

Containing COVID-19 risk in the UAE: Mass quarantine, mental health, and implications for crisis management

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Abstract

The COVID-19 pandemic is the first global “NASECH disaster,” owing to its natural hazard (NH) origin and unprecedented subsequent repercussions for global society (S), economy (EC), and health (H). Emergency health control measures required the implementation of compulsory mass quarantine (CMQ) or so-called periods of “lock-down.” Yet, CMQ is an instrument with iatrogenic consequences, associated with a rise in societal levels of depression, anxiety, and posttraumatic stress. With a view to informing future crisis management, the study investigated sociodemographic factors associated with mental wellbeing during the March–April 2020 lockdown in the United Arab Emirates. Respondents ($n=1585$) completed self-report measures of depression (PHQ8) and generalized anxiety (GAD7). Rates of symptomatology were notably higher than those observed in similar UAE-based studies before the pandemic. Younger age, urban-dwelling, female-gender, and a history of mental health problems were significant factors linked to elevated levels of depression and anxiety. Findings emphasize (1) the crucial need for psychological intervention after disasters and (2) the importance of strengthening the nexus at the intersection of public health and disaster risk reduction (DRR). Implications are that future pandemic containment would benefit from adopting new Health–DRR paradigms and ensuring these are effectively translated into disaster policy.

KEYWORDS

COVID-19, lockdown, mental health, NASECH disaster, pandemic, quarantine, risk management, UAE

INTRODUCTION AND BACKGROUND

COVID-19: The first global NASECH disaster

2020 was supposed to be the year marking significant 5-year milestones for progress on three key international programs: the 2030 Agenda for Sustainable Development with its 17 Sustainable Development Goals (SDGs), the Paris Agreement on Climate Change, and the Sendai Framework on Disaster Risk Reduction (DRR) 2015–2030, all of which were adopted by UN member states in 2015. From the perspective of working towards greater global sustainability, the mood was, therefore, one of optimism at the onset of 2020, and the year was positioned as one of renewed action by the UN Secretary-General (Djalante et al., 2020). As it turned out in contrast, 2020 will doubtless be remembered by history as the year the world staggered under the global health emergency and socioeconomic crisis brought about by the advent of the novel Coronavirus disease (COVID-19). This virulent new respiratory disease was first reported in Wuhan, China in December 2019. Due to the availability and ease of modern international air travel, COVID-19 spread worldwide at an alarming pace. Within just three short months of its appearance, on March 11, 2020, the World Health Organisation (WHO) declared COVID-19 a global pandemic (Zhang and Shaw, 2020). As of September 01, 2021, there were more than 217 million confirmed cases and sadly over 4.5 million related deaths worldwide (WHO, 2021), with fatalities continuing to mount on a daily basis.

According to the WHO (2011), health emergencies have assumed increasing attention during the past few decades, typified by major outbreaks of new infectious diseases (e.g., SARS, MERS, influenza H1N1, and H5N1) and the re-emergence of familiar adversaries such as cholera and Ebola. Biological hazards and risks are specifically mentioned within the agreed “scope and purpose” of the Sendai Framework (UNISDR, 2015). More recently, a review of hazard definitions and classification was published by the United Nations (2020), through the joint efforts of the United Nations Office for Disaster Risk Reduction (UNDRR) and the International Science Council (ISC). In that technical report, infectious human disease is listed under the group of biological hazards, whereas epidemic is mentioned as one example of a slow-onset disaster that emerges gradually over time.

The coronavirus outbreak is considered a health emergency first and foremost, because the disease is highly contagious and potentially fatal, with the elderly and those with chronic underlying poor health most at risk. However, the multiple cascading and significant impacts of the ensuing pandemic leading to the geopolitical crisis we see today place the pandemic squarely within the realm of global disasters. No universally agreed definition exists for what actually constitutes a disaster (Smith, 2013), but this is generally recognized to be an event where the severity of human, economic or environmental consequences is so great that the functioning of society at any scale is seriously disrupted. A disaster triggered by a natural hazard (e.g., typhoon, flood, volcanic eruption) tends to be referred to in the vernacular as a “natural disaster,” whereas the alternative term “NATECH disaster” has been used to encompass the combination of (cascading) effects of natural hazards that trigger consequent technological failures (Steinberg et al., 2008). For example, the Great East

Japan Earthquake of March 2011, and the subsequent Tōhoku tsunami that was unleashed, caused the Fukushima nuclear reactor explosion and resulting widespread radiation leak (Goff & Terry, 2012; Krausmann et al., 2019). Here, we describe the COVID-19 pandemic as the first global “NASECH disaster.” We propose this new term because the pandemic disaster stems from a natural hazard (NA) origin (infectious disease outbreak), whereas its severe impacts extend fully across the social (S), economic (EC), and health (H) spheres of most countries affected.

It is certainly the case that many disaster events over recent decades have either afflicted extensive regions and/or had costly and lasting socioeconomic repercussions, such as witnessed in the aftermath of the highly destructive 2004 Indian Ocean Tsunami (ADPC, 2006) and devastating 2005 Hurricane Katrina in the United States (Blake et al., 2011). There have also been other disease pandemics in past centuries and in more recent times alike, such as the Black Death (bubonic plague) in 14th century Europe and the Spanish Flu (influenza) of 1918–19 (Spreeuwenberg et al., 2018). Yet, simply viewing the numbers of fatalities alone, Table 1 illustrates how the present COVID-19 pandemic (more than 4.5 million deaths so far) already contends as one of the deadliest disasters over the last 100 years. What the full global social ramifications will be, and how long the deepening economic recessions due to the pandemic will last, are questions only future historians can answer.

Crisis management through compulsory mass quarantine (CMQ)

The task of authorities during any catastrophe is to implement coordinated strategies to reduce the scope (type) and scale (severity and extent) of negative impacts, while relief agencies provide immediate assistance to disaster victims. Disaster risk management for health in particular requires a multisectoral approach. According to the WHO (2011), this should encompass: “systematic analysis and management of health risks, through a combination of (1) hazard and vulnerability reduction to prevent and mitigate risks, (2) preparedness, (3) response and (4) recovery measures.” To tackle the growing health emergency as cases of coronavirus infections spread internationally, one radical measure adopted by many governments was to impose periods of curfew and home confinement on local populations. Limiting human contact slows down disease transmission. During outbreaks of infectious disease, isolation and quarantine are often required. Isolation means the enforced separation of people who have been diagnosed with a disease from those who are not sick, whereas quarantine is the separation of people who have potentially been exposed to establish if they then become sick, to lessen the chance of them passing on the infection to others (Brooks et al., 2020).

However, the compulsory stay-at-home orders, enforced in many countries during the early phase of national COVID-19 epidemics, extended far beyond the separation of only (potentially) infected persons. Quarantine was imposed as mandatory home confinement on entire cities, states, or even nationwide. It was argued that without such restrictions on human movement for everything but essential reasons (e.g., buying food, emergency healthcare), national health services would soon be overwhelmed with enormous numbers of COVID-19 cases requiring hospitalization. Fears were expressed that epidemics might reach unmanageable proportions. The media were quick to coin the term “lockdown” to refer to the CMQ measures implemented, at first locally then nationwide. Table 2 shows the various durations of initial CMQ mandated at the national scale across various countries within the Middle East/North Africa (MENA) region. Staggeringly, about half of the world's population came under some form of requested or mandatory lockdown by early April 2020. Never in human

TABLE 1 Comparing the deadliest disasters caused by different types of natural hazards over the past 100 years

Rank	Estimate of death toll ^{a,b}	Type of natural hazard	Named event	Country or region affected	Date
1	17.4 million+	Disease outbreak	Spanish flu	Worldwide	February 1918–April 1920
2	>500,000	Tropical cyclone	1970 Bhola cyclone	East Pakistan (Bangladesh)	November 13, 1970
3	227,898	Tsunami	2004 Indian Ocean tsunami	Indian Ocean	December 26, 2004
4	100,000–316,000	Earthquake	2010 Haiti earthquake	Haiti	January 12, 2010
5	150,000	River flood	1931 Yangtze–Huai River floods	China	June–August 1931
6	100,000	Landslide	1920 Haiyuan landslides	China	December 16, 1920
7	70,000	Heatwave	2003 European heatwave	Europe	Summer 2003
8	23,000	Volcanic eruption	Armero tragedy	Colombia	November 13, 1985
9	4000	Blizzard	1972 Iran blizzard	Iran	Winter 1972
10	1744	Limnic eruption (CO ₂ release)	Lake Nyos disaster	Cameroon	August 21, 1986
11	1300	Tornado	Daulatpur–Saturia tornado	Bangladesh	April 26, 1989
12	1200	Wildfire	Kursha-2 Fire	Soviet Union (Russia)	August 3, 1936

^aData (unverified) from various sources, including media accounts, encyclopaedic entries, online databases.

^bDirect death toll, not including subsequent secondary effects such as disease or starvation.

TABLE 2 Durations of initial periods^a of compulsory mass quarantine enforced at national levels in response to the coronavirus epidemic, for selected countries in the MENA (Middle East/North Africa) region^b

County	Lockdown start date	Lockdown end date
Iraq	03-22-2020	04-11-2020
Jordan	03-18-2020	04-30-2020
Kuwait	03-14-2020	03-29-2020
Lebanon	03-15-2020	03-28-2020
Morocco	03-19-2020	06-10-2020
Tunisia	03-22-2020	04-19-2020
United Arab Emirates	03-26-2020	04-17-2020

^aFor the first nationwide lockdown period. Many countries worldwide reinstated restrictions in response to second and third waves of infections in late 2020 and early 2021.

^bData (unverified) from various sources, including news, media accounts, and online databases.

history has mass quarantine of extended durations been simultaneously imposed on such considerable populations worldwide.

Whenever natural catastrophes or NATECH disasters strike, they are responsible for death, injury, and physical illnesses. But it is well recognized that mental health also suffers. First-responders and humanitarian workers who respond in the aftermath of disaster events are known to experience posttraumatic psychological outcomes (Guilaran et al., 2018). By their very nature, disasters severely disrupt family security, livelihoods, and social connectivity within the wider community. The shock of extreme events and their consequences have complex effects on physical, mental, and social wellbeing (Marx et al., 2012). Many factors influence levels of individual and collective trauma during disasters (Flynn, 1997). Multiple adversities are experienced leading to anxiety that may develop into long-term distress. Posttraumatic symptoms can include depression, anxiety, dissociation, suicidality, dissocial behavior, and substance abuse (Kar, 2006). Siddiqi et al. (2006) found evidence of considerable postdisaster psychological distress, their findings being consistent with expectations of increases in psychological morbidity post-disaster. In the most recent studies, COVID-19 is likewise associated with psychological distress (Bao et al., 2020; Rajkumar, 2020).

Yet, one feature is unique to the current COVID-19 pandemic. In addition to the wide-ranging problems common to most catastrophes, here the disaster management tool itself brings a sting in the tail: adverse impacts on mental health. In other words, CMQ—the very instrument specifically utilized to protect public health—brings about negative health consequences itself. Clearly, understanding such iatrogenic effects has important ramifications for building future pandemic management strategies.

AIMS AND OBJECTIVES

Developing new policies for pandemic management will need to be evidence-based following scientific study of factors influencing the short and long-term psychosocial reactions within affected populations. Against the background described above, the current study is concerned with understanding how the coronavirus epidemic affected ordinary people in the United Arab Emirates (UAE). CMQ was implemented over March–April 2020

(Table 2) as a necessary measure to curb the transmission of COVID-19. The overarching aim is to look at the factors most strongly associated with elevated psychopathology during the early phase of CMQ. The study hypothesis is that CMQ causes adverse (iatrogenic) effects in terms of mental health. The specific objectives are:

- To examine the prevalence of (1) depression and (2) anxiety as key indicators of psychological health in a sample of the UAE population during the initial phase of imposed CMQ lockdown.
- To measure the relative importance of various demographic factors on the chosen psychological health indicators.

The findings are then discussed in the context of promoting better integration of health dimensions within DRR frameworks, policies, and practice.

METHODS

Characteristics of the study area

UAE is a federation of seven states formed in 1971 and located on the eastern side of the Arabian Peninsula. The discovery and subsequent revenues from oil and gas have

TABLE 3 Sample characteristics ($n = 1585$)

Demographic variable	Frequency (%)
Gender	
Female	1325 (83.6)
Male	260 (16.4)
Over 30	
Yes	802 (50.6)
No	783 (49.4)
College education	
Yes	1133 (71.5)
No	452 (28.5)
Emirati/citizen	
Yes	1023 (64.5)
No	562 (35.5)
Rural dweller	
Yes	210 (13.2)
No	1375 (86.8)
History of mental health problems	
Yes	250 (15.7)
No	1335 (84.2)

fueled rapid social and economic development across the UAE during the latter half of the 20th century (WHO, 2012). The nation's wealth has led to the large-scale influx of migrant workers from around the world, who comprise around 80% of the total population according to the UAE National Bureau of Statistics (2009). Demographically, the citizens of the UAE, known as Emiratis, are a numerical minority.

Participants

Participants were a nonprobability sample ($n = 1585$) of adults resident in the UAE during the early stages of the COVID-19 pandemic. All participants were 18 years or over. The mean age of the sample was 31.97 ($SD = 11.71$) and the median age was 31 (interquartile range [IQR] = 21–40). Participants were recruited during the first two weeks of April 2020 via announcements in the UAE media and through the email networks of the UAE's National Program for Happiness and Wellbeing (<https://u.ae/en/about-the-uae/the-uae-government/government-of-future/happiness>). The survey was presented as questionnaires in English and Arabic; the Arabic was translated using the back-translation technique. Although not representative of the whole UAE, the sample reflected many of its constituents. The two most populous emirates/city-states were well represented, with Abu Dhabi and Dubai accounting for 43.2% and 24.5% of the sample, respectively. Citizens of the UAE (Emiratis) accounted for the majority (65%) of the respondents. Table 3 gives further details on the sample characteristics.

Measures of psychological health

The Patient Health Questionnaire-8 (PHQ8)

The PHQ8 (Kroenke et al., 2009) is a well-standardized and widely used screening instrument for the assessment of depressive symptoms in the general population. Its psychometric properties are excellent (Kroenke et al., 2009; Shin et al., 2019) and it is short enough to be used for survey work. The scale consists of eight short items assessing the frequency of depressive symptomatology over the past two weeks. Participants' responses range from 0 to 3, where 0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, and 3 = *nearly every day*. Total scores (from 0 to 24) are obtained by summing the responses to each item. Higher scores are indicative of greater levels of depressive symptomatology. When used as a screening tool, a cut-off score of 10 or more has been associated with excellent sensitivity and specificity for the diagnosis of depressive disorders (Kroenke et al., 2009). The cutoff score of 10 or more was used here to indicate "caseness" or clinically significant depressive symptom levels. The internal reliability of the scale among the current sample was excellent, with Cronbach's $\alpha = 0.907$.

The Generalized Anxiety Disorder-7 (GAD7)

The GAD7 (Spitzer et al., 2006) is a widely used measure of anxiety in the general population. Participants are asked to indicate how often, in the past two weeks, they have experienced each of seven main symptoms associated with generalized anxiety disorder. Total scores can range from 0 to 21 and are calculated by assigning scores of 0 (*not at all*), 1 (*several days*), 2 (*more than half the days*), and 3 (*nearly every day*) to item responses.

Scores of 5, 10, and 15 are considered cut-off points for mild, moderate, and severe anxiety, respectively. The psychometric properties of the instrument have been widely supported and the reliability of the scale among the current sample was excellent, with $\alpha = 0.931$. The present study used the cutoff score of 10 or more as indicative of clinically significant symptomatology for anxiety disorder.

Demographic measures

Gender: Participants were asked to report their gender as either male or female. **Age:** Participants were asked their age. For ease of interpretation, this variable was dichotomized using a median split. We now have two groups, those 30 and over and those under the age of 30. **Education:** Participants were questioned on their education level. Education was indicated on a scale from 1 (did not complete high school) to 4 (holds PhD/Doctoral degree). For ease of interpretation, we also dichotomized this variable, into those who had completed college and those who had not. **Residence:** Participants specified if they lived in a village/rural community or in a city/urban location. **Citizenship:** Participants identified whether they were citizens of the UAE (Emirati) or nonnational residents. Finally, participants were asked if they had ever been diagnosed or received treatment for a mental health problem.

Procedure

The Research Ethics Committee of the UAE Ministry of Health and Prevention (MOHAP/DXB-REC/MMM/No. 49/2020) approved the study. Data collection took place online from April 2 to 17, whereby participants first selected their preferred language (57.8% selected English) and then read the participant information page, before giving consent. Consenting participants answered demographic and personal history questions first, followed by the PHQ8 and the GAD7 questionnaires. The median completion time for the survey was 18.05 min. The data presented here are a subset of a more expansive survey exploring the psychosocial correlates of COVID-19 in the UAE.

TABLE 4 Descriptive statistics for psychological health outcome variables

Statistic	Depression (PHQ8)	Anxiety (GAD7)
Percent above screening cut-off (%)	44.79	38.17
Median score	8.00	7.00
Mean score	9.25	7.90
Interquartile range	3–14	2–13
Standard deviation	6.83	6.51
Minimum	0.00	0.00
Maximum	24.00	21.00

Abbreviations: GAD7, Generalized Anxiety Disorder-7; PHQ8, Patient Health Questionnaire-8.

TABLE 5 Bivariate (OR) and multivariate (AOR) binary logistic regression results predicting depressive symptomatology

Demographic variable	Sample (N)	Depression, N (%)	Unadjusted OR (95% confidence interval)	Significance level	AOR (95% confidence interval)	Significance level
Age (years)						
Under 30	777	467 (60.10)	0.297 (0.241–0.365)	<0.001	0.390 (0.298–0.509)	<0.001
Over 30	787	243 (30.87)				
Gender						
Female	1325	642 (48.85)	0.388 (0.288–0.524)	<0.001	0.554 (0.399–0.768)	<0.001
Male	260	68 (27.09)				
Residence						
City/Suburb	1357	634 (46.72)	0.657 (0.486–0.888)	<0.01	0.734 (0.539–1.025)	ns
Rural	208	76 (36.53)				
Education						
No college	446	271 (60.76)	0.417 (0.333–0.522)	<0.001	0.860 (0.649–1.141)	ns
College	1119	439 (39.23)				
UAE citizenship						
Yes	1007	530 (52.63)	0.429 (0.345–0.532)	<0.001	0.920 (0.663–1.113)	ns
No	558	180 (32.25)				
History of mental health problems						
No	1316	544 (41.33)	0.352 (0.264–0.468)	<0.001	0.343 (0.253–0.465)	<0.001
Yes	249	166 (66.66)				

Abbreviations: AOR, adjusted odds ratio; OR, odds ratio; ns, not significant (at $p < 0.05$).

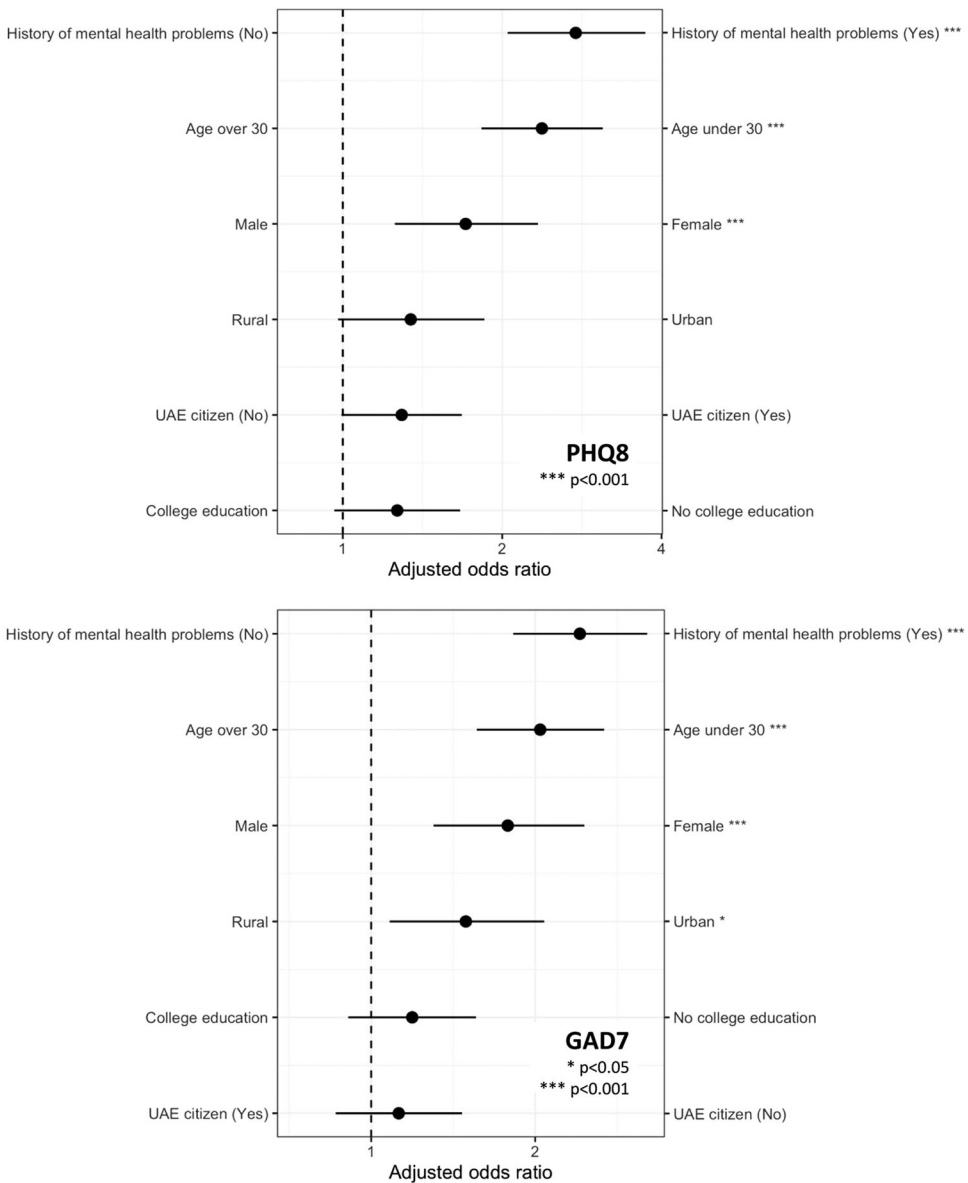


FIGURE 1 Forest plots of adjusted odds ratios (displayed as 1/AOR) for depression (above) and anxiety (below) during the early phase of compulsory mass quarantine implemented to contain the COVID-19 epidemic in the United Arab Emirates (UAE). GAD7, Generalized Anxiety Disorder-7; PHQ8, Patient Health Questionnaire-8

RESULTS AND ANALYSIS

Psychological health and demographic factors

On the basis of the cutoff scores for the PHQ8 and GAD7 instruments, the rates of depression were 44.8% and the rates of anxiety were 38.2%. Descriptive statistics for depression and anxiety are summarized in Table 4.

TABLE 6 Bivariate (OR) and multivariate (AOR) binary logistic regression results predicting anxiety symptomatology

Demographic variable	Sample (N)	Anxiety, N (%)	Unadjusted OR (95% confidence interval)	Significance level	AOR (95% confidence interval)	Significance level
Age (years)						
Under 30	777	377 (48.52)	0.427 (0.346–0.525)	<0.001	0.474 (0.361–0.621)	<0.001
Over 30	795	228 (28.67)				
Gender						
Female	1314	540 (41.09)	0.480 (0.351–0.649)	<0.001	0.562 (0.408–0.774)	<0.001
Male	259	65 (25.09)				
Residence						
City/suburb	1363	543 (39.83)	0.633 (0.461–0.867)	<0.01	0.686 (0.495–0.960)	<0.05
Rural	210	62 (29.52)				
Education						
No college	446	216 (48.43)	0.561 (0.449–0.701)	<0.001	0.857 (0.653–1.125)	ns
College	1127	389 (34.51)				
UAE citizenship						
Yes	1013	425 (41.95%)	0.655 (0.527–0.814)	<0.001	0.869 (0.664–1.137)	ns
No	560	180 (32.14)				
History of mental health problems						
No	1325	462 (34.86)	0.393 (0.283–0.518)	<0.001	0.410 (0.309–0.545)	<0.001
Yes	248	143 (57.66)				

Abbreviations: AOR, adjusted odds ratio; OR, odds ratio; ns, not significant (at $p < 0.05$).

Two binary logistic regression models were used to predict caseness for depression and anxiety. The demographic predictor variables were age group, gender, living location, education, citizenship status, and mental health history. Table 5 details the results of model 1, looking at depression. Findings for depression are stratified by the predictor variables, with bivariate associations presented as (unadjusted) odds ratios (OR), and adjusted odds ratios (AORs) from the multivariate model with all predictors entered. The multivariate model was significant ($\chi^2 = 213.26$, $p < 0.001$). When ORs were calculated, all variables were predictive of depression. Being younger, female, Emirati, urban-dwelling, and less educated were associated with an elevated risk of depression (Figure 1). However, when the AORs were calculated, only the effects for age, gender, and history of mental health persisted (remained significant).

The findings for anxiety closely followed those of depression. Table 6 details the results of model 2 looking at anxiety. Again, the multivariate model was significant ($\chi^2 = 125.27$, $p < 0.001$). When unadjusted odds ratios were calculated, all variables were predictive of anxiety. Being younger, female, Emirati, urban-dwelling, less educated, and having a history of mental health problems were associated with elevated risk (Figure 1). However, when the adjusted odds ratios were calculated, only the effects for age, gender, history of mental health problems, and residence persisted (remained significant). Figure 1 visualizes the results of adjusted odds ratios for depression and anxiety in descending order of risk.

Temporal analysis: Early versus late responders

To explore further the possible impact of lockdown on mental health, we looked at participants' scores from both ends of the data collection timeframe. The depression and anxiety status of participants who completed the survey from April 2 to 8, 2020 (early responders, $N = 851$) was compared with those who responded during the latter stages of the survey timeframe from April 9 to 17 (late responders, $N = 714$). Elevated depressive symptom status (scores above the PHQ8 cut-off) varied between the two groups, with a rate of 55.2% and 33.6% among early and late responders, respectively. Using Pearson's χ^2 test, the difference was statistically significant, with $\chi^2(1, N = 1565) = 73.19$, $p < 0.001$. The same analysis was carried out looking at anxiety status. The rates for participants scoring above the GAD7 cut-off were 45.8% and 29.8% among early and late responders, respectively. This difference was again statistically significant, with $\chi^2(1, N = 1573) = 42.33$, $p < 0.001$. Subsequently, a multivariate logistic regression analysis was performed with depressive symptom status (above/below the PHQ8 cut-off) as the dependent variable, entering responder timeline (early/late) as the predictor variable, while also controlling for age, gender, and nationality (Emirati/non-Emirati). Even after controlling for these demographic variables, early survey responses were associated with a greater likelihood of scoring above the PHQ8 cut-off: AOR = 1.515, confidence interval (CI) 1.192–1.926, $p < 0.001$. The same pattern of findings was observed for anxiety status (GAD7), with early responders more likely to score above the GAD7 cut-off than late responders: AOR = 1.447, CI 1.136–1.843, $p = 0.003$.

Comparisons of findings

The present study found unusually high levels of anxiety and depressive symptomatology in the UAE sample during the early stages of the CMQ lockdown. The

frequencies of individuals scoring above the screening cut-offs for both the PHQ8 (44.8%) and GAD7 (38.2%) were far higher than anything reported in similarly designed pre-pandemic surveys in the UAE. In a review of 14 articles exploring depression and anxiety in the UAE, the highest rate of depression reported was 33% (all-female sample), whereas, for anxiety, it was 28.6% (Razzak et al., 2019). However, previous UAE investigations have tended to focus on clinical groups. For example, Alsaadi et al. (2015) explored depressive symptoms among multiple sclerosis patients and reported a 17.6% and 20% prevalence for depression and anxiety, respectively. More recently, among UAE patients diagnosed with epilepsy, Alsaadi et al. (2017) reported 26.9% and 25% prevalence for depression and anxiety. Although it is understood that chronic health conditions are associated with elevated levels of depression (Simon, 2001), both of these reasonably contemporaneous studies still yielded much lower rates than our current findings. For subjects without underlying health problems, pre-COVID-19 background data on depression and anxiety levels in the UAE population are unfortunately scarce. Abdulrahman et al. (2018) present one of the few available studies for comparison. In a nonclinical set of 302 UAE medical residents (doctors), depression rates ranged from 6% to 33%—again, appreciably lower than rates found here. Similarly, a UAE-based psychiatric survey administered a structured clinical interview to 1669 Emirati households across the city of Al Ain. The study reported a lifetime prevalence for depressive illness of 2.8% and 10.3% for males and females, respectively (Abou-Saleh et al., 2001).

It should be noted that differences in methods of data collection, study samples, and assessment instruments combine to make formal cross-survey comparisons difficult. Nevertheless, it is observed that similar patterns of results (i.e., a post-CMQ spike in psychopathology) have been reported in several other nations, for example, the United Kingdom (Shevlin et al., 2020), United States of America (McGinty et al., 2020), China (Lei et al., 2020) and Lebanon (Grey et al., 2020). Moreover, at least one UAE-based study had fortuitously collected depressive symptom data from college students two weeks before the UAE CMQ measures and then again two weeks afterward (Thomas et al., 2021). Before lockdown, the rate of students scoring in the severe range on a widely used self-report measure of depression was 15%. In the two weeks after CMQ commenced, rates rose to 36.5%. It seems fairly certain that lockdown measures have some direct impact on mental health status, at least during the early stages of this infection control measure.

We also explored differences between participants completing the survey during the first week of April and those completing it during Week 2. We observed a statistically significant decrease in the rate of people scoring above the screening cut-off among those participants who completed the survey in Week 2, even after controlling for demographic differences. Although this 2-week data collection window is rather narrow, it is possible that the apparent drop-off in symptom levels reflects a general sense of habituation to a novel situation. This idea of an acute reaction followed by a lessening of symptoms is borne out by other longitudinal studies using repeated measurements across a broader timeframe. For example, using a large convenience sample weighted to match the UK population, Fancourt et al. (2021) reported a decreasing level of generalized anxiety and depression over the twenty weeks of lockdown, with the greatest decline in the first two weeks. Similar findings are also reported by O'Connor et al. (2021). The general finding seems to be one of heightened prevalence during the early stages of lockdown, followed by the amelioration of psychiatric symptomology with the passage of time. However, Shevlin et al. (2021) challenge this idea, suggesting that there are

different patterns of change for certain demographic groups, or as they express it, “different slopes for different folks.” In their UK analysis spanning four months, they found great heterogeneity in pandemic response across time, identifying individuals who improved, those who remained stable, and those who showed a deterioration in mental health. Loneliness, lower levels of trait resilience, and a history of mental health treatment were predictors of mental health deterioration between April and July 2020 (Shevlin et al., 2021).

Caveats to findings

This study has several important limitations that need to be clarified. First, the sample was not representative of the entire UAE populace. Notably absent were male foreign laborers employed in construction and other types of manual work. Reaching this group was beyond the scope of the present study owing to time constraints, general lack of internet access by this group for the online survey, and the necessary CMQ restrictions curtailing movement during April 2020. Second, self-selection bias might mean that the most anxious and depressed were perhaps the keenest to take the survey. Third, differences in methods of data collection and mental health assessment can hinder formal comparisons between studies. Fourth, the correlational nature of the study renders all causal and temporal inferences tentative at best.

In spite of these caveats, the abnormal rates of depression and anxiety measured at high levels of statistical significance by the present study are likely, at least in part, to be related to the COVID-19 pandemic and the CMQ measures implemented for infection prevention and control. Moreover, obtaining these preliminary insights into the demographic factors associated with a heightened incidence of depression and anxiety among segments of the UAE population during the pandemic is important to help inform public (mental) health plans for current and future outbreaks of infectious illness.

DISCUSSION

Importance of strengthening the Health–DRR nexus

Overall, our present findings, and the broader body of research exploring mental health implications, highlight the crucial need for mental health to be more fully integrated into policies aimed at DRR. According to Murray (2014), efforts at mainstreaming health into policies and practices for DRR in the past have been relatively scarce, not always successful, and often restricted simply to the notion of “saving lives.” Consequently, Lo et al. (2017) proposed that Health Emergency and Disaster Risk Management (Health-EDRM) should be established as a new paradigm to better consolidate the centrality of health within DRR agendas and that the emerging field of scientific inquiry at the intersection of health and DRR deserves greater encouragement. The Health-EDRM paradigm has the potential to meaningfully guide the implementation of the health aspects of the UN Sendai Framework on DRR (Pearson & Pelling, 2015). Beyond the Sendai Framework, human health is also seen as an important cross-cutting theme relevant to the other UN-ratified global frameworks stated earlier. Thus, the Paris Agreement on Climate Change acknowledges how climate change can have negative health risks, whereas the focus of SDG3 within the 2030 Agenda for Sustainable Development is to

“ensure healthy lives and promote wellbeing,” with an emphasis on the management of health risks at national and global scales.

There are positive signs that research at the Health–DRR nexus is beginning to gain traction. Djalante et al. (2020) call for more utilization of the Health-EDRM framework mentioned above to complement current responses on building resilience against biological hazards and pandemics. Furthermore, a new edited volume with 23 separate chapters is entirely dedicated to *Public Health and Disasters* (Chan & Shaw, 2020). Starkly notable by its absence, however, is any specific study dedicated to psychological health and disasters in that collection. This is in spite of the recommendation by Lo et al. (2017) that the scope of Health-EDRM research inquiry should expand to include psychosocial health and wellbeing, which they characterized as the thematic gap of “invisible health needs.” Our findings here similarly underscore how research on mental health during disasters must not be overlooked.

Importance of psychological intervention after disasters (PIAD)

Victims face many challenges in the immediate aftermath of a natural disaster that causes major societal disruption and environmental damage. Adversities arise directly from physical harm, lack of access to food and clean water, damage to shelter/housing, disconnection from family and friends, breakdown of infrastructure (power, sanitation, transport), and various other negative impacts. This compound set of multiple different stressors generates strong feelings of displacement. For the COVID-19 disaster, however, the situation is different: the emergency CMQ lockdown measures implemented for disease containment produce feelings of *confinement* rather than *displacement*.

Disaster effects on health can be long-lasting. Initial emergency healthcare later gives way to the need for post-disaster psychological care, sometimes for considerable periods (Rao, 2006). There may be a decrease in life satisfaction, with full recovery taking a significant length of time. Psychosocial support is, therefore, seen as crucial in disaster-affected communities. Ideas about the most appropriate forms of PIAD were developed a decade ago (Higgins et al., 2010). They should be adapted to tackle the particular needs of the disaster-affected community in question. For this reason, research needs to improve the existing understanding of the mental health consequences of disasters and their principal driving factors. Practitioners with applied expertise will then have evidence-based ability to respond. Consequently, the value of PIAD has been underscored in the series of capacity-building workshops organized jointly by the International Union of Psychological Science (IUPsyS, 2016) and the International Council for Science Regional Office for Asia and the Pacific (ICSU ROAP). Within the existing context of COVID-19, our current findings reinforce the importance of a targeted role for PIAD towards vulnerable groups in UAE society—in this case, women and younger residents in urban settings.

Resilience and Emirati culture

Levels of disaster risk depend not only on existing hazard threats and corresponding environmental exposure but also on the psychological and social vulnerability of exposed communities (Jogia & Wedawatta, 2020). As an individual human trait, resilience in the face of trauma is often remarkable (Bonanno, 2004). Resilience is one of several possible trajectories of stress response following exposure to disasters (Norris

et al., 2009). Wider societal dimensions of resilience should also not be underestimated. Societal resilience refers to the inherent capacity for communities to overcome grim circumstances and adversities. People who inhabit disaster-prone regions, and have done so over many generations, in particular, tend to develop greater disaster resilience. According to Fincher et al. (2008), such communities are more collectivist, interdependent, family-oriented, less extravert, more religious, and, in general, more in-group-oriented, all of which may be interpreted as behavior that offers some protection against psychopathology in the form of social support or at least the expectation of such support. Societal resilience, and how to promote it, is, therefore, a valuable concept in understanding and projecting post-disaster recovery.

It is, thus, interesting to observe that similar qualities typify the close-knit, religious, supportive, and traditional family values of Emirati culture (Bristol-Rhys, 2010). In other words, Emirati society is seen to already possess many of the qualities that typically enhance resilience. However, the nature of this particular pandemic and the response to it—CMQ lockdown and social distancing—might disrupt the traditional bonds of interdependence and social support. Having to refrain from extended family gatherings and religious congregations might prove to be an additional strain for individuals accustomed to close-knit contact with extended kinship networks and coreligionists. Similarly, Emiratis generally live within larger households, which might include several generations of family members along with unmarried adult children. Such living arrangements resonate with collectivist cultural values. Yet, in the context of an infectious illness pandemic, such arrangements are associated with a heightened risk of infection and perhaps the increased anxiety that accompanies fear of infection. These cultural and mental health factors are important considerations, especially given that long-term post-pandemic economic recovery is likely to be appreciably impacted by societal levels of mental ill-health. Exploring ways to enhance resilience and mitigate the impact of the pandemic on social support and mental health would, therefore, be deserving of further in-depth investigation.

CONCLUSIONS

All types of disasters cause tragic loss of life and suffering, and can bring serious long-term consequences for human health and wellbeing in many ways. Yet, a crisis triggered by an infectious disease outbreak clearly poses even greater risks through direct mortality. In early 2020, COVID-19 quickly escalated into a health emergency of unfathomable proportions and has caused an incomparable geopolitical crisis never witnessed before. The pandemic has inflicted immeasurable human suffering, catastrophic economic losses, and disrupted the normal functioning of society—it is humanity's first experience of a truly global NASECH disaster.

Assessment of disaster risk based on vulnerability and exposure is fundamental for policymakers. The Sendai Framework on DRR is arguably the most influential global agreement aiming to enhance national and community capacity to cope with disaster risks. It emphasizes a comprehensive approach to address multiple hazards (including biological hazards) that impact at different scales, frequencies, and intensities. However, other commentators have identified that greater efforts are needed to integrate public health emergencies into discussions surrounding disasters. For the continuing COVID-19 pandemic, strengthening the interconnectedness between emergency health responses and DRR is clearly of vital importance. This is supported by our findings in the context of the UAE's experience: (1) In addition to explicit health consequences of the coronavirus disease itself, the psychological wellbeing of people

in the UAE appears to have been adversely affected. This finding underscores the importance of PIAD. (2) Early CMQ (“lockdown”) was necessary to contain infection disease transmission. But this instrument also causes iatrogenic (adverse) effects. The resulting rates of depression (44.8%) and anxiety (38.2%) reached high levels. (3) Demographic factors are significantly linked to psychiatric impacts. Female gender, a history of mental health problems, and being a young (under 30) urban dweller, all appeared to be risk factors among this UAE sample. (4) Many cultural values of Emirati society, for example, interdependence, are resilience-enhancing. However, CMQ may interfere with such protective factors. Exploring ways to mitigate the impacts of CMQ and enhance societal resilience are key areas for future research. Such work can help inform broader strategies aimed at national recovery to the COVID-19 crisis in the UAE, as well as promoting disaster preparedness in the future.

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