



Mental health outcomes of COVID-19 quarantine in the Kurdistan Region of Iraq: A Case-Control Study

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ABSTRACT

This study was designed to evaluate the association of COVID-19 quarantine with the mental health outcomes in the Kurdistan region of Iraq according to key measures of this study. We conducted a matched case-control study within the cohort of all quarantined persons from February 22 through March 31, 2020 (n=300) in Kurdistan region of Iraq. Participants were matched on gender, age, marital status, and education level. Mental health outcomes measured by General Health Questioner (GHQ-28), Impact of event scale – revised (IES-R), and Fear of COVID-19(FC-19S) using an online form. Data analyzed with a t-test and Multiple Regression analysis (confidence intervals=99%). The final study sample included 102 cases and 106 controls, (69% participation rate). Cases showed significantly higher scores in general health questionnaire (t=4.57, P<0.001) and its components (anxiety /insomnia, somatic syndrome, social dysfunction [P<0.001]), Post-traumatic symptoms (t=6.25, P<0.001), and Fear of COVID-2019 (t=3.04, P<0.001). The groups were not significantly different in the case of depression (t=1.95, P=0.06). Multivariable logistic regression analysis showed that after controlling for confounders (age, gender, education) mental health predicted with PTSD (OR,1;95%CI,0.45-0.78; P=.0001) and fear of COVID19(OR,0.55;95%CI,0.73-0.33; P=.0001). These findings suggest that quarantine significantly contributed to negative mental health outcomes in the Kurdistan region of Iraq where people are already affected by other stressors. These findings may inform decision and public health policy makers to prevent psychological complications while designing and applying measures in the face of other major public health emergencies.

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1. Introduction

In December 2019 coronavirus disease (COVID-19) started in Wuhan-China and spread widely around the world.¹ On March 2020, the World Health Organization (WHO) called all countries to take measures to limit the spread of the virus.² As a result, many states imposed quarantine on travels coming from infected areas.³ Iraq, neighboring two highly infected countries, Iran and Turkey, implemented quarantine on travelers coming back from abroad particularly these two countries. By early June 2020, 11,098 cases were confirmed and 318 persons had died in Iraq, among them 1222 confirmed cases and 24 deaths in the Kurdistan Region of Iraq (KRI).^{4,5}

Although the number of confirmed cases and died people are less than many other countries and regions, because of the ongoing instability, presence of large vulnerable populations, such as forcibly displaced persons, and the weak health system, the KRI health authorities announced measures to prevent the spread of the virus in the region, which included border closures and the establishment of different quarantine sites to accommodate travelers returning from abroad for 14 days.⁶

Quarantine eventually is an unpleasant experience for those who undergo it.⁷ Separation from loved ones, the loss of freedom, uncertainty over disease status,⁸ boredom and even in some cases suicide ideation/attempt⁹ create dramatic effects. It is reported that quarantine could let several negative emotions.^{7, 10, 11} However, in case of predictors of psychological problems during quarantine there are contradicting findings.^{12,10} To our knowledge, there is no information available about the psychological impacts of quarantine specially in the KRI where most of the population is afflicted by conflict and political

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upheavals. It is documented that people in such settings are already in need for receiving mental health services.¹³ Findings by local researchers are in agreement with these reports.^{14, 15} In addition to ongoing stressors and the weak health system, stigma is a major barrier for the population to seek mental health services in the region.¹⁶ When not addressed, these stressors and problems will have long-term impact on the population.

Our aim in the current study was to investigate the association between quarantine and mental health outcomes for the following reasons: First, there is lack of information about psychological conditions of under quarantine cases during the COVID-19 pandemic in the Middle East generally and in Iraq specifically;¹⁷ Second, studies have focused on the mental health outcomes in healthcare providers, patients and the public while quarantined individuals are overlooked. In this study we hypothesized that quarantine may affected mental health outcomes of quarantined persons.

2. Methods

2.1. Study setting and date

A case-control study conducted within a cohort of all quarantined persons and controls in Garmian Region of KRI close to the Iran-Iraq border between February 22 to March 31, 2020. The

quarantine center was a hotel designated by the authorities located in Kalar city. Under quarantined individuals were instructed not to leave the hotel, wash their hands frequently, and wear masks and gloves when they are not in their rooms. In addition, their body temperature, obligatory, blood glucose and blood pressure, optional, were measured twice a day.

2.2. Participants

Sample consists of two groups:

- Cases: Of 150 quarantined individuals we recruited 102 cases, 36 females and 66 males, who met inclusion criteria, with mean age of 31.75 ± 6.34 .
- Control: Of 150 non-quarantined individuals, we purposively recruited 106 controls, 46 females and 60 males, who met inclusion criteria, with mean age of 30.08 ± 6.48 . They were matched according to gender, age, marital status, and education level with cases.

Most of the quarantined cases were Iraqi students in Iranian Universities who returned home due to the spread of COVID19 in Iran. The out of quarantine participants were staff and students from universities in the KRI who completed questionnaires with a similar procedure as the quarantined samples.

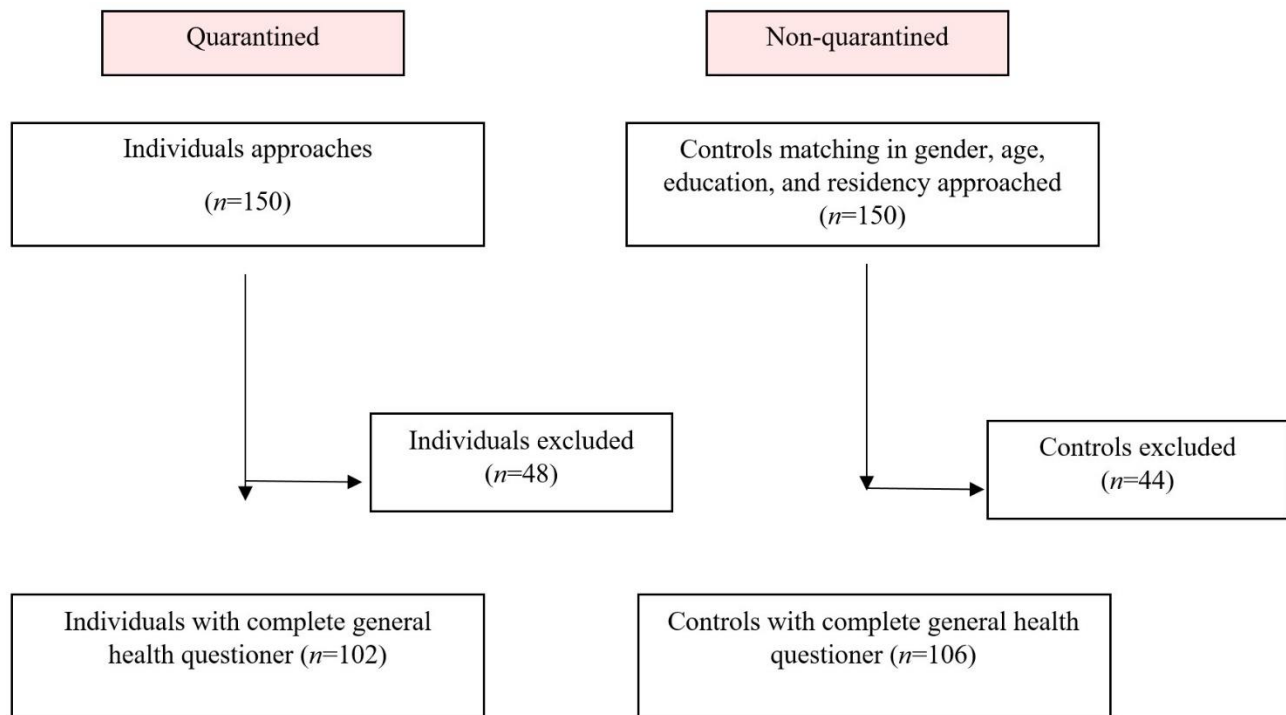


Figure 1: Flow chart depicting enrolment of quarantined individuals and non-quarantined controls.

2.3. Inclusion and exclusion criteria

Inclusion criteria were Iraqi citizenship, educated at least up to high school, completed at least seven consecutive days in quarantine at the designated center, being medically stable, no obvious signs of illness or injury indicating a need for immediate medical attention, not being diagnosed with a psychotic disorder. Participants were informed about the study using a detailed phone-call. The individuals who replied were

contacted for online consent with no further contact with those who didn't reply. The response rate was 69%.

2.4. Outcome Measures

Mental health outcomes were investigated using these measures: General Health Questionnaire-28 (GHQ-28), Impact of Event Scale-Revised (IES-R), and Fear of COVID-19 Scale (FC-19S). GHQ-28 is a self-administrated screening tool designed to detect current mental disturbances and disorders. It has four

components, somatic symptoms; anxiety/insomnia; social dysfunction, and depression. A higher score represents poorer mental health and a total score of 23/24 is the threshold for the presence of distress. The GHQ-28 is a valid and reliable tool for screening mental health in Kurdish communities.¹⁸ Cronbach Alpha for GHQ-24 in this study was 0.87. The IES-R scale is a self-report questionnaire, which includes 22 items and three components: intrusion, avoidance, and hyperarousal.¹⁹ It is an appropriate instrument to measure the symptoms of Post-Traumatic Stress Disorder (PTSD) in adult populations with cut-off score of 33 or above.²⁰ The Kurdish version is validated and used in another study in the KRI.²¹ Cronbach Alpha showed appropriate internal consistency for this study (0.70). FC-19S include seven items and participants should indicate their level of agreement with its statements using a five-item Likert-type scale. The higher total score, represents the greater fear of coronavirus-19. The validity procedure of this scale showed a stable unidimensional structure with robust psychometric properties.²² The translation process for Kurdish version was performed according to the Functional Assessment of Chronic Illness Therapy translation methodology (FACIT), as a standard methodology.²³ Obtained Cronbach Alpha for this study was 0.67

Besides these measures, a demographic data questionnaire was developed to cover basic demographic variables, which included being quarantined or non-quarantined, gender, age, marital status, education, origin, destination, days in quarantine, whether you contacted with an infected patient? do you think quarantine is necessary for your case?

2. 5. Procedure and Ethical considerations

In line with the Garmian Directorate of Health guidelines, and in order to prevent person-to-person contact, private online questionnaires developed and sent via email or Facebook Messenger to participants through KoBo Toolbox, a free open-source tool for data collection using mobile phones, tablets, computers as well as paper. The corresponding researcher was available on-call during the data collection to answering questions. Ethical Committee of Research Center at the University of Garmian in cooperation with Garmian Directorate

of Health approved the current study on March 9th (approval number EC-G/201). On first page of the questionnaire, a privacy statement, right to refuse to participation, aims of the study and contact numbers of corresponding researcher were provided. All participants signed consent forms electronically before completing the questionnaires. Data was stored on a secured computer.

2. 6. Statistical analysis

The collected data scored and entered into PSS-20. The mean and standard deviation of mental health with its components [somatic symptoms; anxiety/insomnia; social dysfunction, and depression], post-traumatic symptoms with its components [intrusion, avoidance, and hyperarousal], and fear of COVID-19, were investigated for both groups. The normal distribution of quantitative data was investigated by applying Kolmogorov-Smirnov test. The GHQ-28 and IES-R global and their components scores, and fear COVID-2019 were compared between groups by independent t-test for groups. Chi-square conducted for continuous and categorical data. Cronbach's α coefficient was calculated to examine IES-R, GHQ-28, and FC-19S inter-item internal consistency. The Fear of COVID-2019, post-traumatic symptoms, and mental health relationship analyzed through regression. An effect size (ES) of 0.10, 0.30, and 0.50 was considered small, medium, and large. The statistical significance was set at $p < .001$.

3. Results and Discussion

3. 1. Demographic Characteristics

Of the 300 approached participants (150 quarantined and 150 non-quarantined) 106 non-quarantined cases (70.66%) and 102 quarantined cases (68%) participated in the study. From the data, 59.61% of the participants were male and the rest were female. The majority of participants were married (65.86%). More than half of participants (63.94%) were master graduate or master's student, 20.67% bachelor graduate or last year student and rest were PhD/PMD student or graduate. Demographic characters of participants compared in Table 1.

Table 1: Demographic characters of participants

Variable		Non-Quarantined	Quarantined	Result
		N (%)	N (%)	
Education	Bachelor	28(26.4)	15(14.7)	$\chi^2=4.87$ P -value=0.08
	Master	61(57.5)	72(70.6)	
	PhD	17(16.00)	15(14.7)	
Age	19-25	24(20.8)	30(29.4)	$\chi^2=2.64$ P -value=0.26
	26-30	20(18.9)	21(20.6)	
	31-38	64(60.4)	51(50)	
Marriage	Married	67(63.2)	70(86.6)	$\chi^2=0.67$ P -value=0.41
	single	39(36.8)	32(31.4)	
Gender	Male	60(56.6)	64(64.7)	$\chi^2=1.42$ P -value=0.14
	female	46(43.4)	38(35.3)	
Age	Mean± SD	31.75±6.34	30.08±6.48	t=1.94, P=0.06

3. 2. Scores of Measurements and Differences

Cases showed considerably higher scores of anxiety /insomnia (10.27[3.88]), depression (10.26 [3.79]), somatic syndrome

(11.89 [3.93]), social dysfunction (8.49 [3.04]), mental health problems (40.92 [12.40]), Post-traumatic symptoms (39.19 [9.75]), and fear of COVID-19 (13.89 [2.90]). These differences were significant for mental health ($t=4.57$, $P<0.001$) and its components, anxiety /insomnia ($t=3.57$, $P<0.001$), somatic syndrome ($t=5.57$, $P<0.001$), and social dysfunction ($t=3.34$, $P<0.001$) in comparison to non-quarantined participants ($P<0.001$). The groups were not significantly different in case of depression ($t=1.95$, $P=0.06$) (Table2). However, the total score of mental health in both groups was higher than the cut-point

(GHQ>23), which showed more mental health issues in both groups.

In term of Post-traumatic symptoms ($t=6.25$, $P<0.001$), and its components, avoidance ($t=5.78$, $P<0.001$), hyperarousal ($t=3.77$, $P<0.01$), and intrusion ($t=5.06$, $P<0.001$) significant difference observed (Table 2). In addition, Fear of COVID-2019 in quarantined cases significantly were higher than non-quarantined group ($t=3.04$, $P<0.001$) (Table 2).

Table 2: Results of GHQ-28, IES-r and FC-19S scores of participants in two groups

Variable	Group	Mean	SD	T	sig	
GHQ	Mental health	Non-quarantined	34.70	7.21	4.57	0.001*
		quarantined	40.92	12.40		
	anxiety/insomnia	Non-quarantined	8.76	2.60	3.57	0.001*
		quarantined	10.27	3.88		
	Depression	Non-quarantined	9.33	3.08	1.95	0.06
		quarantined	10.26	3.79		
	Somatic syndrome	Non-quarantined	10.04	3.50	5.57	0.001*
		Quarantined	11.89	3.93		
	Social dysfunction	Non-quarantined	6.56	1.79	3.34	0.001*
		Quarantined	8.49	3.04		
IES-R	Post-traumatic symptoms	Non-quarantined	31.83	7.06	6.25	0.001*
		Quarantined	39.19	9.75		
	avoidance	Non-quarantined	10.22	2.74	5.78	0.001*
		Quarantined	13.28	4.57		
	hyperarousal	Non-quarantined	10.27	3.15	3.77	0.001*
		Quarantined	11.98	3.35		
	intrusion	Non-quarantined	11.33	3.62	5.06	0.001*
		Quarantined	13.93	3.78		
FC-19S	Fear of COVID_19	Non-quarantined	12.72	2.60	3.04	0.001*
		Quarantined	13.89	2.90		

* $P<0.001$

While our findings showed a significant difference between mental health outcomes of quarantined and non-quarantined groups, another research reported no significant difference.²⁰ It is noteworthy to mention that they investigated home-based quarantine for shorter time while ours was 14 days centralized quarantine. In addition, the differences between these results could be related to basic differences in mental health conditions between the populations in both studies. Researches suggested that people who live in Kurdistan region, generally have more mental health issues due to experiencing conflicts, displacement, violence, and political upheavals.^{14,24} The results of this study also confirm this claim, because the total scores of mental health for non- quarantined group is also higher than the cut-point.

In line with our findings, it was reported that about one-third of quarantined participants reported psychological distress during the quarantine.¹⁰ Challenges such as sense of isolation,²⁵ inadequate supplies of daily needs, inadequate information on dealing with infectious diseases,²⁶ financial hardships,²⁷ fear, anger, and boredom,²⁸ during quarantine could trigger common

mental disorders,²⁹⁻³¹ which exceed the consequences of the COVID-19 pandemic itself.

In our research, cases reported higher fear of COVID-19 as most of them were travelers who came from Iran, one of the first five infected countries during our data collection, and had contact with the public in Iran without applying proper protective measures such as social distancing and using face masks. In addition, constant increase in mortality and morbidity from COVID-19 reported in the Iranian news cycle created ambiguity and anxiety in most of the cases. Therefore, they felt more likely at risk of infection.

3. 3. Risk Factors of Mental Health Outcomes

Multivariable logistic regression analysis showed that, after controlling for confounders such as age, gender, and education, mental health predicted in the participants with post-traumatic symptoms (OR,1;95%CI,0.45-0.78;P=.0001) and fear of COVID19(OR,0.55;95%CI,0.73-0.33;P=.0001) (Table3).

Table 3: Relationship between mental health, Post-traumatic symptoms and fear of COVID-2019

Variable	R	Adj R2	F	B	β	t	P
Post-traumatic symptoms	0.51	0.26	73.76	0.58	0.51	8.85	0.001*
Fear of COVID-2019	0.24	0.05	13.25	0.92	0.24	3.64	0.001*

*P<0.001

This implies that people who experienced more traumatic symptoms and higher fear of COVID-19 reported lower mental health as they perceived more distress.³² Although both fear of COVID-19 and Post-Traumatic symptoms can predict the mental health outcomes but Post-Traumatic symptoms is a stronger predictor of mental health which is in line with the context of the region of the study.

Despite the fact that quarantine is one of the most effective measures for preventing outbreak of diseases,³³ depriving people from their home and routine may trigger mental health conditions, especially those who have been already affected by other stressors. To mitigate that, some measures could be implemented such as home-based quarantine, disseminating sound and clear information heavily to the public and providing mental health support for the people in need.

4. Conclusion

This case-control study establishes an association between quarantine and mental health outcomes. Our findings showed that quarantine triggered mental health distress as the cases reported higher anxiety/insomnia, social dysfunction, somatic syndrome, post-traumatic symptoms, and fear of COVID-19 in comparison to controls. However, no difference has seen in case of depression between the two groups. This concludes that short time stress didn't trigger depression among quarantined participants. According to the results of this study, there was a significant relationship between mental health, Post-Traumatic symptoms and fear of COVID-2019. This study has several limitations which must be pointed out. The mental health status of the samples was not followed up over long time. The sample sizes were small due to the number of travelers that quarantined in the study location. The study mainly included educated individuals which may not correctly represent the mental health status of the general population. There was a lack of standardized survey instruments for psychological responses to quarantine. Despite these limitations, the results of this survey will allow for the generation of hypotheses that require further exploration.

4.1. Public Health Implications

Our study provides evidence that quarantine can result in considerable psychological distress in people that have been affected by other stressors. Quarantine plans should be implemented carefully to avoid these negative psychological outcomes. These findings may inform decision and public health policy makers to prevent psychological complications while designing and applying measures in the face of other major public health emergencies.

Authors contribution

PAMS: Conceptualization; data collection; writing original draft preparation, review and editing. ASMAK: Data collection; data

extraction, resources; writing original draft preparation. MDA: designed the search strategy, interpretation of the data, resources, writing original draft preparation. EAA: Data collection; data extraction, resources; writing original draft preparation. DJ: supervision; methodology; interpretation of the data; resources; revise the final draft and editing. Authors certify that the manuscript represents valid work and that neither the submitted manuscript nor one with substantially similar content under their authorship has been published or is being considered for publication elsewhere.

Conflict of interests

None.

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