Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Archives of Psychiatric Nursing 35 (2021) 311–316

Contents lists available at ScienceDirect

Archives of Psychiatric Nursing

journal homepage: www.elsevier.com/locate/apnu

The psychological and social impacts on personal stress for residents quarantined for COVID-19 in Saudi Arabia

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ARTICLE INFO

Keywords:
COVID-19
Cognitive reappraisal
Expressive suppression
Psychological factors
Social factors
Stress
Saudi Arabian

ABSTRACT

Objective: The study investigates psychological and social moderators of anxiety, depression, and personal stress in Saudi Arabian residents quarantined for COVID-19.
Methods: Data were collected from 200 participants quarantined in Saudi Arabia using the Emotion Regulation Scale (ERQ), Satisfaction With Life Scale (SWLS), Multidimensional Scale of Perceived Social Support (MSPSS), and the Hospital Anxiety and Depression Scale (HADS). Multiple regression analyses were carried out in SPSS.
Results: The results indicated that the overall prevalence of anxiety symptoms, depressive symptoms, and stress were 40.5%, 57.5%, and 55.5%, respectively. Cognitive reappraisal, satisfaction with life, and the social support of friends reduced depression and stress in quarantine. Additionally, females were more likely to be anxious but less likely to be depressed, while older residents generally experienced fewer anxiety and depression symptoms.
Conclusion: The findings indicate that residents in quarantine, especially younger people, experienced high levels of anxiety and depression. Therefore, continuous psychological monitoring and mental health support may need to be integrated into health care during pandemics.

Introduction

The novel corona virus, called COVID-19, has dramatically affected countries around the globe and significantly changed individuals' daily lives. Many countries put social distancing measures in place to slow transmission of the disease (Wilder-Smith & Freedman, 2020). However, these social distancing measures disrupted individuals' work and social routines. As countries enforced strict lockdowns to reduce the pandemic's spread, international meetings, educational activities, major sports competitions, tourism, and festivals were canceled or transferred to the virtual environment. This eventually resulted in the devastation of numerous industries such as tourism and travel.

In Saudi Arabia, the first case of COVID-19 was officially detected on March 2, 2020. From the beginning of March to June 15, 2020, the number of reported cases reached 136,315. Of this number, 89,540 patients have recovered, 1052 people have died, and the remaining are still active cases (Worldometer, 2020). As cases escalated, the Saudi Arabian government took precautions such as implementing quarantines and social distancing to both protect public health and minimize negative political consequences (Yezli & Khan, 2020). However, staying in isolation without socializing for many days may negatively impact people's mental health, and psychological and social factors can exacerbate stress levels in quarantined or isolated people (Algaissi et al., 2020).

The most extreme form of social distancing is the quarantine of those infected or in close contact with infected patients. Quarantine, especially in cultures where social gatherings and family visits are prevalent, can add to individuals' stress and depression because it exacerbates feelings of isolation and fear of the unknown. Isolation enhances stressors related to social factors like fear of losing contacts, inadequate information from the media, inadequate supplies, stigmatization linked with contracting the virus, and financial loss as well as boredom and frustration. Galea et al. (2020) reported that quarantined people, especially those with a long-established history of mental disorder, could develop higher levels of stress-related problems. In addition, Banerjee et al. (2020) found that 28% of quarantined citizens reported difficulty sleeping, high levels of worry due to hearing of other people in quarantine through social media, and feelings of isolation. These studies also

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https://doi.org/10.1016/j.apnu.2020.09.008
Received 16 June 2020; Received in revised form 14 August 2020; Accepted 21 September 2020
Available online 25 September 2020

reported higher levels of inappropriate behavior such as restlessness and excessive worrying, anger, and fear in those under quarantine.

The international literature provides several examples of the extreme negative psychological effects of pandemics and quarantines. For example, 35% of the Chinese population experienced those unpleasant circumstances, and consequently, during the lockdown period their psychological stress levels increased (Huang & Zhao, 2020; Qiu et al., 2020). Tan et al. (2020) and Jizheng et al. (2020) reported that healthcare workers quarantined to provide care to infected patients experienced higher levels of stress, depression, anxiety, and post-traumatic anxiety even after quarantine. Huang and Zhao (2020) and Lai et al. (2020) both reported insomnia for quarantined individuals. Brooks et al. (2020) also highlighted suicide, anger, and possible lawsuits resulting from quarantine, and Holmes et al. (2020) recorded high levels of psychological health issues, social isolation, and acute loneliness. According to Matthews et al. (2018) and Dsouza et al. (2020), these symptoms strongly correlate with self-harm, depression, and heightened anxiety. Mamun and Griffiths' (2020) study in Bangladesh demonstrated the relationship between fear and suicide, and Goyal et al. (2020) found a correlation between high stress and anxiety based on the fear of COVID-19 resulting in suicides in India. Other studies report that psychological stress has a significant relationship with various negative physical health conditions (e.g., Valtorta et al., 2016). Thus, it is important to explore the psychological and social factors that can moderate people's psychological well-being while quarantined.

Of course, negative psychological effects are not unique to the COVID-19 pandemic, and thus the importance of studying psychological and social moderators of psychological well-being in quarantine go far beyond the current crisis. Bavel et al. (2020) found that the significant central emotional reaction to pandemics like COVID-19 is fear. Previous studies on SARS and MERS–coronavirus discovered large increases in fear levels, especially among quarantined and infected people. During the SARS quarantine of 129 Canadian citizens, Hawryluck et al. (2004) found a significant relationship between quarantine, psychological

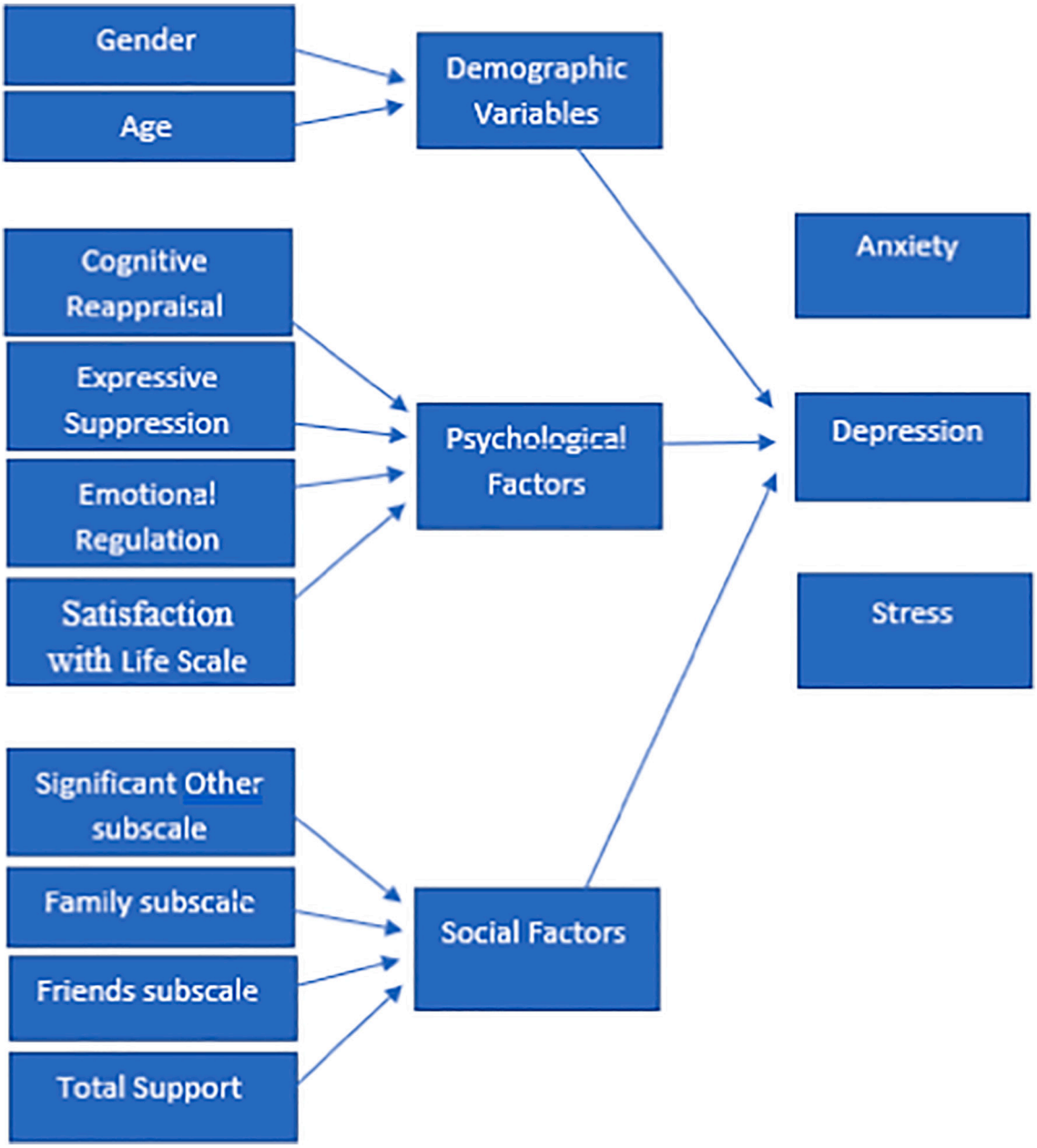

Fig. 1. Conceptual framework for this research.

crisis, and post-traumatic stress disorder (PTSD); furthermore, Tang et al. (2020) noted that of the patients quarantined, between 10 and 29% suffered PTSD. Bortel et al. (2016) assessed the Ebola outbreak's psychological impacts on people, society, and the world and found that people experienced severe psychological trauma from fearing and observing death. Additionally, Chatterjee et al. (2020) highlighted a correlation between mental health and quarantine in epidemics like COVID-19.

Brooks et al.'s (2020) study on the psychological impact of stress discovered that 23 of the 24 recent studies related to SARS, Ebola, and swine flu relate to quarantine and its psychological impacts. As reported by Yezli and Khan (2020), the lockdown period has inevitable mental, emotional, and social impacts on quarantined individuals. However, no prior studies have investigated those effects in the Saudi Arabian population. Hence, this study's purpose is to explore the psychological and social factors that moderate or exacerbate the effects of COVID-19 quarantine on stress levels in Saudi Arabian patients.

This study builds on the previous work relating to the psychological and social factors that influence anxiety and depression by focusing on the experiences of quarantined residents in Saudi Arabia. The study uses three groups of independent variables: 1) demographic variables (i.e., age and gender), 2) psychological factors including emotional regulation, cognitive reappraisal, expressive suppression, and satisfaction with life, and 3) social factors including social support from family, friends, and significant others. Fig. 1 presents the conceptual model.

Methods

Participants

A random sampling method was used to send study invitations to approximately 445 individuals quarantined in the Kingdom of Saudi Arabia (KSA). Those individuals were quarantined for either because they had come in close contact with someone infected with COVID-19 or because they had recently re-entered the country form overseas. 200 participants completed the study for a response rate of 45%.

Measures

Hospital Anxiety and Depression Scale (HADS)

We assessed anxiety, depression, and psychological distress using the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). Although initially developed for residential psychiatric populations, the HADS has also been used widely in community research. This research suggests that the total score is a valid measure of emotional distress (Costantini et al., 1999). The scale consists of 14 items evenly divided into two subscales measuring anxiety and depression. The total scores across all items were computed and used as a measure of psychological distress. In the current sample, the scale had good internal consistency and reliability, with Cronbach's α of 0.84, 0.78, and 0.81 for the total score, anxiety, and depression subscales, respectively. Cronbach's alpha values between 0.7 and 0.8 are generally considered acceptable and those over 0.8 indicate very good reliability (DeVillis, 1991).

Emotion Regulation Questionnaire (ERQ)

The Emotion Regulation Questionnaire (ERQ), developed by Gross and John (2003), measures individual differences in the use of two different emotion regulation strategies, cognitive reappraisal (CR), and expressive suppression (ES). Respondents rate the items on a 5-point Likert-type scale. There are six and four items in the CR and ES subscales, respectively. Higher scores indicate greater use of the corresponding strategy. Cronbach's α values for ERQ, CR, and ES were 0.88, 0.81 and 0.77, respectively.

Satisfaction With Life Scale (SWLS)

We assessed participants' satisfaction with life using the Satisfaction With Life Scale (SWLS) (Diener et al., 1985). The scale has only one dimension. There are five items, and each item has seven response options. Cronbach's α for the total score was 0.79.

Multidimensional Scale of Perceived Social Support (MSPSS)

We used the MSPSS, developed by Zimet et al. (1988), to determine how the respondents perceive informal social support. There are 12 items on the scale, and each item has seven response options. The scale is evenly divided into three subscales: support from family, friends, and significant others. Higher scores indicate more perceived social support. Cronbach's α values for the total score and support from family, friends, and significant others were 0.87, 0.81, 0.78, and 0.73, respectively.

Procedures

The authors obtained ethical approval for conducting this study. The instrument informed participants about the study's purpose and asked for consent and willingness to participate. The instrument also informed participants that their data would remain confidential to encourage them to share their opinions freely and openly (Bell et al., 2019). Since participants were in quarantine, the study used an online survey, and all measures were prepared for online administration using Google Forum. The link for the online survey was distributed through social media (e.g. WhatsApp, Telegram), text messages, and emails.

Statistical analysis

The data were analyzed using multiple regression in SPSS (Statistical Package for the Social Sciences; version 20). The data meets all the underlying assumptions for multiple regression (e.g., no multicollinearity, no outliers, multivariate normal distribution).

Results

Descriptive characteristics

A total of 200 quarantined persons participated in this study, 152 females (76%) and 48 males (24%). Two percent of the sample were aged 0–19 years, 42.5% were aged 19–29 years, 31.5% were aged 30–39 years, 14% were aged 40–49 years, and 10% were older than 50 years. In the sample, 10.5% were non-Arabic, and 89.5% were Saudi Arabian. In the sample, 38% had full-time work, 9.5% were working part-time, 6% were retired, and 46.5% were unemployed. Nearly 50% of the sample spent more than ten days in quarantine. Of the participants, 34% declared that they had been in contact with COVID-19 infected people; 66% of them stated they came from outside of the KSA.

Prevalence of anxiety, depression, and stress during COVID-19 quarantine

A HADS score $\geq$ 8 indicates the presence of either depression or anxiety and a score $\geq$ 16 indicates stress. Using these cut-offs, the data identify 40.5% of participants as having anxiety, 57.5% as having depression, and 55.5% as having stress.

Correlation

Table 1 presents the bivariate correlations. Many correlations were significant at the 0.05 or 0.01 alpha levels and ranged from 0.06 to 0.92.

Regression analysis

The multiple regression analyses used three dependent variables, anxiety, depression, and stress. The model summary is shown in Table 2. The findings indicated that 50% of the stress level among the Saudi quarantined residents can be explained by the demographic variables, psychological factors, and social factors. Their level of stress might have

Table 1
The bivariate correlation between stress, emotional regulation, life satisfaction, social support, gender, and age.

Variable	HADS	Anx	Dep	C R	E S	ERQ	SWLS	SSS	SSF	SSD	MSPSS	Gender	Age
HADS	1	0.802**	0.794**	−0.243**	0.139	−0.089	−0.341**	−0.169*	−0.194**	−0.307**	−0.273**	0.234**	−0.313**
Anx		1	0.274**	−0.102	0.071	−0.031	−0.051	−0.093	−0.071	−0.114	−0.114	0.308**	−0.326**
Dep			1	−0.288**	0.151*	−0.112	−0.497**	−0.177*	−0.240**	−0.379**	−0.325**	0.064	−0.172*
C R				1	0.596**	0.924**	0.437**	0.369**	0.295**	0.309**	0.400**	−0.255**	0.112
E S					1	0.858**	0.123	0.243**	0.040	−0.003	0.118	−0.070	−0.033
ERQ						1	0.338**	0.352**	0.208**	0.196**	0.312**	−0.196**	0.056
SWLS							1	0.584**	0.438**	0.358**	0.568**	−0.245**	0.108
SSS								1	0.485**	0.336**	0.755**	−0.233**	0.067
SSF									1	0.654**	0.875**	0.022	0.296**
SSD										1	0.809**	−0.088	0.326**
MSPSS											1	−0.125	0.280**
Gender												1	−0.115
Age													1

Note: HADS = Hospital Anxiety and Depression scale (total degree), Anx = anxiety, Dep = depression, ERQ = Emotion Regulation Questionnaire (total degree), CR = cognitive reappraisal, ES = expressive suppression, SLS = satisfaction with life, MSPSS = Multidimensional Scale of Perceived Social Support (total degree), SSS = Social Support Significant Other, SSF = Social Support Family, SSD = Social Support Friends.

** Correlation is significant at the 0.01 level (two-tailed).

* Correlation is significant at the 0.05 level (two-tailed).

Table 2
ANOVA and regression model summary.

Model summary	Anxiety	Depression	Stress
R	0.447	0.650	0.549
R square	0.200	0.423	0.301
Adjusted R square	0.167	0.398	0.272
Std. error of the estimate	3.472	2.901	0.367
Anova mean squares	72.079	147.121	1.385
Significance Anova	<0.001	<0.001	<0.001

been affected by several other factors, including staying at home, losing their jobs, and the fear of serious health issues.

The ANOVA summary in Table 2 shows the analysis of the variance and the models used. Based on the findings, anxiety, depression, and stress were all significant.

Finally, the effect of the independent variables was assessed using multiple linear regression. The results are shown in Table 3.

Importantly, Table 3 shows that demographic variables, psychological factors, and social factors significantly affected stress levels among quarantined residents in Saudi Arabia. Using anxiety as the dependent variable suggests gender, age, total degree of ERQ, and the family subscale are all significantly associated with anxiety. Gender, total degree of ERQ, and support from family positively relate to anxiety, while age and anxiety had a negative association. Females felt more anxiety than males. Older people were less anxious than younger people.

When depression was the dependent variable, gender, cognitive reappraisal, expressive suppression, total degree of ERQ, SWLS, support from family, support from friends, and total degree of MSPSS were all significant explanatory variables. Gender, cognitive reappraisal, SWLS, and support from friends had a negative association with depression, while expressive suppression, total degree of ERQ, support from family, and total degree of MSPSS had positive associations with depression. Females felt less depression than males. On average, quarantined people suffered from depression, but the factors with negative associations may have helped reduce the depression they experienced.

Finally, when the dependent variable was stress, age, cognitive reappraisal, expressive suppression, total degree of ERQ, SWLS, and the family support subscale were all significant explanatory variables. Among these, age, cognitive reappraisal, and SWSL had a negative association with stress. In contrast, expressive suppression, total degree of ERQ, and support from family had a positive association with stress, suggesting that high values of these factors may have reduced stress in quarantined Saudi residents. Gender, support from significant others, and total support (MSPSS) had no statistically significant associations with stress levels.

Discussion

People in quarantine may experience boredom due to losing their independence, staying separate from their households, uncertainty about the condition of the disease. They can also experience sudden changes in emotions due to a long stay in quarantine. This study evaluates the psychological and social impacts of quarantine for the coronavirus (COVID-19) on stress levels.

In relation to anxiety, Table 3 shows four significant relationships. The B = 0.26 for gender shows that female residents felt more anxiety in quarantine. The B = −0.29 for age suggests that older people had less anxiety than younger people due to their experience. The B = 0.16 for total degree of ERQ means that participants with more emotional control and stability felt more anxiety about managing their emotions due to

Table 3
Multiple linear regression analysis of anxiety, depression, and stress.

Predictor variables	Anxiety			Depression			Stress		
	B	β	p	B	β	p	B	β	p
Gender	2.326	0.262	0.000	−1.066	−0.122	0.045	0.090	0.090	0.179
Age	−1.104	−0.295	0.000	−0.240	−0.065	0.273	−0.096	−0.227	0.001
CR	−0.071	−0.131	0.176	−0.184	−0.342	0.000	−0.018	−0.295	0.001
ES	0.119	0.163	0.060	0.265	0.369	0.000	0.027	0.332	0.000
ERQ	0.124	0.124	0.036	0.215	0.221	0.001	0.015	0.020	0.000
SWL	0.077	0.118	0.176	−0.301	−0.468	0.000	−0.016	−0.216	0.009
SSS	−0.072	−0.111	0.467	−0.057	−0.090	0.489	−0.009	−0.126	0.378
SSF	0.010	0.009	0.034	0.214	0.248	0.001	0.014	0.025	0.005
SSD	0.000	0.000	0.998	−0.292	−0.435	0.002	−0.021	−0.270	0.073
MSPSS	0.014	0.051	0.830	0.123	0.458	0.024	0.010	0.316	0.155

the difficult circumstances. The B = 0.10 for support from family indicates that people generally needed more family support because being in quarantine and separation from family could increase their anxiety. This is consistent with previous findings; for instance, Yezli and Khan (2020) identified that the Saudi population emphasizes social life, and is more interested in social gatherings, on average, than other cultures. Because of the social distancing rules the KSA applied, quarantined people may have feared they would not be able to meet their loved ones, further increasing their anxiety.

Multiple social and psychological factors also showed significant associations with depression. Gender showed a significant association with depression (B = −0.12) such that females felt more depressed than males. Cognitive reappraisal was significantly negatively associated with depression (B = −0.34), suggesting that more emotional control could reduce the level of depression. On the other hand, expressive suppression has a significantly positive association (B = 0.37), indicating that quarantined Saudi residents who have a more difficult time expressing their emotions experienced higher depression levels. Total degree of ERQ, and satisfaction with life were also significant. As the ERQ decreased, depression decreased, and as the satisfaction with life increased, depression decreased. Interestingly, support from family members did not work to reduce depression for those in quarantine. Rather, the support from family and MSPSS had significant positive relations with depression, suggesting that increased support from family and MSPSS increased depression. Support from friends was negatively associated with depression, meaning that if quarantined people talked to or were supported by friends, they experienced lower depression levels. Hawryluck et al. (2004) found a highly significant relationship between quarantine and psychological crisis and PTSD. That research also supports our results, indicating that psychological factors had significant impacts on the stress experienced by the Saudi quarantined residents. Martínez-Hernáez et al.'s (2016) findings that support of family members can reduce depression, especially in the young, further reinforce our study's results, which suggest that psychological symptoms and the stress experienced in quarantine can be significantly reduced through family support.

Results also indicate several significant associations between social and psychological factors and overall psychological stress levels. Older people were less stressed while quarantined than younger people. Also, higher levels of cognitive reappraisal may have helped to reduce the stress residents experienced in quarantine. As with depression, the positive coefficient on expressive suppression suggests that quarantined residents who find it difficult to express their emotions adequately experience higher levels of overall stress. This finding is consistent with previous studies (see Buhle et al., 2013; Davidson, 2000; Gross & John, 2003). Similarly, Martínez-Hernáez et al. (2016) identified that emerging adults are more concerned and depressed compared to youth, perhaps because they are the primary economic support and caregivers for their families. This can become extremely difficult in crisis situations like COVID-19 that lead to the isolation of both children and adults in their homes, which in turn increases their fear of the future. Economic worries can further weigh on individuals struggling to pay their rent and make ends meet, thereby increasing the likelihood of experiencing stress and depression.

Total degree of ERQ, ES, and support from family were positively associated with overall stress, perhaps because people were worried about their families. As those scoring high on these scales were in relatively unstable emotional states during quarantine, they experienced more stress. In contrast, people who were more satisfied with life were happier and less stressed during quarantine. These results are similar to those reported by Chatterjee et al. (2020) who highlighted a correlation between mental health and quarantine whereby enhanced stressors related to social factors like fear of losing contact, boredom, frustration, inadequate information from the media, inadequate supplies, stigmatization linked with fear of contracting the virus, and financial loss all reduced mental health.

Conclusion

This study examines psychological and social factors affecting the mental health of those in quarantine. This study's results suggest that social factors significantly influenced the stress levels experienced by quarantined Saudi residents. Further, the results indicate that the mandatory quarantine process applied to protect public health may have negative mental health consequences for individuals. Overall, our study identified 40.5% of respondents as having anxiety, 57.5% as having depression, and 55.5% as having stress. These are alarming statistics, but the findings also demonstrate the importance of demographic variables, psychological factors, and social factors for managing the stress levels experienced by quarantined Saudi residents.

This study's findings align with prior literature showing that depression and anxiety are prevalent in quarantined individuals (e.g., Huang & Zhao, 2020; Jizheng et al., 2020; Qiu et al., 2020; Tan et al., 2020). Importantly, the depression and anxiety caused by quarantining may lead to significant negative societal effects such as heightened suicide rates, self-harm, excessive anger, and negative physical health outcomes (Brooks et al., 2020; Dsouza et al., 2020; Holmes et al., 2020; Matthews et al., 2018; Valtorta et al., 2016). The results are also important for understanding cross-cultural differences in the psychological and social impacts of quarantine for the coronavirus (COVID-19) that can emerge early and significantly stress levels.

Non-drug interventions are society's main preventive options in cases where it is important to manage pandemic outbreaks. Therefore, it is necessary to systematically analyze the psychological and social effects of these interventions on individuals. Our results have important implications for how policymakers conceptualize non-drug interventions and should lead to further discussion about how to clinically manage quarantined individuals. When designing and implementing intervention for outbreaks, more attention should be given to their social impact, and policymakers should note that social support is a valuable component of such interventions. Mental health support should be integrated into health care support during the pandemic, and policymakers should include training, education, and awareness about psychosocial issues as part of the strategy for handling COVID-19.

COVID-19 has health, emotional, and social implications for individuals, and there is a need to provide for the psychosocial needs of quarantined individuals. State and local planning authorities need to identify the mechanisms for managing psychosocial scenarios as well as managing the pandemic. By providing important information on population-specific issues, psycho-behavioral observations and analyses such as those in this study can be used to design and evaluate outbreak control policies. Accordingly, this study will help the government of Saudi Arabia focus on the factors critical for improving quarantined residents' mental health outcomes.

Like all research, this study has several limitations. The study uses a relatively small sample, which can limit generalizability to the population as a whole; a larger sample size is recommended so that the results can be generalized to other settings. Another limitation of this research is that the sample was predominantly female (76% vs. 24%), limiting inferences for the male population and gender differences. Future research should strive to achieve balanced samples.

Financial disclosure

None.

Declaration of competing interest

None.

Acknowledgements

None.

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