ranged in age from 18 to 22, with a value of 699 (69.9%). Almost 40.4% of the sample lives in Irbid, while the southern regions (Tafila, Aqaba, Karak, Ma'an, and Madaba) recorded the lowest response. Of the sample, 57.7% had a stable family income, and 90.5% lived with their family; 91.1% had a marital status "single." Most of the sample (92.5%) did not have relatives or acquaintances who contracted COVID-19.

Table 1) Demographic information of the respondents (total N=1000).

Socio-demographics	N (%)
Gender	
Male	393 (39.3)
Female	607 (60.7)
Age	
18-22	699 (69.9)
23-25	181 (18.1)
26-30	69 (6.9)
Above 31	51 (5.1)
Region	
Irbid	404 (40.4)
Balqa	31 (3.1)
Jerash	24 (2.4)
Ajloun	36 (3.6)
Alzarqa	136 (13.6)
Tafila	7 (0.7)
Amman	304 (30.4)
Madaba	6 (0.6)
Aqaba	13 (1.3)
Karak	11 (1.1)
maan	8 (0.8)
Mafraq	20 (2.0)
Steady family income	
Stable	577 (57.7)
Nonstable	423 (42.3)
Living with	
The family	905 (90.5)
Far from the family	95 (9.5)
Relative or acquaintance got COVID-19	
Yes	75 (7.5)
No	925 (92.5)
Social status	
Single	911 (91.1)
Married	72 (7.2)
Other	17 (1.7)

The two main variables in the study were psychological distress and students' anxiety. As shown in Table 2, the frequency of each student's response was calculated for the eight items of

psychological distress and the seven items of students' anxiety. Questions concerning psychological distress and anxiety used a five-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). Of the 1,000 university students, 42.1% agreed that they suffer from distress, and 72.6% agreed to suffer from anxiety. Over 22.30% of the students disagreed that they suffer from distress, and 9.6% disagreed that they suffer from anxiety.

Table 2) Frequency of responses for psychological distress and anxiety items

Levels	Psychological distress		Anxiety	
	N	%	N	%
Strongly disagree	43	4.30	20	2.00
Disagree	180	18.00	76	7.60
Neither agree nor disagree	356	35.60	178	17.80
Agree	294	29.40	411	41.10
Strongly agree	127	12.70	315	31.50

Before going any further in the analysis, a nonparametric test (One-Sample Kolmogorov-Smirnov test) was performed to obtain the normality of the two main variables. Both variables had an assumption significance of less than 0.05, which meant that the authors would perform the nonparametric tests (Mann-Whitney test and the Kruskal-Wallis) in their analysis.

First, the authors started with the Mann-Whitney test and the Kruskal-Wallis test to compare the median scores among the demographic variables.

Table 3 shows the relationship between the demography variables and median scores of psychological distress and students' anxiety variables. Gender scored a p-value of <0.05 in both psychological distress and students' anxiety variables as statistically significant, which meant there is a difference between the median value of male and female respondents. Females show a higher median value for psychological distress (3.7143) than males (3.000). This means females seem much more distressed than males. Furthermore, females show a higher median value for anxiety (4.00) than males (3.7143). Also, steady income scored a p-value of <0.05 in psychological distress and students' anxiety variables, which was statistically significant, and meant there was a difference between the median value for psychological distress of stable income (3.1250) and non-stable income (3.5000); in addition to a difference between the median value for anxiety of stable income (3.7143) and non-stable income (4.000). Non-stable income showed higher psychological distress and students' anxiety than stable income. Regions had no significant impact on psychological distress with a p-value of > 0.05, while in students' anxiety, there was a statistically significant difference with a p-value of <0.05. Having a relative or acquaintance infected with COVID-19 had no significant impact on psychological distress and students' anxiety variables with a p-value of > 0.05. Age and marital status had no significant impact on psychological distress and students' anxiety with a p-value of > 0.05. Living with the family had no significant impact on students' anxiety with a p-value of >0.05. In analyzing the psychological distress items, living with family showed higher median values than living far from the family.

Table 3) The relationship between the demography variables and median scores of psychological distress and students' anxiety variables

Variables	Psychological distress		Students' anxiety	
	Median Rank	p-value	Median Rank	p-value
Gender				
Male	3.0000	0.000[a]	3.7143	0.000[a]
Female	3.3750		4.000	
Age				
18-22	3.250	0.418[b]	3.8571	0.499[b]
23-25	3.250		3.8571	
26-30	3.1250		3.7143	
Above 31	3.250		4.0000	
Region				
Irbid	3.1875	0.465[b]	3.7143	0.005[b]
Balqa	3.2500		4.0000	
Jerash	3.0625		3.500	
Ajloun	3.4375		3.7143	
Alzarqa	3.3750		4.000	
Tafila	2.6250		3.5714	
Amman	3.2500		4.0000	
Madaba	2.5625		3.0000	
Aqaba	3.2500		4.0000	
Karak	3.6250		4.0000	
maan	3.5625		4.1429	
Mafraq	2.8750		3.5714	
Steady family income				
Stable	3.1250	0.000[a]	3.7143	0.000[a]
Nonstable	3.5000		4.0000	
Living with				
the family	3.2500	0.040[a]	3.8571	0.144[a]
In the housing (far from the family)	3.1250		3.7143	
Relative or acquaintance got COVID-19				
Yes	3.5000	0.054[a]	4.0000	0.149[a]
No	3.2500		3.8571	
Social status				
Single	3.2500	0.532[b]	3.8571	0.436[b]
Married	3.2500		4.0000	
Other	3.5000		4.1429	

a=Mann-Whitney test; b=Kruskal Wallis test

The significant factors included in the univariate analysis were used to perform the ordinal logistic regression analysis. In the model test, p-value=0.00, which is less than 0.05, indicating that the OR value of at least one variable was statistically significant. Therefore, x2=3.898, p-value=0.918 > 0.05, obtained in the test of parallel lines, indicating a good model fit with the observed values.

Results shown in Table 4 indicate that the male gender is considered a protective factor (OR=0.478, 95% CI: 0.377, 0.607) against psychological distress, in contrast to females with OR=1, which means it has no impact. Moreover, the stability of family income (OR=0.506, 95% CI: 0.401, 0.639) was considered a protective factor. In contrast, the live-with family was

considered a risk factor with an OR value greater than 1 (OR=1.415, 95% CI: 0.964, 2.077).

The significant factors included in the univariate analysis were used to obtain the ordinal logistic regression analysis. The model test's p-value (0.001) was less than 0.05, indicating that the OR value of at least one variable was statistically significant. Therefore, x2=32.333b, p-value=0.766 > 0.05, obtained in the test of parallel lines, indicating a good model fit with the observed values.

The results in Table 5 showed that the male gender is considered a protective factor (OR=0.554, 95% CI: 0.435, 0.706) against students' anxiety, in contrast to females with OR=1. Moreover, the stability of family income (OR=0.511, 95% CI: 0.400, 0.652) is considered a protective factor. All regions are considered risk factors with an OR value greater than one, as shown in Table 5, except Madaba, which is considered a protective factor. Mafraq does not affect OR=1.

Table 4) Ordinal regression analysis of factors affecting psychological distress

Factors	regression coefficient βi	Std. error	p-value	Odd ratio	95% Confidence Interval	
					Lower Bound	Upper Bound
Gender						
Male	-0.738	0.1215	0.000	0.478	0.377	0.607
Female	0	-	-	1	-	-
Steady family income						
Stable	-0.681	0.1190	0.000	0.506	0.401	0.639
Non-stable	0	-	-	1	-	-
Live with						
The family	0.347	0.1959	0.076	1.415	0.964	2.077
Far from the family	0	-	-	1	-	-

Table 5) Ordinal regression analysis of factors that affected student's anxiety

Factors	regression coefficient βi	Std. error	p-value	Odd ratio	95% Confidence Interval	
					Lower Bound	Upper Bound
Gender						
Male	-0.591	0.1235	0.000	0.554	0.435	0.706
Female	0	-	-	1	-	-
Steady family income						
Stable	-0.672	0.1247	0.000	0.511	0.400	0.652
Non-stable	0	-	-	1	-	-
Region						
Irbid	0.501	0.4262	0.240	1.650	0.716	3.804
Balqa	0.766	0.5289	0.148	2.151	0.763	6.066
Jerash	0.137	0.5522	0.805	1.146	0.388	3.383
Ajloun	0.255	0.5165	0.622	1.290	0.469	3.550
Alzarqa	0.930	0.4467	0.037	2.535	1.056	6.085
Tafila	1.370	0.7752	0.077	3.935	0.861	17.981
Amman	0.747	0.4307	0.083	2.110	0.907	4.909
Madaba	-1.216	0.8448	0.150	0.297	0.057	1.553
Aqaba	0.906	0.6671	0.174	2.475	0.670	9.149
Karak	0.161	0.6757	0.811	1.175	0.313	4.418
maan	0.379	0.7877	0.630	1.461	0.312	6.843
Mafraq	0	-	-	1	-	-

Discussion

One of the first studies about mental disorders in university students during the COVID-19 pandemic was in China [18]. With the spread of the disease globally, researchers focused on mental health and the extent of the impact of the virus on the psyche of patients. Various factors negatively affect psychological distress and anxiety in general, specifically for students; these include quarantine, social distancing, self-isolation, loneliness, and therapy of the infected people [21].

The main aim of this study was to investigate the impact of covid-19 on students' mental health. This study indicated that 72.6% of university students were affected by anxiety, and 42.1% were affected by psychological distress. The lack of medical equipment, masks, the focus of newscasts on the pandemic, the spread of rumors, the increase in cases infected with the virus on the ground, and the virus outbreak in different countries, may affect anxiety levels and fear [22].

This study on university students in Jordan indicated that psychological distress and anxiety were related to gender and family income stability. The psychological distress is linked to whether the student lives with family, and anxiety is related to the region or the governorate. However, age and marital status showed no significant difference in anxiety or psychological distress. This could be because all sample members were almost the same age, and 91% were single. A relative or acquaintance infected with COVID-19 or not showed no significant difference in anxiety or psychological distress, different from the previous study [18]. The differences in factors from previous studies might be due to the environment and cultural issues since the current work deals with

Jordanian students.

In contrast, Cao *et al.* [18] dealt with Chinese students. Females showed higher psychological distress and students' anxiety than males; this can be due to several reasons, including increased hormonal fluctuations in females [23] and household chores that cause sleep problems [24]. Non-stable income showed higher psychological distress and students' anxiety than a stable income, which is in line with previous work [25].

In multivariate logistic regression analysis, being a male and having a stable family income are protective factors, as represented in the odds ratio with a value less than 1. This result is in line with a previous study [18], which also demonstrated that family income stability is an essential factor that affects students' anxiety [18, 26]. Living with the family was considered a risk factor in psychological distress analysis. Although this result contrasts previous work [13], it seems logical that when a student lives with his or her family, and each member of the family might interact with friends or strangers, this may increase the fear of catching the virus. On the other hand, if a student lives with one roommate, there will be a fear of catching the virus from only one side.

All regions were considered as a risk factor, except Madaba and Mafraq. This might be due to the number of infections in these regions being much lower than in other regions. In addition, students from Madaba and Mafraq usually study at universities located in their governorates, therefore reducing the possibility of catching the disease from far universities.

There were several limitations in this study: The study sample size consisted of 1,000 respondents, which is considered small compared to Jordanian university students. This is because the survey was administered online, and completing the questionnaire was optional rather than compulsory.

The geographical distribution of the participating student respondents was not equal or close in many regions, as the students in Irbid, Zarqa, and Amman comprised 84.4% of the sample size.

Conclusion

Anxiety and psychological distress are among the most significant problems facing mental health professionals today. COVID-19 is currently one of the most significant factors that helped stimulate these problems, especially among university students in Jordan. Of the Jordanian university students, 42.1% suffered from psychological distress, and 72.6% suffered from anxiety. Both anxiety and psychological distress were affected by gender and family income stability, where both were protective factors. However, in all regions except two, living with the family was considered a risk factor. Students need more attention to cope with their pressures during quarantine, which can negatively impact their academic achievement.

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