



Evaluating the impact of COVID-19 on mental health of the public in Jordan: A cross-sectional study

[Evaluación del impacto de COVID-19 en la salud mental del público en Jordania: Un estudio transversal]

Yara A. Suleiman¹, Derar H. Abdel-Qader^{1*}, Bashar A. Suleiman², Adel H. Suleiman³, Salim Hamadi¹, Ahmad Z. Al Meslamani⁴

¹Faculty of Pharmacy and Medical Sciences, University of Petra, Amman, Jordan.

²Faculty of Pharmacy, The American University of Madaba, Madaba, Jordan.

³Dr. Sulaiman Al Habib Hospital, Riyadh, Saudi Arabia.

⁴College of Pharmacy, Al Ain University of Science and Technology, Abu Dhabi, United Arab Emirates.

*E-mail: derar.balawi@uop.edu.jo

Abstract

Context: Although the COVID-19 pandemic was expected to have a significant impact on the mental health of the Jordanian population, there have been few studies to investigate the nature and magnitude of the impact.

Aims: To assess the potential psychiatric disorders induced by the current pandemic and evaluate the relevant risk factors.

Methods: A cross-sectional national survey-based study was conducted over 3 months (August to October, 2020) in 12 governorates in Jordan using random proportionate sampling; the questionnaire being answered in face-to-face interviews with a randomly selected sample of the adult population aged 18 years and older, to collect data from 1820 individuals. The modified Kessler scale was validated by a multidisciplinary committee. SPSS V26 was used for data analysis.

Results: Findings indicated that due to the COVID-19 pandemic, 11.4% (207/1820) of participants had severe mental disorders, 25.4% (462/1820) moderate mental disorders, while 34.7% (632/1820) were without any mental issues. Predictors for severe mental disorder were: monthly income (<500 JOD) {OR: 3.6, 95%CI: 3.12-7.68, p = 0.01}, Employment status (unemployed) {OR: 2.4, 95%CI: 1.45-4.96, p = 0.001}, and those diagnosed with diabetes {OR: 1.9, 95%CI: 1.13-3.63, p = 0.03}.

Conclusions: COVID-19 pandemic had a notable impact on the mental health of people living in Jordan. People who had low monthly income (<500 JOD) or were unemployed were mostly affected as well as diabetes patients. These cases were recognized as significant risk factors for moderate and severe mental disorders. Appropriate psychiatric and economic interventions were recommended to improve the mental preparedness for pandemics among the population in Jordan.

Keywords: depression; anxiety; Kessler psychological distress scale; SARS-CoV-2 infection; social epidemiology.

Resumen

Contexto: Aunque se esperaba que la pandemia de COVID-19 tuviera un impacto significativo en la salud mental de la población jordana, se han realizado pocos estudios para investigar la naturaleza y la magnitud del impacto.

Objetivos: Evaluar los posibles trastornos psiquiátricos inducidos por la pandemia actual y evaluar los factores de riesgo relevantes.

Métodos: Se realizó un estudio transversal nacional basado en encuestas durante 3 meses (de agosto a octubre de 2020) en 12 municipios de Jordania utilizando un muestreo aleatorio proporcional; el cuestionario se respondió en entrevistas cara a cara con una muestra seleccionada al azar de la población adulta de 18 años o más, para recopilar datos de 1820 personas. La escala de Kessler modificada fue validada por un comité multidisciplinario. Se utilizó SPSS V26 para el análisis de datos.

Resultados: Nuestros hallazgos indicaron que debido a la pandemia de la COVID-19, el 11,4% (207/1820) de los participantes tenían trastornos mentales graves, el 25,4% (462/1820) trastornos mentales moderados, mientras que el 34,7% (632/1820) no tenían problemas mentales. Los predictores de trastorno mental severo fueron: ingreso mensual (<500 JOD) {OR: 3,6, IC del 95%: 3,12-7,68, p = 0,01}, Situación laboral (desempleado) {OR: 2,4, IC del 95%: 1,45-4,96, p = 0,001}, y los diagnosticados con diabetes {OR: 1,9, IC del 95%: 1,13-3,63, p = 0,03}.

Conclusiones: La pandemia de COVID-19 tuvo un impacto notable en la salud mental de las personas que viven en Jordania. Las personas que tenían ingresos mensuales bajos (<500 JOD) o estaban desempleadas fueron las más afectadas, así como los pacientes con diabetes, estos casos fueron reconocidos como factores de riesgo importantes para los trastornos mentales moderados y graves. Se recomendaron intervenciones psiquiátricas y económicas apropiadas para mejorar la preparación mental para las pandemias entre la población de Jordania.

Palabras Clave: ansiedad; depresión; epidemiología social; escala de angustia psicológica de Kessler; infección; SARS-CoV-2.

ARTICLE INFO

Received: September 5, 2021.

Received in revised form: October 9, 2021.

Accepted: October 11, 2021.

Available Online: October 16, 2021.



INTRODUCTION

Over the past year, one of the most contagious pandemics has invaded the world causing thousands of deaths and global economic crisis. Coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was initially identified in Wuhan, China (December 2019) and rapidly spread to nearly the entire world (Zheng et al., 2021; CDC, 2021). SARS CoV-2 is an RNA virus with a 2-14-days incubation period, exhibiting mild to severe symptoms, mainly dry cough, fever, and shortness of breath. This may proliferate into more serious complications, especially among vulnerable patient groups (Hassan et al., 2020; Pan et al., 2020; Wang et al., 2020). As stated by research, SARS CoV-2 infected respiratory droplets are the main form of transmission. Specifically, when an individual who has respiratory symptoms (e.g., sneezing or coughing) is standing nearby within one meter of distance (Chan et al., 2020; Huang et al., 2020; Li et al., 2020; Ong et al., 2020).

COVID-19 was announced as a global pandemic on March 11, 2020 (WHO, 2020). The consequences of this emergency may affect the health and safety of individuals, causing them to feel confusion, insecurity, and emotional isolation (Pfefferbaum and North, 2020; Chen et al., 2020). Communities have also been affected by economic loss, school closure, insufficient resources for medical care, and inadequate distribution of necessities (Pfefferbaum and North, 2020). These effects may induce a range of negative emotional reactions (such as distress or psychiatric conditions), irrational health behaviors (such as excessive substance use), and non-compliance with public health directives (such as home confinement and vaccination) in the general population (Pfefferbaum and North, 2020). The spectrum of psychological consequences produced by such natural disaster “viral outbreaks” is different from that occurred as a result of conventional crises, such as wars, mass destruction, or human-related accidents, in which post-traumatic stress disorder (PTSD) is ubiquitous (Liu et al., 2020; Yao et al., 2020). Nevertheless, life-threatening viral infections may trigger other psychopathological disorders, such as depression and anxiety. The most vulnerable groups are those at heightened risk for COVID-19, including the elderly, immunocompromised patients, people with co-morbidities, and those with pre-existing psychiatric or substance use problems and children (Pfefferbaum and North, 2020; Yang et al., 2020). The prevalence, severity, and outcomes of these adverse effects are still ambiguous in most countries. The seriousness of psychological outcomes of COVID-19 is expected to be greater in

countries in which individuals suffer from unemployment, huge economic loss, as well as deficient distribution and delivery of health care services. These criteria encompass most of the Middle Eastern countries, including Jordan.

A flight arriving from Italy on March 3, 2020, carried the first case recognized of COVID-19 in Jordan marking the beginning of the crisis (Alqutob et al., 2020). The authority in The Hashemite kingdom enforced the defense law that resembled an urgent recognition of the situation in order to control the pandemic and reduce the transmission of the virus between people. Including internal curfews as well as travel ban procedures. The Ministry of Health took several measures controlling the situation; that included applying public health and social preservation protocols and until this day, they provide daily reports regarding the epidemiological situation announced on their website (Al-Tammemi, 2020; Jordanian Ministry of Health, 2020). The burden over the Jordanian health care system increases proportionally along with the total COVID-19 active case number, posing more challenges and responsibilities to front-line health care teams, not to forget concerns to the general public (Suleiman et al., 2020).

Consequently, we acknowledge that investigating the mental health of the public during COVID-19 should be a top priority for researchers, health officials, and policymakers. This study was one of the first studies to assess the impact of COVID-19 on the mental health of the Jordanian public. The results would provide decision-makers in Jordan a better understanding of the public’s mental health during emergencies, therefore contributing to effective solution ideas in order to help preserve people’s lives and protect them from irreparable harm. Not to forget supporting the Jordanian healthcare system and medical teams, most importantly preserving the Jordanian national security.

This study aimed to investigate potential psychiatric disorders, mainly affective and anxiety disorders, psychological distress, risk factors, and potential predictors for mental preparedness for the pandemic.

MATERIAL AND METHODS

Study design and eligibility criteria

A cross-sectional national survey was conducted over 3 months (from August 1 to the end of October, 2020) in all 12 governorates of Jordan. The questionnaire was carried out as face-to-face interviews on a random sample of the ≥18-year-old adult population.

Table 1. Calculation of sample proportionate distribution in Jordan (n = 1820).

Region	Areas	Population	% of total	Sample size
Capital	West Amman, East Amman	4 430 700	42.0%	764
Northern	Irbid, Ajloun, Jerash, Mafraq	3 021 800	28.6%	521
Central	Balqa, Zarqa, Madaba	2 261 800	21.4%	389
Southern	Karak, Tafilah, Ma'an, Aqaba	839 700	8.0%	146
Total	-	10 554 000	100.0%	1820

Sample size and sampling method

Using proportionate random sampling, the population of the study was divided into 4 geographical regions: Northern, Southern, Capital and Central Regions. Also, two urban areas and two rural areas were selected randomly from each region, as shown in Table 1.

Based on the Raosoft sample size calculator (Raosoft, 2004), the minimum recommended sample size for this study was 385 adults at a 95% significance level and 5 % error margin. To include a representative sample, which could be generalized, the authors decided to include 1820 individuals.

Study instrument

The study instrument was a self-administered questionnaire. This tool was developed in Jordan after analyzing previous relevant studies that investigated the link between COVID-19 and psychiatric disorders among the public (Lai et al., 2020; Mohindra et al., 2020; Xiao et al., 2020). The survey was translated to Arabic and validated by two bilingual linguistic experts using the back translation method intentionally to be suitable to the Jordanian public. The questionnaire was constructed to include 3 sections with a total of 28 questions.

Socio-demographic characteristics of participants

This section included six questions about participants' gender, age, educational level, income, marital status, and living area.

Risk factors assessment

This section included questions regarding risk factors for a severe course of COVID-19, including chronic diseases, age, immunity status, and smoking. Also, it included questions related to employment status, psychiatric insurance coverage, history of mental illness, and if the participant was currently receiving psychotherapy or not.

Assessment of psychiatric disorders (depression and anxiety)

To examine depression and anxiety symptoms, Kessler Psychological Distress Scale (K10) was used (Kessler et al., 2003). This was a 10-item questionnaire intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced during the COVID-19 outbreak. The scale used five-value response options for each question –all of the time, most of the time, some of the time, a little of the time, and none of the time– that were scored from five through to one. Kessler scale was tailored to our aims by adding 6 questions related to the COVID-19 and the local situation in Jordan. The scale was reviewed, validated, and scored following the addition of the new questions. Therefore, the maximum score was therefore 80, indicating a severe mental problem, and the minimum score was 16, indicating well mental health. From 16 to 32 was considered well mental status, from 32 to 48 was considered mild mental status, from 48 to 64 was considered moderate mental status, and from 64 to 80 was considered severe mental status.

Reliability and validity of the second study instrument

Reliability was established using a pilot test by collecting data from 20 subjects in each governorate. Data collected were analyzed by SPSS Version 26 (Statistical Package for Social Sciences, by IBM incorporated). Given the fact that Cronbach's alpha (α) is the most commonly used measure of internal consistency reliability (Noble and Smith, 2015; Bolarinwa, 2015), we used it in order to test our instrument reliability. Our results showed good reliability ($K = 0.75$), and it was a significant result ($p < 0.05$). Data from the pilot testing were not included in our study results.

Content validity was assessed by a panel of 3 members included a psychiatrist, clinical pharmacist, and infectious diseases consultant. Questions were

rated according to the appropriateness, importance and phrasing, whereas overall means (\pm SD) were 8.2 ± 1.23 , 8.45 ± 1.47 and 8.81 ± 1.74 , respectively. Also, the rater's additional comments were collected. Amendments to the survey included adding an extra information risk factor section and clarification of Kessler questions.

Data collection and analysis

The final survey was delivered through face-to-face interviews with participants who were willing to participate, and met the inclusion criteria. Due to the COVID-19 pandemic situation, protective measures were followed while collecting data, such as wearing protective medical face masks and maintaining physical distance between the collector and participant. Also, the survey was installed on an iPad2 IOS 4.3 in order to minimize paper transfer.

Interviews were conducted across the country by the researcher and 5 experienced pharmacists. Eligible participants were approached randomly in public places. Pharmacists briefed the participants about the aims of the study, the time needed to complete the survey, and ensured people were given the choice to complete the questionnaire on one's own or by the data collector. Verbal consent was obtained from eligible respondents. The researcher ensured that the survey was anonymous and confidential. Data were coded and entered into the Statistical Package for Social Science (SPSS®) version 26 (IBM, Chicago, IL, US). Descriptive results were presented as proportions (%) with 95% CIs, while logistic regression results were presented as adjusted ORs with 95% CI. Statistical significance was considered at $p < 0.05$ (with a confidence limit at 95%). Logistic regression was used to determine predictors for mental disorders. Rao-Scott's chi-square test was used to assess differences between categorical variables. Pearson's R was calculated to assess the correlation (association) between risk factors and psychiatric disorders scale (K10).

Ethical considerations

Ethics Approval: The Institutional Review Board (IRB) at the University of Petra approved the research (Q1/7/2020). All participants gave a consent form showing their willingness to participate in this study.

RESULTS

To achieve the targeted sample, 1820 individuals were approached. More than half of the included participants were females 55.8% (1015/1820), and aged 30-55, 63.5% (1156/1820). Approximately two-thirds 60.3% (1097/1820) of the respondents had a

college diploma or BSc; while 5.6% (102/1820) held MSc/PhD postgraduate qualifications; 23.7% (431/1820) participants earned less than 500 JOD per month. Although results showed significant age and gender variances across the different demographic regions ($p < 0.05$), there were no significant variances in education level or monthly income across the different demographic regions ($p > 0.05$), as shown in Table 2.

The study sample participants included 35.2% (641/1820) heavy smokers, 5.7% (103/1820) diabetics, 4.2% (76/1820) suffering from chronic respiratory disorders, 3.5% (63/1820) were immuno-compromised, and 3.1% (57/1820) were suffering from cardiac disorders. Among the families of participants, 36.9% (672/1820) were heavy smokers, 8% (146/1820) were diagnosed with cardiac disorders, 13% (236/1820) were diabetic, and 3.6% (65/1820) were immuno-compromised. The findings of the present study illustrated that although the majority of participants 78.4% (1426/1820) declared that they did not suffer from any mental disorder, however, 8.9% (162/1820) were diagnosed with anxiety disorder, 5.6% (102/1820) were diagnosed with depression, and 3.1% (56/1820) were diagnosed with post-traumatic stress disorder during the COVID-19 pandemic. Regarding employment status, roughly a quarter 24% (437/1820) of respondents were unemployed, 17% (309/1820) were students, 5.7% (104/1820) were self-employed, and 4.7% (86/1820) were retired. Approximately two-thirds 62% (1129/1820) of participants had no psychiatric health insurance, and only 25% (455/1820) had full psychiatric health insurance cover.

The findings of the present study indicated that 11.4% (207/1820) of the study participants suffered a severe mental disorder due to the COVID-19 pandemic, 25.4% (462/1820) of participants indicated a moderate mental disorder, while 34.7% (632/1820) were well and not suffering from any mental health issue (Fig. 1). During the COVID-19 pandemic, 5.5% (101/1820) complained of unexplained chronic fatigue, 8.6% (156/1820) felt nervous, and 7% (129/1820) felt constantly hopeless. In addition, 25.4% (463/1820) felt restless or fidgety most of the time. Surprisingly, 21.8% (397/1820) of the participants said their main worry concerned the social and economic consequences of the infection, rather than the infection, treatment and quarantine, as shown in Table 3.

Predictors for severe mental disorder were monthly income (< 500 JOD) {OR: 3.6, 95%CI: 3.12-7.68, $p = 0.01$ }, Employment status (unemployed) {OR: 2.4, 95%CI: 1.45-4.96, $p = 0.001$ }, and those with diagnosed with diabetes {OR: 1.9, 95%CI: 1.13-3.63, $p = 0.03$ }, as shown in Table 4.

Table 2. Demographic characteristics of participants (Study 1) (n = 1820).

Demographics	Total (n = 1820) (n, %)	Capital (n, %)	Northern (n, %)	Central (n, %)	Southern (n, %)	P-value
Age (years)						0.03
18-29	(528, 28%)	(298, 39%)	(73, 14%)	(83, 21.3%)	(74, 50.7%)	
30-55	(1156, 63.5%)	(385, 50.4%)	(403, 77.4)	(298, 76.6%)	(70, 47.9%)	
>55	(136, 7.5%)	(81, 10.6%)	(45, 8.6%)	(8, 20.1%)	(2, 1.4%)	
Gender						0.04
Male	(805, 44.2%)	(388, 50.8%)	(203, 39%)	(109, 28%)	(105, 71.9%)	
Female	(1015, 55.8%)	(376, 49.2%)	(318, 61%)	(280, 72%)	(41, 28.1%)	
Educational level						0.36
Primary	(199, 10.9%)	(65, 8.5%)	(56, 10.7%)	(47, 12%)	(31, 21.2%)	
High school	(422, 23.2%)	(125, 16.4%)	(114, 21.9%)	(115, 29.6%)	(68, 46.6%)	
College (BSc or diploma)	(1097, 60.3%)	(527, 69%)	(322, 61.8%)	(208, 53.5%)	(40, 27.4%)	
Postgraduate (MSc or PhD)	(102, 5.6%)	(47, 6.2%)	(29, 5.6%)	(19, 4.9%)	(7, 4.8%)	
Monthly income in JOD (USD)						0.1
<500 JOD (< 705 USD)	(431, 23.7%)	(186, 24.3%)	(91, 17.4%)	(140, 36%)	(14, 9.6%)	
500-1000 JOD (705-1410 USD)	(968, 53.2%)	(409, 53.5%)	(293, 56.2%)	(152, 39.1%)	(114, 78.1%)	
>1000 JOD (> 1410 USD)	(421, 23.1%)	(169, 22.1%)	(137, 26.3%)	(97, 24.9%)	(18, 12.3%)	
Subtotal	(1820, 100%)	(764, 42%)	(521, 28.6%)	(389, 21.4%)	(146, 8%)	

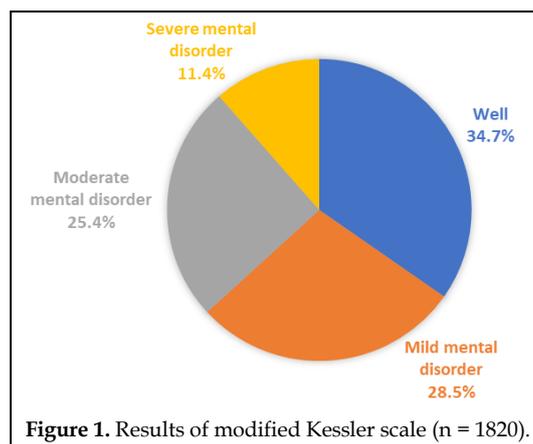


Table 3. Responses of participants to the modified Kessler scale (n = 1820).

During the COVID-19 outbreak, how often did you feel...?	All of the time (a)	Most of the time (b)	Some of the time (c)	A little of the time (d)	None of the time (e)
..tired out for no good reason?	101	340	453	429	497
..nervous?	156	308	551	507	298
..so nervous that nothing could calm you down?	74	169	292	742	543
..hopeless?	129	322	495	399	475
..restless or fidgety?	178	463	384	209	586
..so restless that you could not sit still?	51	251	442	377	699
..depressed?	203	352	493	320	452
.. depressed that nothing could cheer you up?	106	268	379	483	584
.. that everything was an effort?	187	304	465	420	631
..worthless?	218	318	368	439	677
.. sleeping problems?	196	267	490	322	545
..eating problems?	152	311	425	299	633
.. that your smoking rate was increasing?	39	26	41	68	1646
.. that COVID-19 influenced your mental health?	156	382	178	363	741
.. that you were more worried about social and economic consequences of the infection than treatment and quarantine?	397	452	322	196	453
.. that you have COVID-19 symptoms?	56	89	108	236	1331

Table 4. Predictors for moderate and severe mental disorders.

Dependent variables	Independent variables	Odds ratio	p-value	95% CI for odds	
				Lower	Upper
Severe mental disorder	Monthly income (<500 JOD)	3.6	0.01	3.12	7.68
	Employment status (unemployed)	2.4	0.001	1.45	4.96
	Chronic disease (diabetes)	1.9	0.03	1.13	3.63

DISCUSSION

Following the outbreak of COVID-19, several studies emerged suggesting that the resultant crisis was responsible for insecurity, emotional disturbance, and spreading of confusion as well as uncertainty among individuals (Pfefferbaum and North, 2020; Chen et al., 2020) as a consequence of the severe economic downturn and general negative effect on people's lives. According to Liu et al. (2020); Yao et al. (2020), the nature of the psychopathy most likely induced by such disastrous circumstances would be related to anxiety and depressive disorders. Although in most countries, the incidence and severity of these effects and the nature of the associated factors have remained vague, what is known indicates that the negative psychological impacts of viral outbreaks will be significantly greater in countries where poverty, un-

employment, and inadequacies in the health care system are widespread. Therefore, the main purpose of the present study was to investigate the prevalence of mental disorders among people living in Jordan and to explore health and socio-related risk factors for psychiatric disorders during the COVID-19 pandemic.

It is believed that the importance of this study is to illustrate that a high prevalence of severe and moderate psychopathy in the community can lead not only to a public health catastrophe, but to a failure in the entire health care system, which may extend to encompass other sectors. It is imperative therefore, that policymakers and health care providers should be fully informed and experienced with regard to the nature, prevalence, and risk factors associated with these mental disorders.

The strength of the present study is represented in the sampling method and the study instrument; proportionate random sampling was applied as a holistic and valid sampling technique to ensure representative sampling covering all the different regions of Jordan. A modified version of The Kessler Screening Scale was used, which has been widely utilized as a screener for mental health problems (Mitchell and Beals, 2011). This modified version covers additional risk factors and predictors for mental disorders based on the specific nature of the Jordanian lifestyle. This version was edited and validated by a multidisciplinary committee whose members included a psychiatrist, clinical pharmacist, and infectious diseases consultant.

The findings of the modified Kessler scale indicated that more than one-third of the included population suffered from severe and moderate mental disorders. To explain this inclusively, we need to discuss various economic, political, and social aspects of Jordan. The Kingdom of Jordan is a middle-income, relatively small country located in the Middle East with a population of nearly 10 million inhabitants. (Karnouk et al., 2019) The ongoing Syrian and Iraqi crises have greatly influenced both the social and economic climates in Jordan due to influxes of large numbers of refugees and economic migrants, but in spite of the imposition of specific regulations and preferential restrictions such as giving priority in employment to Jordanians and imposing limitations on the legal practice of professions such as pharmacy and medicine, poverty levels have risen (Okasha et al., 2012). A further important factor for consideration must be the unfortunate financial and social circumstances of most Jordanians even before the current pandemic; in assessing the general medical preparedness and availability of trained staff, there were only two psychiatrists, 0.27 psychologists and 0.04 nurses for every 100 000 inhabitants in Jordan (WHO, 2014; International Medical Corps, 2017). The COVID-19 pandemic rapidly wreaked havoc and disruption on every aspect of everyday life in Jordan, causing an unprecedented wave of unemployment, and shortages in the availability of some of the necessities. On the medical front, hospital appointments were canceled, and admissions curtailed except for specific wards. In addition, anxiety levels were raised substantially due to the closure of schools and universities, and many parents were worried about the health, safety, and financial support of their children studying abroad. Therefore, it is believed that economic difficulties heightened the health consequences of the pandemic and strongly affected the severity of mental problems among the Jordanian population.

Findings also demonstrate that those with low monthly income, the unemployed, and diabetic patients are more likely to have moderate and severe mental disorders due to COVID-19. Explaining this within the context of Jordan and its economic situation, we can say that insufficient finance will lead to a poor lifestyle and relentless high-stress levels on a daily basis. This exacerbating bad habits and increasing the incidence of chronic diseases such as diabetes, which, in turn provoke a network of other chronic illnesses (mental and physical), possibly affecting the quality of physical functionality and may worsen to threaten life expectancy. However, looking at the matter from a diabetic patient's perspective, one can say that living with diabetes, its restrictions and effect on health in general, and in older patients, particularly the deterioration in eyesight, is depressing and debilitating. Economic status is also a factor here; if constant, affordable supplies of test strips and insulin are unavailable, a possible indicator for fluctuations in depression rates may well be due to patients not observing a regular testing and dosage regime, particularly if injecting insulin, where forgetting to take the insulin or miscalculating the dose may result in hypo/hyperglycemia.

As noticed from the literature, the risk factors identified in the current study are similar to some of those identified in other studies and differ from the findings in others. Contrary to previous COVID-19-related studies, however, diabetes was found to be a significant risk factor for mental disorders. A study in 2013 found proof that the prevalence of depression is moderately inflated in pre-diabetic and in undiagnosed diabetic patients, and markedly enlarged in previously diagnosed diabetic patients compared to individuals with normal glucose metabolism (Chen et al., 2016). In fact, the findings of Roy and Lloyd (2012) indicate that prevalence rates of depression could be up to three-times higher in patients with type 1-diabetes and twice as high in people with type 2-diabetes, compared with the general population worldwide.

To the best of the researcher's knowledge, the present survey results are the first to indicate that a relevant percentage of the Jordanian population may have experienced mild/moderate/severe psychological distress symptoms during the COVID-19 pandemic. Recommendations to help improve the mental health situation in Jordan include multiple interventions on many levels. First, awareness provided by the healthcare team to the public is incredibly important; it would guide people towards the appropriate measures to take, as well as reducing the stigma behind asking for help. Secondly, a 24-hour hotline number needs to be available for mental health coun-

seling and severe case reporting. Another suggestion is providing affordable treatment as well as reachable insurance, especially for people with pre-existing conditions. Finally, initiating a national protocol for emergencies is recommended. Daily healthy habits were advised to maintain wellbeing and good mental health in good participants.

Limitations

This study has several limitations: 1) This is not a pre-post study, and thus the actual impact of COVID-19 on the mental health of the population cannot be measured. Nevertheless, we implemented COVID-19-focused questions and risk factors questions to investigate how these mental disorders are associated with and affected by the current crisis. 2) The study lacks longitudinal follow-up, which may limit our understanding of the development of the mental health status of Jordanians during the pandemic. 3) Participants in the current study did not receive a standard psychiatric diagnosis. Thus, the results did not encompass a diagnosis of common mental disorders. However, the study instrument enabled the researcher to collate sufficient diagnostic indicators related to mental disorders such as anxiety and depression. Moreover, 4) the current circumstances of COVID-19 and the fear of virus transmission required special and protective measures to take place. Such as maintaining physical distance, wearing face masks, and assuring hygiene while having the survey installed on an iPad to minimize contact.

CONCLUSION

The current study managed to collect data from a representative sample of the community in Jordan. The findings of our study emphasized a higher rate of depressive and anxiety symptoms among the population in Jordan compared to other countries. In addition, our study identified several risk factors for moderate/severe mental disorders. This highlights the importance of psychological and economic interventions to improve the mental health of the public in Jordan. In this regard, it is recommended to implement a national program that encompasses a broad range of mental health care, including but not limited to psychological diagnosis, treatment, education, and training.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ACKNOWLEDGMENTS

Authors thank the University of Petra for facilitating the research. Data availability: Data are available upon reason-

able request from the corresponding author. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

- Alqutob R, Al Nsour M, Rasoul Tarawneh M, Ajlouni M, Khader Y, Aqel I, Kharabsheh S, Obeidat N (2020) COVID-19 crisis in Jordan: Response, scenarios, strategies, and recommendations. *JMIR Public Health Surveill* 6(3): 19332.
- Al-Tammemi AB (2020) The battle against COVID-19 in Jordan: An early overview of the Jordanian experience. *Front Public Health* 8: 188.
- Bolarinwa OA (2015) Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Niger Postgrad Med J* 22(4): 195.
- CDC (2021) Coronavirus Disease 2019 (COVID-19). <https://www.cdc.gov/coronavirus/2019-ncov/index.html> [Consulted October 10, 2021].
- Chan JF-W, Yuan S, Kok K-H, To KK-W, Chu H, Yang J, Xing F, Liu J, Yip CC-Y, Poon RW-S, Tsoi H-W, Lo SK-F, Chan K-H, Poon VK-M, Chan W-M, Ip JD, Cai J-P, Cheng VC-C, Chen H, Hui CK-M, Yuen K-Y (2020) A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: A study of a family cluster. *Lancet* 395(10223): 514–523.
- Chen Q, Liang M, Li Y, Guo J, Fei D, Wang L, He L, Sheng C, Cai Y, Li X, Wang J, Zhang Z (2020) Mental health care for medical staff in China during the COVID-19 outbreak. *Lancet Psychiatry* 7(4): e15–6.
- Chen S, Zhang Q, Dai G, Hu J, Zhu C, Su L, Wu X (2016) Association of depression with pre-diabetes, undiagnosed diabetes, and previously diagnosed diabetes: A meta-analysis. *Endocrine* 53(1): 35–46.
- Hassan SA, Sheikh FN, Jamal S, Ezeh JK, Akhtar A (2020) Coronavirus (COVID-19): A review of clinical features, diagnosis, and treatment. *Cureus* 12(3): e7355.
- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, Xia J, Wei Y, Wu W, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L, Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J, Cao B (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 395(10223): 497–506.
- International Medical Corps (2017) Understanding the Mental Health and Psychosocial Needs, and Service Utilization of Syrian Refugees and Jordanian Nationals. 2017: 1–36.
- Jordanian Ministry of Health (2020) Coronavirus disease. <https://corona.moh.gov.jo/en> [Consulted October 10, 2021].
- Karnouk C, Böge K, Hahn E, Strasser J, Schweininger S, Bajbouj M (2019) Psychotherapy in Jordan: An Investigation of the Host and Syrian Refugee Community's Perspectives. *Front Psychiatry* 10: 556.

- Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, Howes MJ, Normand S-LT, Manderscheid RW, Walters EE, Zaslavsky AM (2003) Screening for serious mental illness in the general population. *Arch Gen Psychiatry* 60(2):184-189.
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R, Tan H, Kang L, Yao L, Huang M, Wang H, Wang G, Liu Z, Hu S. (2020) Factors associated with mental health outcomes among health care workers exposed to Coronavirus Disease 2019. *JAMA Netw Open* 3(3): e203976.
- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KSM, Lau EHY, Wong JY, Xing X, Xiang N, Wu Y, Li C, Chen Q, Li D, Liu T, Zhao J, Liu M, Tu W, Chen C, Jin L, Yang R, Wang Q, Zhou S, Wang R, Liu H, Luo Y, Liu Y, Shao G, Li H, Tao Z, Yang Y, Deng Z, Liu B, Ma Z, Zhang Y, Shi G, Lam TTY, Wu JT, Gao GF, Cowling BJ, Yang B, Leung GM, Feng Z (2020) Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia 382(13): 1199-1207.
- Liu S, Yang L, Zhang C, Xiang Y-T, Liu Z, Hu S, Zhang B (2020) Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry* 7(4): e17-8.
- Mitchell CM, Beals J (2011) The utility of the Kessler screening scale for psychological distress (K6) in two American Indian Communities. *Psychol Assess* 23(3): 752-761.
- Mohindra R, Ravaki R, Suri V, Bhalla A, Singh SM (2020) Issues relevant to mental health promotion in frontline health care providers managing quarantined/isolated COVID19 patients. *Asian J Psychiatr* 51: 102084.
- Noble H, Smith J (2015) Issues of validity and reliability in qualitative research. *Evid Based Nurs* 18(2): 34-35.
- Okasha A, Karam E, Okasha T (2012) Mental health services in the Arab world. *World Psychiatry* 11(1): 52-54.
- Ong SWX, Tan YK, Chia PY, Lee TH, Ng OT, Wong MSY, Marimuthu K (2020) Air, surface environmental, and personal protective equipment contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *JAMA* 323(16): 1610-1612.
- Pan L, Mu M, Yang P, Sun Y, Wang R, Yan J, Li P, Hu B, Wang J, Hu C, Jin Y, Niu X, Ping R, Du Y, Li T, Xu G, Hu Q, Tu L (2020) Clinical characteristics of COVID-19 patients with digestive symptoms in Hubei, China: A descriptive, cross-sectional, multicenter study. *Am J Gastroenterol* 115(5):766-773.
- Pfefferbaum B, North CS (2020) Mental health and the Covid-19 pandemic. *N Engl J Med* 383(6): 510-512.
- Raosoft (2004) Sample Size Calculator by Raosoft, Inc. <http://www.raosoft.com/samplesize.html> [Consulted October 10, 2021]
- Roy T, Lloyd CE (2012) Epidemiology of depression and diabetes: A systematic review. *J Affect Disord* 142: S8-S21.
- Suleiman A, Bsisu I, Guzu H, Santarisi A, Alsatari M, Abbad A, Jaber A, Harb T, Abuhejleh A, Nadi N, Aloweidi A, Almustafa M (2020) Preparedness of frontline doctors in Jordan healthcare facilities to COVID-19 outbreak. *Int J Environ Res Public Health* 17(9): 3181.
- Wang Y, Wang Y, Chen Y, Qin Q (2020) Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures. *J Med Virol* 92(6): 568-576.
- WHO (2020) Coronavirus Disease (COVID-19) Situation Reports. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports> [Consulted October 10, 2021].
- WHO (2014) Mental Health Atlas Country Profile. https://www.who.int/mental_health/evidence/atlas/profiles-2014/jor.pdf [Consulted October 10, 2021].
- Xiao H, Zhang Y, Kong D, Li S, Yang N (2020) The effects of social support on sleep quality of medical staff treating patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China. *Med Sci Monit* 26: e923549-1.
- Yang Y, Li W, Zhang Q, Zhang L, Cheung T, Xiang Y-T (2020) Mental health services for older adults in China during the COVID-19 outbreak. *Lancet Psychiatry* 7(4): e19.
- Yao H, Chen J-H, Xu Y-F (2020) Patients with mental health disorders in the COVID-19 epidemic. *Lancet Psychiatry* 7(4): e21.
- Zheng S, Yang L, Zhou P, Li H, Liu F, Zhao R (2021) Recommendations and guidance for providing pharmaceutical care services during COVID-19 pandemic: A China perspective. *Res Soc Adm Pharm* 17(1): 1819-1824.

AUTHOR CONTRIBUTION:

Contribution	Suleiman YA	Abdel-Qader DH	Suleiman BA	Suleiman AH	Hamadi S	Al Meslamani AZ
Concepts or ideas	x	x		x		
Design		x		x	x	
Definition of intellectual content		x			x	
Literature search	x	x	x	x		x
Experimental studies				x		x
Data acquisition	x		x		x	x
Data analysis	x				x	x
Statistical analysis	x		x			x
Manuscript preparation	x					x
Manuscript editing	x		x			
Manuscript review	x	x	x	x	x	x

Citation Format: Suleiman YA, Abdel-Qader DH, Suleiman BA, Suleiman AH, Hamadi S, Al Meslamani AZ (2022) Evaluating the impact of COVID-19 on mental health of the public in Jordan: a cross-sectional study. *J Pharm Pharmacogn Res* 10(2): 196-205.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.