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ORIGINAL ARTICLE

Public Concerns and Mental Health Changes Related to the COVID-19 Pandemic Lockdown in Saudi Arabia

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SUMMARY

Background: **Public measures to confine the spread of the novel coronavirus disease 2019 (COVID-19) infection involves partial or full lockdown by some countries including Saudi Arabia. Social isolation, and financial insecurity are potential risk factors for mental changes. This study aimed to address public concerns, and assess mental health changes, and the factors associated with mental health burden in response to the COVID-19 outbreak in Saudi Arabia after the full lockdown is widely employed.**
Methods: **This cross-sectional study was conducted between 30th of April, and 10th of May, 2020 by posting an online survey on social media platforms (WhatsApp, and Twitter) to collect data on participants' demographics, concerns and worries related to the COVID-19 pandemic, and mental health changes using a validated Arabic version of the self-rated Hospital Anxiety and Depression Scale (HADS).**
Results: **A total of 1,921 responded to the questionnaire. Of them, 1,429 (74.5%) were ≤ 45 years old, and 967 (50.3%) were males. Reported public concerns included disturbed lifestyle, getting self or family member infected, loss job or part of income, difficult access to routine health care, and 55.8% reported negative impact on their mental health. Hospital anxiety and depression scale revealed high rates of depression [717 (37.3%)], and anxiety [508 (26.4%)]. Binary logistic regression revealed that female gender, working for the private sector, smokers, and people with chronic diseases were at increased risk of mental illnesses ($p < 0.05$).**
Conclusions: **This study addressed serious public concerns, and substantially high rates of depression and anxiety related to the COVID-19 pandemic, and lockdown.**
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KEY WORDS

COVID-19, public concerns, mental changes, anxiety, depression

INTRODUCTION

A pandemic caused by a novel coronavirus, COVID-19, is responsible for progressively increasing cases of pneumonias throughout the world was announced [1]. Person-to-person spread of COVID-19 is believed to arise mainly via respiratory droplets. Infection can also occur if a person touches a surface contaminated with infected secretions and then touches his/her eyes, nose, or mouth [2]. To reduce the risk of transmission in the

community, individual population are recommended to wash hands meticulously and abstain from social gatherings [3,4].

Public health measures variably employed in different countries include social distancing and stay-at-home regulations, aggressive case-contact tracing and health quarantine of contacts, lockdown of areas of high prevalence which involves the restriction of movement, and/or separation from the rest of the population [5,6]. Factors including cultural, geographic and economic factors affect the effectiveness of quarantine and lockdown. Fast evaluation is needed to assess both the success and the possible obstacles to quarantine and lockdown effectiveness, and they should be utilized to direct plans for the most suitable and culturally convenient measures [6].

Only a few studies have addressed public concerns (e.g., access to healthcare, getting routine/essential medications) and the mandated lifestyle changes (e.g., self-isolating, washing hands more often) in response to the COVID-19 preventive measures, including lockdown [7].

While the pandemic's health consequences are clear from the physical point of view, the mental health consequences should not be ignored or minimized. As time in the lockdown continues, people might develop more severe anxiety or depression. Social isolation, loneliness, and financial insecurity are among potential factors of adverse mental changes. A very recent report by the Kaiser Family Foundation in the United States demonstrated that the mental health burden is increasing for almost everyone. In a mid-March 2020 survey, 32% of surveyed individuals reported that worries and stress about COVID-19 had a negative effect on their mental health. Two weeks later, in late March, this number had increased to 45% [8].

We sought to use this work to identify public emotions regarding measures taken and threats faced as the pandemic is progressing. Moreover, we thought to use this work to address mental health changes, including anxiety and depression, among the general population under stress of COVID-19 outbreak and its related measures to confinement, social isolation, and lockdown. Also, we aimed to study the factors associated with potential mental changes.

Outcome results of this work are believed to aid in understanding public reflection on measures taken to confine infectious outbreaks, subsequently, assist stakeholders to plan accordingly. Moreover, understanding the psychological consequences of infectious outbreaks support health sectors on boosting mental health systems during outbreaks and afterwards.

MATERIALS AND METHODS

This cross-sectional study was conducted during the period from the April 30, 2020, to May 10, 2020, by posting an online survey on social media platforms (WhatsApp, Twitter) to collect data on concerns and general worries among the public in response to the COVID-19 pandemic after full lockdown had been widely employed in Saudi Arabia for six weeks.

1. WhatsApp and Twitter posts were shareable to facilitate snowball sampling.
2. Informed consent was obtained from participants after being informed of the purpose, risks, and benefits of the study.
3. The survey was pilot tested with 50 participants, who were included in the final results.
4. The survey consists of three sections (multiple choice, single choice). All questions were mandatory.
5. ***Section one*** includes demographic characteristics of participants.
6. ***Section two*** includes six questions on the participants' concerns and general worries from the outbreak and lockdown (e.g., report disrupted life, personal worry about themselves or a family member getting sick, economic worries includes loss of income due to a workplace closure or reduced hours, etc.).
7. ***Section three*** to assess mental health using a validated Arabic version [9] of the self-rated Hospital Anxiety and Depression Scale (HADS) to identify and score symptoms of depression and anxiety [10]. This 14-item questionnaire was designed to screen for psychiatric disorders in the general population and to identify those who need further psychiatric assessment. It encompasses two subscales: anxiety and depression. Items are rated on a 4-point Likert scale as yes definitely, yes sometimes, no not much, and no not at all. Its maximum scores are 21 for anxiety or depression. Scores of ≥ 11 on the depression or anxiety subscale are considered indicative of ''case-ness'' for either disorder, scores of 8 - 10 represent ''borderline case," and scores 0 - 7 is ''non-case''. The HADS is commonly used, significantly reliable, and valid in assessing case-ness of depression and anxiety in clinical practice and general populations, and permits significant distinction between these two disorders [11].

Statistical analysis

Data were analyzed with STATA (StataCorp LLC, College Station, TX, USA). We represent categorical variables in terms of frequency (percentage). The binary logistic regression model was used to identify factors associated with mental changes. Odds ratios and their associated 95% confidence intervals (CIs) were used as measures of effect size. p-value less than 0.05 (two-tailed) was considered to be statistically significant.

RESULTS

A total of 1,921 responded to the questionnaire. Of those, 1,429 (74.4%) were $\leq$ 45 years old, and 967

Table 1. Participants' characteristics, concerns, and mental health changes related to COVID-19 lockdown.

Variable		Total (1,921) N (%)
Age	18 - 35	843 (44)
	36 - 45	586 (30.5)
	46 - 55	341 (17.7)
	56 - 75	151 (7.8)
Gender, male		967 (50.3)
Level of education	Below high school/secondary school	11 (0.6)
	High school/secondary school	233 (12.2)
	Some college	246 (12.8)
	Bachelor degree	969 (50.4)
	Post-graduate degree	462 (24)
Nationality	Saudi	1,575 (82)
	Non-Saudi	346 (18)
Type of Occupation	Governmental	729 (38)
	Private	491 (25.5)
	Self-employed	78 (4)
	Retired	135 (7)
	Non-employed	488 (25.4)
Living status	Alone	100 (5.2)
	With family	1,792 (93.3)
	With others	29 (1.5)
Smoking status, yes		571 (29.7)
Comorbidities, yes		461 (24)
Frequency of daily follow up COVID-19 news	Not at all	401 (20.9)
	Once/twice a day	843 (43.9)
	Multiple times a day	621 (32.3)
	Most of the day	56 (2.9)
Concerns and general worries		
Level of concern about COVID-19	Not concerned at all	169 (8.8)
	Somewhat concerned	484 (25)
	Moderately concerned	842 (43.8)
	Very concerned	235 (12.2)
	Extremely concerned	191 (9.9)
The pandemic is disturbing my lifestyle, yes		1,400 (73)
Worried to get self-infected, yes		1,452 (75.6)
Worried a family member gets infected, yes		1,760 (91.6)
Worried about loss of income due to workplace closure, yes		599 (31.2)
Worried about loss of part of income due to reduced working hours, yes		960 (50)
Getting food/other essentials		463 (24.1)
Access to routine health care/getting medications		847 (44)
The pandemic has negative impact on my mental health, yes		1,073 (55.8)
Mental health changes:		
Anxiety		508 (26.4)
Depression		717 (37.3)

Most participants were ≤ 45 years old, half of them were males. High percentages of participants indicated that the pandemic is disturbing their lifestyle, worried about self or family member getting infected, worried about loss of job or part of income, and more than half indicated negative impact on their mental health. Substantially high rate of anxiety and depression were detected (26.4%, and 37.3%, respectively).

Table 2. Logistic regression for anxiety.

Variable		OR	95% CI	p-value
Age	36 - 45	0.796	0.627 - 1.011	0.061
	46 - 55	0.723	0.540 - 0.969	0.030
	56 - 75	0.709	0.471 - 1.069	0.101
Gender, female		1.704	1.520 - 2.299	< 0.001
Level of education	High school/secondary school	0.969	0.358 - 8.101	0.503
	Some college	1.113	0.370 - 8.325	0.479
	Bachelor degree	1.091	0.338 - 7.330	0.564
	Post-graduate degree	1.000	0.358 - 7.578	0.544
Type of Occupation	Private sector	1.488	1.151 - 1.924	0.002
	Self-employed	0.986	0.567 - 1.717	0.962
	Retired	1.064	0.693 - 1.633	0.777
	Non-employed	1.323	0.958 - 1.827	0.090
Living status	With family	0.703	0.457 - 1.081	0.109
	With others	1.895	0.819 - 4.386	0.135
Smoking, yes		1.417	1.142 - 1.759	0.002
Comorbidities, yes		1.546	1.231 - 1.942	< 0.001
Concerns and general worries				
Level of concern	Somewhat concerned	0.846	0.762 - 4.538	0.173
	Moderately concerned	3.492	3.593 - 18.908	< 0.001
	Very concerned	16.567	16.151 - 89.301	< 0.001
	Extremely concerned	31.548	29.512 - 169.541	< 0.001
The pandemic is disturbing my lifestyle, yes		6.038	4.293 - 8.493	< 0.001
Worried about getting self-infected, yes		4.411	3.182 - 6.114	< 0.001
Worried a family member may get infected, yes		3.065	1.857 - 5.059	< 0.001
Worried about loss of income due to workplace closure, yes		3.244	2.624 - 4.012	< 0.001
Worried about loss of part of income due to reduced working hours, yes		3.099	2.495 - 3.849	< 0.001
Getting food/other essentials		0.907	0.483 - 4.142	0.217
Access to routine health care/getting medications		0.836	0.581 - 3.297	0.153
The pandemic has negative impact on my mental health, yes		15.168	10.838 - 21.229	< 0.001
Frequency of daily follow up of COVID-19 news	Twice a day	0.646	0.503 - 0.829	0.001
	Multiple times a day	1.623	1.040 - 2.050	< 0.001
	Most of the day	3.675	1.119 - 4.093	< 0.001

There was increased risk for anxiety among females, smokers, people with chronic diseases, workers of the private sector, increasing level of concern towards the pandemic, higher frequency of daily following of the pandemic news, those indicating that the pandemic is disturbing their life style, those worried about self or family member getting infected, worried about loss of job or part of income, and those indicating that the pandemic has a negative impact on their mental health ($p < 0.05$).

(50.3%) were males. Among the total responders, 1,575 (82%) were Saudis, 969 (50.4%) had bachelor degrees, while 462 (24%) had postgraduate degrees, and the remaining 244 (12.8%) were below college level. As regards occupation, 729 (38%) work for the government, 491 (25.5%) work for the private sector, while 488 (25.4%) were non-employed. The majority [1,792 (93.3%)] were living with their families, 571 (29.7%) were smokers, and almost one-fourth of them [461 (24%)] had chronic diseases. While most of the participants [843 (43.9%)] indicated they follow COVID-19 news once or twice per day, one-third of them [621 (32.3%) indicated they follow the pandemic news multiple times per day, while one-fifth of them [401 (20.9%)] do not follow the news at all (Table 1).

Table 1 also shows the participants' concerns and gen-

Table 3. Logistic regression for depression.

Variable		OR	95% CI	p-value
Age	36 - 45	0.885	0.712 - 1.100	0.272
	46 - 55	0.802	0.617 - 1.043	0.100
	56 - 75	0.699	0.482 - 1.014	0.059
Gender, female		1.329	1.104 - 1.600	0.003
Level of education	High school/secondary school	1.618	0.418 - 6.262	0.486
	Some college	1.485	0.384 - 5.742	0.566
	Bachelor degree	1.662	0.438 - 6.303	0.455
	Post-graduate degree	1.495	0.391 - 5.714	0.556
Type of Occupation	Private sector	1.601	1.201 - 2.333	< 0.001
	Self-employed	1.836	0.868 - 3.120	0.012
	Retired	1.182	0.377 - 1.411	0.395
	Non-employed	1.566	0.377 - 1.411	0.003
Living status	With family	0.709	0.473 - 1.064	0.097
	With others	1.141	0.498 - 2.611	0.755
Smoking, yes		1.260	1.031 - 1.539	0.024
Comorbidities, yes		1.256	1.014 - 1.556	0.037
Concerns				
Level of concern about COVID-19	Somewhat concerned	1.908	1.214 - 2.998	0.005
	Moderately concerned	2.949	1.921 - 4.529	< 0.001
	Very concerned	4.826	2.988 - 7.795	< 0.001
	Extremely concerned	10.732	6.464 - 17.817	< 0.001
The pandemic is disturbing my lifestyle, yes		4.293	3.323 - 5.547	< 0.001
Worried about getting self-infected, yes		1.869	1.485 - 2.350	< 0.001
Worried a family member may get infected, yes		2.191	1.494 - 3.214	< 0.001
Worried about loss of income due to workplace closure, yes		2.412	1.978 - 2.940	< 0.001
Worried about loss of part of income due to reduced working hours, yes		2.473	2.044 - 2.992	< 0.001
Getting food/other essentials		0.653	0.586-1.302	0.142
Access to routine health care/getting medications		0.523	0.752 - 2.462	0.136
The pandemic has negative impact on my mental health, yes		4.805	3.892 - 5.931	< 0.001
Frequency of daily follow up of COVID-19 news	Twice a day	0.922	0.740 - 1.149	0.472
	Multiple times a day	1.495	1.159 - 1.928	0.002
	Most of the day	2.836	1.617 - 4.973	0.000

The risk for depression was similar to anxiety, plus increased risk for depression in those self-employed and non-employed ($p < 0.05$).

eral worries regarding the pandemic where 842 (43.8%) were moderately concerned, while 484 (25%) were somewhat concerned, whereas 235 (12.2%) were very concerned, and 191 (9.9%) were extremely concerned. The vast majority of participants [1,760 (91.6%)] were worried a family member may get infected, 1,452 (75.6%) were worried to become infected themselves, and 1,400 (73%) reported that the pandemic is disturbing their lifestyle. While half of participants [960 (50%)] expressed their concern regarding the loss of part of their income due to reduced working hours, one-third of them [599 (31.2%)] revealed their concern to loss of job and whole income. Of the participants, 847 (44%) indicated that access to routine medical care and getting essential medications would be difficult, one-fourth of them [463 (24.1%)] indicated their worries about obtaining food and other essentials. More than half of participants [1,073 (55.8%)] indicated that the pandemic had negative impact on their mental health. There was variation in the levels of concern about losing job among participants of each job sector, with the highest concern among workers of the private sector,

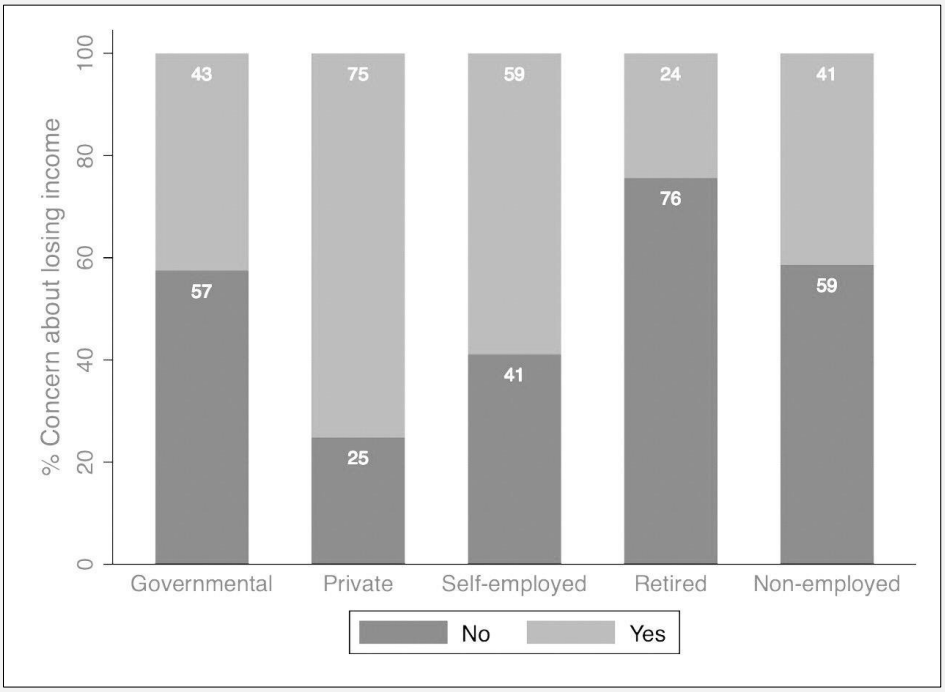

Figure 1. The level of concern about losing income among each job sector during COVID-19 pandemic lockdown.

There was a variation in the levels of concern about losing a job among participants of each job sector, with the highest concern among workers of the private sector.

Figure 1. The mental health screened by hospital anxiety and depression scale revealed high rates of depression and anxiety, where more than one-third of participants achieved the score for depression [717 (37.3%)], and one-fourth of them achieved the scores for anxiety [508 (26.4%)].

Table 2 and Table 3 show the binary logistic regression for anxiety and depression, respectively. Female gender, smokers, people with chronic diseases, and workers of the private sector were associated with higher risk of both mental illnesses, while individuals who were self-employed, or non-employed were more prone to depression ($p < 0.05$).

Also, the risk of having any of the two mental illnesses was positively related to the level of concern (worry) towards the pandemic and the frequency of daily following of the pandemic news ($p < 0.05$).

Participants who indicated that the pandemic is disturbing their life style were at high risk of anxiety [OR = 6.038, 95% CI (4.293 - 8.493); $p < 0.001$] and depression [OR = 4.293, 95% CI (3.323 - 5.547); $p < 0.001$].

Those participants who were worried both about becoming infected, either themselves or a family member and the loss of a job or part of income were at increased risk of mental illnesses ($p < 0.05$). Persons who indicated that the pandemic has a negative impact on their mental health demonstrated high odds of mental illness [OR = 15.168, 95% CI (10.838 - 21.229); $p < 0.001$ for anxiety and OR = 4.293, 95% CI (3.323 - 5.547); $p < 0.001$ for depression].

DISCUSSION

In this convenient sample survey, distributed via two social media platforms in late April 2020, we assessed the Saudi Arabian population's mental health due to public concerns about the COVID-19 pandemic and the effects of lockdown restrictions. The mental health changes were evaluated by screening the rate of anxiety and depression with a standardized and validated questionnaire. Serious concerns were reported, comparable to those demonstrated through a recent survey by Nelson et al. [7] and a study by the Kaiser Family Foundation in the United States [8]. More than half of participants (55.8%) reported that they are concerned that their mental health has been negatively impacted due to worry and stress over the COVID-19 pandemic.

In the current study, mental health was evaluated by screening the rate of anxiety and depression. The rate of

depression and anxiety were 37% and 26%, respectively, which are considerably higher than rates previously reported among Saudi Arabian general population. In a previous study in Saudi Arabia, the prevalence of depression and anxiety were 4.5% and 4.3%, respectively [12]. However, other reports from Saudi Arabia estimated the depression prevalence of 12 - 27% [13-16] and anxiety 20 - 27% [9,17]. Nevertheless, these reports are not population-based but disease-specific, making them less representative of the population.

Typically, infectious outbreaks can be stressful [18]. For instance, the SARS-Cov1 epidemic was associated with increases in post-traumatic stress disorder and psychological distress in patients and clinicians [19].

Consistent with our findings, concerns about protecting oneself and loved ones, guilt if loved one gets infected, concern that regular medical care or community services may be disrupted, loneliness, social distancing, and feeling socially isolated, were demonstrated as potential risk factors for mental health changes [18]. The mental health concern is so evident that the United Kingdom has issued psychological first aid guidance from Mental Health UK [20].

In our study, it was revealed that females and smokers are at risk of higher COVID-19 disease severity and people with chronic diseases [21-23] are at higher risk of psychiatric complications. Previous studies have revealed differences in genders. Specifically, stress in women, in general, results in higher rates of depression and anxiety disorders compared to men [24,25].

Participants in the current study working for non-governmental sectors demonstrated higher rates of concern of losing their job or part of income and showed higher rates of depression and anxiety. The lockdown and restrictive measures taken by governments to minimize spreading of the COVID-19 infection, caused a significant negative effect on the global economy and, in turn, increased the unemployment rate [26]. Fear of unemployment or loss of income is a chief concern during a time of global crisis, and fear of unemployment has been associated with increased risk of depression and anxiety [8,27-30] and negative impact on mental health equally across the income distribution, even if the unemployment did not occur [31]. There is an elevated, self-reported poor health status among unemployed during periods of high unemployment [32].

Limitations and strengths

The study's primary strength is filling the gap in the knowledge regarding the prevalence of mental health among the Saudi Arabian population during the crisis. Although many disasters have occurred in Saudi Arabia, including economic or health in the past few decades, no data on mental health has been reported. However, there are a few limitations to the study. This study is a cross-sectional study that restrains any inference of causality or directionality of the effects of the crisis on mental health. Ideally, sample selection and survey conducted in-person are preferable to digital platforms to minimize selection bias; however, given the lockdown situation, that was not achievable.

Moreover, a self-report questionnaire was used to obtain the data, hence subjecting the data to recall bias, yet recalling questions was very limited. Over- or underreporting, which may have exaggerated or flattened the correlations between mental health and health crisis, is possible. Although data were symmetrical and normally distributed, the sample did not represent the population above 75 years.

Nonetheless, the study sample size is more substantial than most of the epidemiological studies evaluating mental health, precisely the one related to the crisis. Therefore, replicating this study in a more controlled setting and including all age groups would be beneficial.

CONCLUSION

Previous data suggests that there is a negative impact of the global crises on the mental health of the population, especially in times of uncertainty. The current study revealed an increased rate of anxiety and depression among females, smokers, chronic disease patients, and employees of private and non-governmental sectors as a result of the COVID-19 pandemic and the enforced lockdown to contain the disease. There is also an increased rate of fear of unemployment, associated with increased rates of negative mental health impacts. These suggest the most frequent risk factors that might lead to psychiatric illness during a global crisis, such as the COVID-19 pandemic. Nevertheless, more research and longitudinal studies are needed to confirm these associations.

We recommend health sectors reinforce mental health systems to deliver care to patients, from screening to the overflow of mental illness inevitably precipitated by the COVID-19 pandemic, by measures e.g., counseling and virtual visits with psychologists and social workers.

Adherence to Ethical Recommendations:

The authors declare adherence to ethical recommendations. Patients' information was kept confidential throughout the work, and will not be breached.

Declaration of Interest:

The authors declare no conflict of interest for publication of this work.

References:

1. World Health Organization. Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020 (Accessed on April 20, 2020)

2. van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. N Engl J Med 2020; 382(16):1564-7 (PMID: 32182409).

3. Centers for Disease Control and Prevention. Interim guidance for persons who may have 2019 Novel Coronavirus (2019-nCoV) to prevent spread in homes and residential communities. https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-prevent-spread.html#First_heading (Accessed on April 20, 2020)

4. Centers for Disease Control and Prevention. Public Health Recommendations for People in U.S. Communities Exposed to a Person with Known or Suspected COVID-19, other than Health Workers or other Critical Infrastructure Workers. https://www.cdc.gov/coronavirus/2019-ncov/php/public-health-recommendations.html (Accessed on April 20, 2020)

5. Pan A, Liu L, Wang C, et al. Association of Public Health Interventions With the Epidemiology of the COVID-19 Outbreak in Wuhan, China. JAMA 2020;10;323(19):1-9 (PMID: 32275295).

6. World Health Organization. Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19): Interim guidance 19 March 2020. https://www.scribd.com/document/454949017/WHO-2019-nCoV-IHR-Quarantine-2020-2-eng-pdf (accessed April 16, 2020)

7. Nelson LM, Simard JF, Oluyomi A, et al. US Public Concerns About the COVID-19 Pandemic From Results of a Survey Given via Social Media. JAMA Intern Med 2020;7;e201369 (PMID: 32259192).

8. Kirzinger A, Kearney A, Hamel L, Brodie M. The Impact of Coronavirus on Life in America. KFF Health Tracking Poll - Early April 2020: The Impact Of Coronavirus On Life In America. https://www.kff.org/health-reform/report/kff-health-tracking-poll-early-april-2020/. Accessed 23 April 2020

9. Al Aseri ZA, Suriya MO, Hassan HA, et al. Reliability and validity of the Hospital Anxiety and Depression Scale in an emergency department in Saudi Arabia: a cross-sectional observational study. BMC Emerg Med. 2015;15:28 (PMID: 26459412).

10. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67:361-70 (PMID: 6880820).

11. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale. An updated literature review. J Psychosom Res 2002;52:69-77 (PMID: 11832252).

12. Abdelwahid HA, Al-Shahrani SI. Screening of depression among patients in family medicine in Southeastern Saudi Arabia. Saudi Med J 2011;32(9):948-52 (PMID: 21894360).

13. Al-Khathami AD, Ogbeide DO. Prevalence of mental illness among Saudi adult primary-care patients in Central Saudi Arabia. Saudi Med J 2002;23(6):721-4 (PMID: 12070556).

14. Alqahtani MM, Salmon P. Prevalence of somatization and minor psychiatric morbidity in primary healthcare in Saudi Arabia: a preliminary study in Asir region. J Family Community Med 2008;15(1):27-33 (PMID: 23012164).

15. Becker S, Al Zaid K, Al Faris E. Screening for somatization and depression in Saudi Arabia: a validation study of the PHQ in primary care. Int J Psychiatry Med. 2002;32 (3):271-83 (PMID: 12489702).

16. El-Rufaie OE, Albar AA, Al-Dabal BK. Identifying anxiety and depressive disorders among primary care patients: a pilot study. Acta Psychiatr Scand 1988;77(3):280-2 (PMID: 3394530).

17. Abuelgasim KA, Ahmed GY, Alqahtani JA, Alayed AM, Alaskar AS, Malik MA. Depression and anxiety in patients with hematological malignancies, prevalence, and associated factors. Saudi Med J. 2016;37(8):877-81 (PMID: 27464865).

18. Center for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19). Daily life and coping, stress and coping. https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html. (Accessed 25, May 2020)

19. Lee AM, Wong JG, McAlonan GM, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. Can J Psychiatry. 2007;52(4):233-40 (PMID: 17500304).

20. Mental Health UK. Managing your mental health during the coronavirus outbreak. https://mentalhealth-uk.org/help-and-information/covid-19-and-your-mental-health/. (Accessed May 12, 2020)

21. Guan WJ, Ni ZY, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med 2020;382(18):1708-20 (PMID: 32109013).

22. Sun Y, Dong Y, Wang L, et al. Characteristics and prognostic factors of disease severity in patients with COVID-19: The Beijing experience. J Autoimmun 2020:102473 (PMID: 32439209).

23. Hu Y, Sun J, Dai Z, et al. Prevalence and severity of corona virus disease 2019 (COVID-19): A systematic review and meta-analysis. J Clin Virol 2020;127:104371 (PMID: 32315817).

24. Holden C. Sex and the suffering brain. Science. 2005;308:1574 (PMID: 15947170).

25. Kajantie E, Phillips DI. The effects of sex and hormonal status on the physiological response to acute psychosocial stress. Psychoneuroendocrinology. 2006;31:151-78 (PMID: 16139959).

26. Kawohl W, Nordt C. COVID-19, unemployment, and suicide. Lancet Psychiatry 2020;7(5):389-90 (PMID: 32353269).

27. Beautrais AL, Joyce PR, Mulder RT. Unemployment and serious suicide attempts. Psychol Med 1998;28(1):209- 18 (PMID: 94836 98).

28. Beck A, Crain AL, Solberg LI, et al. Severity of depression and magnitude of productivity loss. Ann Fam Med 2011; 9(4):305-11 (PMID: 21747101).

29. Riumallo-Herl C, Basu S, Stuckler D, Courtin E, Avendano M. Job loss, wealth and depression during the Great Recession in the USA and Europe. Int J Epidemiol 2014;43(5):1508-17 (PMID: 24 942142).

30. Mandal B, Ayyagari P, Gallo WT. Job loss and depression: the role of subjective expectations. Soc Sci Med 2011;72(4):576- 83 (PMID: 21183267).

31. Kopasker D, Montagna C, Bender KA. Economic insecurity: A socioeconomic determinant of mental health. SSM Popul Health. 2018;6:184-94 (PMID: 30417065).

32. Ahs A, Westerling R. Self-rated health in relation to employment status during periods of high and of low levels of unemployment. Eur J Public Health. 2006;16(3):295-305 (PMID: 16260444).