



Depressed Middle Eastern University Students in Home-Based Quarantine: A Forgotten Issue



Assem Al Refaei^{1*}, Nour Shewaikani¹, Rand R. Hafidh², Bayan Alsaid³, Heba Kalbouneh⁴

Previous investigations have indicated potential associations between dedicated quarantine and depression. However, a literature gap exists regarding the impact of home quarantine on mental status. Accordingly, our study aims to estimate the psychological effect of home quarantine on university students in Iraq, Jordan and Syria. Our study was conducted via an online survey of 4955 randomly selected university students from 123 universities in Iraq, Jordan and Syria. Our survey included questions regarding sociodemographic characteristics along with the validated Arabic version of the CES-D (The Centre for Epidemiologic Studies Depression Scale) to assess the risk and prevalence of depressive symptoms. Among respondents, 73.2% were women, 89.9% were aged between 17 and 24 years and 65.5% were studying medical specialties. The mean CES-D score was 25.57 ± 12.6 . The CES-D score was greater than 16 for 75.8% of quarantined persons, a typically recommended cut-off to identify patients at risk of clinical depression. Risk factors for depression were studying in Iraq, being female, being of a younger age, smoking, having a low and middle income, partial adherence to home quarantine rules and living alone or with a person taking immunosuppressants ($p < .05$). A high prevalence of clinical depression was observed among university students during the COVID-19 home quarantine. The evidence from this study suggests that post-quarantine psychological interventions are needed; governments should focus on providing psychological services to those in need in the aftermath of the COVID-19 pandemic and addressing psychological aspects while preparing for future pandemics.

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-COV2), the causative agent of COVID-19, is a rapidly emerging respiratory viral infection (Guo et al. 2020). The virus has now affected more than 200 countries, with more than 601 million documented cases and a death toll exceeding 6.4 million. Containment strategies were implemented worldwide to prevent the worsening of the pandemic. These strategies included raising awareness, thermal screening at entry ports, shutting down airports, applying curfew and quarantining either in a dedicated facility or at home (Koo et al. 2020). As a definition, quarantine

is to separate and restrict the movement of people who are suspected to be exposed to a contagious disease, determining whether they are infected or not (Brooks et al. 2020). The history of quarantine goes back to the 14th century when it was first imposed in Italy in response to plague epidemics (Gensini et al. 2004). With the ongoing rapid spread of COVID-19, commitment to quarantine and social distancing became a necessity (Tang et al. 2020). Even though quarantine is a crucial strategy to stand against the spread of an infectious disease (Esquivel-Gómez and Barajas-Ramírez 2018; Koo et al. 2020; Mandal et al. 2020), previous literature illustrates higher post-traumatic stress disorder (PTSD), depression, anxiety and anger among quarantined persons (Reynolds et al. 2008; Liu et al. 2012; Sprang and Silman 2013; Brooks et al. 2020). During the SARS outbreak in Canada, multiple studies emphasised the psychological distress and the traumatising effect of experiencing quarantine (Liu et al. 2012; Sprang and Silman 2013). Similar studies in China found that quarantined individuals composed 60% of the group with the highest CES-D scores (a self reported depression scale), whereas only 14.9% of those with low scores were under quarantine (Liu et al. 2012). During the current pandemic, a meta-analysis of 12 community-based studies showcased a pooled prevalence of depression for 25% of the respondents, seven times higher than the percentage in 2017 (Bueno-Notivol et al. 2021). These results line with the findings of regional and local investigations (Alkhamees et al. 2020;

Address correspondence to:

¹Faculty of Medicine, University of Jordan, University of Baghdad, University of Damascus

²Department of Microbiology, College of Medicine, University of Baghdad

³Department of Anatomy, Histology and Embryology, University of Damascus

⁴Department of Anatomy, Histology and Embryology, Faculty of Medicine, University of Jordan

*aas0170234@ju.edu.jo



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Blbas et al. 2020; Samrah et al. 2020; Behisi et al. 2021; Hamaideh et al. 2021). However, a meta-analysis of 30 studies found that the COVID-19 quarantine had varying impacts on individual anxiety, depression and psychological stress (Jin et al. 2021). Yadav and colleagues estimated the prevalence of depression in university students to be 15.7% in health science students quarantined at home in selected provinces of Nepal (Yadav et al. 2021). Moreover, a study in Jordan that used a similar depression measurement in CES-D found that 37% and 34% of university students had severe and moderate depression, respectively (Saadeh et al. 2021). According to these findings, our study aims to identify predictors for the consequences of home quarantine on the psychological health of university students in three Middle Eastern countries. This would help in understanding the level of urgency for psychiatric interventions so as to avoid the negative impact quarantine could have on mental health.

MATERIALS AND METHODS

Ethics approval and consent to participate

Ethical approvals were obtained from the Academic Research Council of the Faculty of Medicine at the University of Jordan (10-2020 8568), the ethical committee of Damascus University Faculty of Medicine (2507) and the quality assurance, performance and evaluation section of the college of medicine in Baghdad University, Iraq all according to ethical principles of the Helsinki Declaration. In addition, written consent was obtained from all respondents.

Study Population

University students who were placed in home quarantine for at least seven days during the COVID-19 outbreaks in the Middle East were eligible for participation in this study. Participants lived in three Middle Eastern countries (Jordan, Syria and Iraq). The questionnaires were anonymous to maintain the privacy and confidentiality of all information collected in the study.

Survey Structure

Students were recruited into the study randomly by responding to an online survey. The survey was announced through social media platforms, mainly Facebook and Instagram. Moreover, data on the sociodemographics of the quarantined students were collected (i.e., country, gender, age, education and income). Questions explored included the following: 1) adherence to quarantine 2) the number of accompanying individuals in the quarantine and their health status (High-risk subjects: smokers, cardiovascular disease patients (CVD patients), immunosuppressed, diabetics, cancer patients and elderlies) and 3) the smoking behaviour of the participant and his/her accompanying individuals.

The web-based survey relied on a validated Arabic version of the Centre for Epidemiologic Studies Depression

Scale (CES-D Scale) (Radloff 1977). The CES-D is a self-screening accredited scale that measures depression-related symptoms. The scale is composed of 20 self-report items, each with a Likert rating scale from 0 to 3. The maximum score is 60. A score of >16 identifies persons with depressive symptoms with similar patterns observed among depressed patients (Boyd et al. 1982).

Statistical Analysis

The data was entered into a spreadsheet and analysed using IBM SPSS Statistics for Windows, version 22 (IBM Corp, Armonk, NY, USA). Descriptive statistics obtained included the mean and standard deviation for each variable measured. The Shapiro-Francia normality test was used to test whether the data followed a normal distribution. Additionally, an independent t-test was used to investigate the relationship between the sociodemographic variables (gender, age, education and smoking behaviour) and the CES-D total score. Comparisons between the CES-D scores and the different geographic and economic groups, the attitudes toward adherence to quarantine and the number of accompanying individuals in the quarantine and their health status were based on one-way ANOVA. The Tukey HSD test was used for post hoc comparison between these groups. Pearson's chi-squared (χ^2) test was used to test for differences between sociodemographic conditions and adherence. A multinomial multivariate logistic regression was utilised to find the multiple predictors for depression and adherence to home quarantine and their odd ratios. The significant level was set at 0.05.

RESULTS

Sociodemographic Characteristics

This multinational regional survey was completed by 4955 students from 123 universities and colleges in three middle eastern countries (Iraq (44.3%), Jordan (31.5%) and Syria(24.2%)). Among the respondents, 73.2% were women, 89.9% were aged between 17 and 24 years, 65.5% were studying medical specialties, 87.2% were non-smokers, 85.5% had a low to middle income in their respective country and only 3% were living by themselves (Table 1).

Adherence to Home Quarantine

The majority of our respondents were highly adherent to home quarantine (86.3%), with students in Jordan and Iraq reporting a statistically higher adherence than students in Syria (97.6%, 84% and 75.7%, respectively) ($p < .05$). Using multinomial multivariate logistic regression, predictors for high adherence were studying in Iraq and Jordan (odds ratio (OR), 1.633, 11.394; $p < .05$, respectively), female gender (OR, 1.730; $p < .05$), younger age (OR, 0.956; $p = .036$), high income (OR, 1.404; $p = .04$), not smoking (OR, 1.481;



Table 1. Respondents' demographic characteristics (i.e. gender, age, education, income, company in home, commitment, risk groups in home) and their distribution in the three countries included in the study.

Characteristic	Total (4955) n (%)	Iraq (2193) n (%)	Jordan (1563) n (%)	Syria (1199) n (%)
Gender				
Male	1329 (26.8)	530 (24.2)	417 (26.7)	382 (31.9)
Female	3626 (73.2)	1663 (75.8)	1146 (73.7)	817 (68.1)
Age				
17-24	4456 (89.9)	2025 (92.3)	1433 (91.7)	998 (83.2)
25-30	499 (10.1)	168 (7.7)	130 (8.3)	201 (16.8)
Education				
Medical	3246 (65.5)	1263 (57.6)	1259 (80.6)	724 (60.4)
Non-Medical	1709 (34.5)	930 (42.4)	304 (19.4)	475 (39.6)
Income				
Low income	2637 (53.2)	1253 (57.1)	705 (45.1)	679 (56.6)
Middle Income	1598 (32.3)	657 (30)	509 (32.6)	433 (36.1)
High income	720 (14.5)	283 (12.9)	100 (22.3)	88 (7.3)
Smoking				
Smoker	633 (12.8)	167 (7.6)	203 (13)	263 (21.9)
Non-Smoker	4322 (87.2)	2026 (92.4)	1360 (87)	936 (78.1)
Company in Home				
None	151 (3)	19 (0.9)	99 (6.3)	33 (2.8)
<=5	2768 (55.9)	992 (45.2)	832 (53.2)	944 (78.7)
>5	2036 (41.1)	1182 (53.9)	632 (40.4)	222 (18.5)
Commitment				
Highly Adherent	4276 (86.3)	1842 (84)	1526 (97.6)	908 (75.7)
Partially Adherent	565 (11.4)	295 (13.5)	32 (2)	238 (19.8)
Poorly Adherent	114 (2.3)	56 (2.6)	5 (0.3)	53 (4.4)
Risk Groups in Home				
Cancer Patient	98 (2)	54 (2.5)	25 (1.6)	19 (1.6)
Smoker	2207 (44.5)	903 (41.2)	700 (44.8)	604 (50.4)
CVD Patient	549 (11.1)	330 (15)	158 (10.1)	61 (5.1)
Diabetic Patient	1084 (21.9)	633 (28.9)	243 (15.5)	208 (17.3)
Someone taking Immunosuppressants	297 (6)	167 (7.6)	74 (4.7)	56 (4.7)
Elderly	1297 (26.2)	615 (28)	237 (15.2)	445 (37.1)



$p = .01$), living with less than 5 persons (OR, 1.436; $p < .05$, and having more depressive symptoms (OR, 1.395; $p = .005$) (Table 3).

Psychological Impact of Home Quarantine

The mean CES-D score was 25.57 ± 12.6 . The CES-D score was >16 in 75.8% of quarantined persons, indicating an increased risk of clinical depression (Table 2).

Statistically higher CES-D scores were found for 1) students studying in Iraq compared to students studying in Jordan and Syria (mean CES-D score of 27.33 ± 12.98 versus 23.51 ± 12.49 and 24.22 ± 11.81 , respectively, $p < .05$, respectively), 2) females compared to males (mean CES-D score of 22.72 ± 12.16 versus 26.61 ± 12.61 , respectively, $p < .05$), 3) students in a low-income class compared to students in a middle-income and high-income class (mean CES-D score of 26.4 ± 12.7 versus 25.2 ± 12.13 and 23.3 ± 13.01 respectively, $p = .007$, $p < .05$), 4) students younger than 25 (mean CES-D score of 25.76 ± 12.65 versus 23.81 ± 12.09 , $p = .001$), 5) students living alone (mean CES-D score of 27.87 ± 12.49 , $p = .032$) and 6) students living with more than three persons at increased risk of severe illness from coronavirus compared to others (mean CES-D score of 28.05 ± 13 , $p = 0.000$). No statistically significant differences in mean CES-D scores were found regarding the specialty students majored in (medical versus non-medical) and the smoking behaviour of students (smokers vs nonsmokers of the respondents ($p = .11$ and $p = .38$, respectively) (Table 2).

Using multinomial multivariate logistic regression, statistically significant predictors for depression (based on CES-D cut-off of 16) included (1) studying in Iraq (OR, 1.334; $p = .002$), (2) being female (OR, 1.812; $p < .05$), (3) being of a younger age (OR, 1.045; $p = 0.001$), (4) earning a low or middle income (OR, 1.550, 1.474; $p < .05$ respectively), partial adherence to home quarantine rules (OR, 1.401; $p = .000$), living alone (OR, 2.462; $p < .05$) or with someone that takes immunosuppressants (OR, 1.458; $p = .045$) (Table 3).

DISCUSSION

An initial objective of this study was to investigate the psychological impact of home quarantine on university students and its predictors. Perhaps the most striking finding was the high prevalence of depressive symptoms, as more than 75% of our participants were at high risk of developing or having clinical depression. This level was similar to a recent investigation in Jordan that showed an overall depression rate of 78.7% among undergraduates (Hamaideh et al. 2021). However, observed rates were higher than reported depression percentages during non-quarantine conditioning in university students in Iraq, Jordan and regional countries (Amr and El-Gilany 2011; Fawzy and Hamed 2017; Dalky and Gharaibeh 2018; Rasheed and Hussein 2019).

Our statistical analysis revealed studying in Iraq as a predictor of depression. This conclusion was also validated by students having significantly higher depressive symptoms when compared to students in Jordan and Syria. Younger respondents were more compliant with home quarantining but more depressed, thereby strengthening the evidence of the psychological impact of quarantine. Additionally, females' scores on the CES-D scale were significantly higher than those of males. This gender-specific difference is in line with an international meta-analysis that strongly points to an increased risk of depression in females (Salk et al. 2017).

From our investigation of the behaviours of our respondents, we have found that smoking, living alone or with a person taking immunosuppressants, or multiple risk groups are predictors for depression. Several factors could explain these observations including lack of social interactions and fear for their lives and the lives of their family members (Tani et al. 2015; Stahl et al. 2017; Honjo et al. 2018; Van der Werf et al. 2019). A catalyst that could explain such significant results are the harsh messages conveyed through social and digital media (Towers et al. 2015; Kilgo et al. 2019; Depoux et al. 2020), e.g., stating the virus only affects or kills the elderly among others. Accordingly, it is necessary to adjust the message tone and instead consider the elderly as a priority of psychiatric assessment and care.

Another area of interest during infectious disease outbreaks is adherence, as many countries encourage symptomatic people to self-isolate. In the current study, more than 85% of the study's participants were highly adherent to home quarantine. The highest level of adherence was observed in Jordan, which is explained by the strict measures taken within the country (e.g., curfew) (Younes 2020). On the other hand, studying in Syria, the country with the least confirmed cases, was not a predictor of high adherence, unlike studying in Iraq and Jordan. Other predictors included less crowded households, which might be a source of comfort, thus leading to higher adherence.

Although continuous provision with essential needs and income replacement are necessities during quarantine, they are not always provided. That likely has a lot to do with the significantly higher depression among lower-income respondents and their tendency towards being non-compliant.

These findings, taken together, have several practical implications, including adjusting the media message to be more empathic while communicating mortality risks to the public, targeting university students in post-quarantine psychiatric follow-ups, and being prepared for all aspects, including the psychological ones, in future outbreaks.

A possible limitation to our study is the multifactorial nature of depression, especially in conflict zones (Iraq and Syria), in addition to the lack of control for patients' mental diseases, such as depression, before the home

Table 2. CES-D among different sociodemographic strata to assess depression levels in them.

Characteristics	CES-D mean score ±SD	p value	Turkey's HSD		
			G1/G2	G2/G3	G1/G3
Country		.000	.000	.98	0.000
Iraq (G1)	27.33±12.98				
Jordan (G2)	23.51 ±12.49				
Syria (G3)	24.22 ±11.81				
Gender		.000	N/A	N/A	N/A
Male	22.72 ±12.16				
Female	26.61 ±12.61				
Age		.001	N/A	N/A	N/A
17-24	25.76 ±12.65				
25-30	23.81 ±12.09				
Education		0.11	N/A	N/A	N/A
Medical	25.36 ±12.67				
Non-Medical	25.96 ±12,48				
Income		.000	.007	.002	0.000
Low income (G1)	26.4 ±12.7				
Middle income (G2)	25.2 ±12.13				
High income (G3)	23.3 ±13.01				
Smoking		.38	N/A	N/A	N/A
Smoker	25.97 ±12.41				
Non-smoker	25.51 ±12.63				
Company in Home		.018	.032	.215	.137
None (G1)	27.87 ±12.49				
<=5 (G2)	25.23 ±12.39				
>5 (G3)	25.85 ±12.88				
Number of Risk Groups in Home		.000	.000	.003	.000
None (G1)	23.85 ±12.61				
Less than 3 (G2)	26.07 ±12.38				
More than 3 (G3)	28.05 ±13.21				
Commitment		.027	.042	.987	.391
Highly Adherent (G1)	25.37 ±12.64				
Partially Adherent (G2)	26.74 ±12.08				
Poorly Adherent (G3)	26.94 ±13.69				

Table 3. Odds Ratios and associated *p*-values from multinomial logistic regression, thus, highlighting significant predictors of depression and adherence to quarantine in university students.

Characteristic	Association with depression			Association with high adherence		
	OR	95% CL	<i>p</i> value	OR	95% CL	<i>p</i> value
Country						
Iraq	1.334	(1.110-1.605)	.002	1.633	(1.312-2.032)	.000
Jordan	0.947	(0.781-1.147)	.575	11.394	(7.685-16.894)	.000
Syria	0 ^B	..	..	0 ^B	..	..
Gender						
Male	0.552	(0.473-0.644)	.000	0.578	(0.469-0.713)	.000
Female	0 ^b	..	..	0 ^b	..	..
Age						
	0.957	(0.933-0.981)	.001	0.956	(0.924-0.989)	.010
Education						
Medical	1.056	(0.909-1.227)	.476	1.122	(0.924-1.364)	.246
Non-Medical	0 ^b	..	..	0 ^b	..	..
Income						
Low income	1.550	(1.282-1.875)	.000	0.712	(0.515-0.985)	0.04
Middle Income	1.474	(1.206-1.801)	.000	0.875	(0.622-1.232)	0.445
High income	0 ^b	..	..	0 ^b	..	..
Smoking						
Smoker	1.357	(1.069-1.724)	.012	0.675	(0.500-0.912)	.010
Non-Smoker	0 ^b	..	..	0 ^b	..	..
Company in Home						
None (G1)	2.462	(1.562-3.879)	.000	1.282	(0.654-2.513)	.469
<=5	1.100	(0.954-1.270)	.191	1.436	(1.174-1.758)	.000
>5	0 ^b	..	..	0 ^b	..	..
Commitment						
Highly Adherent	0.965	(0.619-1.503)	.874	..	..	..
Partially Adherent	1.401	(1.111-1.767)	.004	..	..	..
Poorly Adherent	0 ^b	..	..	..	..	..
Risk Groups in Home						
Cancer Patient	1.377	(0.788-2.406)	.262	1.484	(0.732 -3.010)	.274
Smoker	1.109	(0.874-1.407)	.395	0.946	(0.697-1.283)	.720
CVD Patient	0.982	(0.748-1.287)	.893	1.269	(0.869-1.852)	.218
Diabetic	1.066	(0.841-1.352)	.589	0.836	(0.613-1.140)	.259
Taking immunosuppressants	1.458	(1.008-2.109)	.045	1.043	(0.674-1.616)	.85
Elderly	1.025	(0.816-1.288)	.833	0.892	(0.667-1.192)	.439
None	0.736	(0.379-1.432)	.367	1.092	(0.520-2.290)	.817
Number of Risk Groups in Home						
None	0.928	(0.396-2.171)	.862	0.824	(0.310-2.186)	.697
Less than 3	0.872	(0.577-1.318)	.516	1.047	(0.634-1.727)	.859
More than 3	0 ^b	0 ^b
CES-D Score						
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<16	0.717	(0.569-.0.904)	.005
>=16	0 ^b

^BReference group in regression analysis

quarantine. Recommendations for future researchers include longitudinal studies with long-term follow-up and larger study populations along with control for previous and current psychiatric diagnoses to increase our understanding of the possible risk factors for extremely high depression prevalence in at-risk populations.

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Declaration of interest statement

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AUTHOR BIOGRAPHY

Nour Shewaikani : Co-First Author who contributed equally to the work