RESEARCH ARTICLE

Psychosocial effects of social media on the Saudi society during the Coronavirus Disease 2019 pandemic: A cross-sectional study

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Abstract

The Coronavirus Disease 2019 (COVID-19) pandemic has been posing a substantial challenge to human survival and well-being, which rely on the actions and behaviors of individuals. It is essential that accurate information is distributed; however, misinformation has been spread via social media. Consequently, the resulting panic has to be addressed while putting essential public health measures in place. It is also important to explore the link between the social media exposure and well-being. Therefore, in the current study, we aimed to identify the levels of anxiety, depression, and social isolation among individuals during the COVID-19 pandemic. Additionally, we explored the relationship between exposure to misleading social media news and anxiety, depression, and social isolation. A cross sectional design was employed to collect data from 371 Saudi participants (aged 16–60 years), using the Generalized Anxiety Disorder-7, Centre for Epidemiological Studies Depression Scale, and de Jong Gierveld Loneliness Scale. Results showed that the prevalence of anxiety, depression, and social isolation was 47.82%, 47.57%, and 46.42%, respectively. Further, more than 83% of the participants reported using social media frequently during the pandemic. We found that exposure to misinformation via social media has a significant positive relationship with anxiety, depression, and social isolation. However, Due to the cross-sectional nature of this study it cannot be determined whether social media causes negative mental health outcomes, or if individuals experiencing greater depression, anxiety and social isolation turn to social media more than others, or if some third variable might explain both. Based on our findings, we present specific suggestions related to the COVID-19 pandemic to the government of Saudi Arabia. Minoring and filtering out misleading information with the cooperation of the World Health Organization (WHO) can promote the spread of accurate news in Saudi Arabia.

Introduction

False information amplifies the challenges that humanity faces, such as the Coronavirus Disease 2019 (COVID-19) pandemic [1, 2]. Within weeks of the appearance of the virus in China, misleading rumors and conspiracy theories about its origin spread globally, coupled with stress

and shock [3, 4]. This resulted in excessive storage and purchase of goods and facial masks [5]. The abundance of information, including false information, has been closely linked to the 21st century communication system, social media, which includes YouTube, Facebook, Twitter, Snap Chats, Instagram, WhatsApp—key applications that may thrive during the pandemic [6]. While staying at home during lockdown, people tend to interact extensively with friends and relatives through social media sites like (Facebook, Twitter, WhatsApp, etc . . .) to obtain information about the pandemic [7]. However, the information may be inaccurate and unreliable. Therefore, it is critical to monitor and reduce its adverse psychological and social effects on people, which can help them manage the pandemic better within communities [8, 9].

The dissemination of misleading and false information via social media has many negative psychological and social consequences for community members [10, 11]. In fact, Dr. Tedros Ghebreyesus, Director-General of the World Health Organization (WHO), said, "the wrong information about COVID-19 may be the most infectious disease," and noted that misinformation about the COVID-19 pandemic has spread just as rapidly as the virus itself [12]. The stress and shock greatly affected the social and psychological well-being of the public [13, 14].

Social media has unprecedented dominance and power throughout the world, allowing the spread of misinformation and rumors that are often presented as facts by fearful citizens looking for a sense of security [15]. Times of crisis often increase anxiety and uncertainty about current events or information [2] and people attempt to resolve their doubts and anxieties through phone calls and social media to understand the situation better [16]. Further, several individuals (including the elderly) who have been forced to live alone during the lockdown became very dependent on social media to access information about the increasing number of infections and mortalities [17, 18]. This had several disadvantages (including increased stress, anxiety, tension, fear, and compulsive obsessions), particularly for those with mental disorders who rely on psychotherapy and psychiatric medication [19–23].

In the last few years, studies have been conducted, which indicated that social media exposure had little effect on mental health [24–26]; thus, the impact of social media on mental health is arguable [27]. However, other studies indicate that the spreading of misleading and fake information via social media led to many mental health problems, such as social isolation, poor individual relationships, family problems, post-traumatic stress disorder, anxiety, panic disorder, depression, and behavioral disorders, to social media news [6, 28–31]. Misleading social media information, in particular, has many psychological and social effects on individuals during crises and disasters, such as increased anxiety [32, 33], depression [34] and psychological stress [35]. The effect of the COVID-19 crisis on mental health [18, 36, 37] includes these negative psychological consequences [30, 38].

Therefore, public health measures should focus on limiting not only the spread of the COVID-19 pandemic but also the social media panic pandemic [39]. We need to respond quickly to the negative effects on individuals and society [39] and expose public rumors, perceptions, attitudes, and behaviors about COVID-19 discussed through social media [14].

The effective panic caused by social media can also be contained by disseminating the right information and supporting public health through social media. During the bans which were imposed due to the spread of COVID-19 in China, social media was used widely, and some governments monitored the information that was spread through such modes [14]. In this regard, social media provides an opportunity to clarify the reasons for imposing quarantine, and to reassure the public and supply practical advice to prevent rumors and panic [14]. Soltaninejad [40] reported that, in Iran, misleading information suggested that gargling with alcohol could prevent the spread of the pandemic. Consequently, many individuals abused alcohol, resulting in 2,200 related poisonings at the time. Accordingly, Llewellyn [41] pointed

out that the best way to achieve a sense of psychosocial security during a crisis, including COVID-19, is to confront false information and rumors spread through social media by flooding the social media with accurate scientific information that is understood and shared easily, and by having certified specialists answer the questions of the public.

In Saudi Arabia, the society has witnessed a rise in social media sites, especially due to the increasing use of modern communication technologies. By January 2020, approximately 4.54 billion, 3.8 billion, and 5.19 billion people globally were using the internet, social networking sites, and mobile phones, respectively. Moreover, 2.78 billion individuals used their phones to surf social networking sites. Saudi Arabia ranks 17th in the rate of internet usage globally [42], and is at the forefront of active social media users internationally. In particular, 32.23 million individuals among its population of 34.218 million are Internet users. Of these, 25 million use social networks for an average of two hours and fifty minutes daily, mostly YouTube (76%), followed by WhatsApp (71%), Instagram (65%), Facebook (62%), and Twitter (58%) [43]. Social media has offered many benefits during closures and health isolation (or rather "social exclusion"). It continues to be the easiest method of accessing information and has played an important role in individuals' ability to work from home and organize/join meetings, seminars, and conferences. However, we need to consider the risks it presents through misleading facts and rumors, especially in times of crises such as the current pandemic, as it may hold dire psychological, social, and health consequences for the society [10, 15, 40, 44, 45].

Considering the psychological, social, and behavioral effects of social media on the society during the COVID-19 pandemic, many countries, including Saudi Arabia, have implemented procedures such as taking legal action to counter the spread of rumors and misinformation. The Kingdom's public prosecution has warned against spreading news from unknown sources and rumors through social media, especially those linked to the COVID-19 crisis; anyone who provides misleading information is subject to penal accountability [46].

The mere fact that social media is used widely in Saudi Arabia makes it necessary to identify the exact impact of misleading information on its citizens' psychological and social well-being, in particular, on their levels of anxiety, depression, and social isolation. Similar research has not yet been undertaken in the Saudi society in relation to the pandemic. Therefore, we aimed to identify the level of generalized anxiety, depression, and social isolation among participants during COVID-19. Additionally, we examined the relationship of exposure to misleading information through social media with psychological and social well-being during the pandemic. We explored the following research questions:

Q1: *What is the level of generalized anxiety, depression, and social isolation among participants during COVID-19?*

Q2: *Is exposure to misleading news in social media related to the level of generalized anxiety, depression, and social isolation?*

Materials and methods

Participants

Three hundred seventy-one participants (male = 272, female = 99; age: 16–60 years) participated in this cross-sectional study in Najran, Saudi Arabia. Participants were invited to complete an online questionnaire one month after the spread of COVID-19 in Najran. The timeline of this study was concurrent with the lifting of restrictions applied nationally. Also, participants were randomly selected using the simple random sampling to provide equal and independent opportunity of selection for the sample.

Procedures

This cross-sectional study was online conducted over six days (May 10–15 May 2020) after cases in Saudi Arabia reached almost two thousand and while curfew and social distancing measures were implemented by Government authorities. We obtained approval for our quantitative study from the Dean of Scientific Research at Najran University. The department of public ration's and university media at Najran University has contacted the ministry of health in Saudi Arabia to distribute the survey link to all Saudi citizens. The ministry of health send messages with the survey link to Saudi citizens over six days. All participants completed the voluntary consent section in the questionnaire and were assured confidentiality. They completed the questionnaire on the website. The authors expected to obtain 450 responses within six days, but only 386 questionnaires were returned, of which 15 were excluded because they did not follow the questionnaire instructions. Consequently, the total number of questionnaires used for analysis was 371.

Measurements

We administered the following three reliable scales with minor adaptions: the Generalized Anxiety Disorder-7 (GAD-7) [47], Centre for Epidemiological Studies Depression Scale (CES-D-10) [48], and De Jong Gierveld Loneliness Scale (DJGLS) [49].

Generalized anxiety disorder questionnaire. The GAD-7 is a seven-item questionnaire created to identify possible causes of generalized anxiety disorder and to measure the severity of the symptoms [47]. It assesses anxiety symptoms based on diagnostic criteria (Diagnostic Standards A, B, and C of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition [DSM-IV]) [50]. Respondents are asked how often they have been upset in the past two weeks, experiencing any of the seven main generalized anxiety disorder symptoms. The answer options are "*Not at all*," "*Several days*," "*More than half the days*," and "*Almost every day*" and are recorded as 0, 1, 2, and 3, respectively. Therefore, GAD-7 scores range from 0 to 21, with scores of 5, 10, and 15 representing mild, moderate, and severe anxiety symptoms, respectively. The scale has demonstrated excellent internal consistency (Cronbach α = .92) and reliability (intraclass correlation = .83) [47]. Several studies have confirmed its internal consistency, test-retest reliability, convergence, construction, standards, and validation [51–53]. For the present study, the scale was translated from English to Arabic and then back-translated. It was presented to specialists in English and Arabic linguistics to ensure the accuracy of the translation and linguistic formulation. Furthermore, the reliability of the data collected with the Saudi version of the GAD-7 was good (Cronbach α = .87), consistent with previous studies in which it ranged from .74 to .94 [51, 54].

Centre for epidemiological studies depression scale. The CES-D-10 is a 10-item Likert scale questionnaire that measures the occurrence of depressive symptoms over the week preceding the assessment [48]. It includes 10 elements, with three on depressive affect, five on physical symptoms, and two on positive affect. Among the 10 elements, eight assess the positive symptoms and two (Item 5 and 8) assess the negative symptoms of depression. The answer options for each item are presented on a four-point Likert scale ranging from "*rarely or none of the time*" (0) to "*all the time*" (3). Moreover, Item 5 and 8 are reverse scored as they are worded positively. Total scores range from 0 to 30, with higher scores indicating a greater severity of symptoms.

For the present study, the scale was translated (English to Arabic) and subsequently back-translated. We presented it to specialists in English and Arabic linguistics to ensure the accuracy of the translation and linguistic formulation. In the present study, the Saudi version showed adequate reliability and viability, with good internal consistency (Cronbach α = .81).

De Jong Gierveld loneliness scale. The six-item DJGLS aims to assess the social (example statement: "*there are many people I can completely trust*") and emotional (example statement: "*I feel a general sense of emptiness*") aspects of isolation between individuals, with three elements each. Response options are presented on a four-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The original version's Cronbach α was 0.76, which was consistent with many previous studies [55, 56]. In the present study, the scale was translated from English to Arabic, and back-translated. It was presented to specialists in English and Arabic linguistics to ensure the accuracy of the translation and linguistic formulation. The Saudi version of the DJGLS exhibited adequate reliability and viability in the present study, with good internal consistency (Cronbach α = .78).

Covariates. The following covariates were included in this study: gender, Marriage (Married and No married), age (16–25, 26–35, 36–50, 50–60 and More than 60), educational level (Less than secondary, Diploma / Secondary, Bachelor, Postgraduate), Living area(urban and rural), self-rated health (Excellent, Good, Sick).

Data analysis

We applied descriptive and inferential statistics to analyze the data. The descriptive statistics included frequency, percentage, average and standard deviation; these were analyzed using SPSS 21 [57]. To address the first research question, we conducted a univariate analysis to compare the differences between participants' characteristics based on social media exposure. Subsequently, we used multivariate analysis to examine the influence of social media exposure on the participants' anxiety, depression, and social isolation. We used linear regression to examine whether the exposure to misleading news in social media is related to the level of generalized anxiety, depression, and social isolation.

Results

Table 1 shows the frequency and percentage of participants' social media exposure during the COVID-19 pandemic. Participants were predominantly male (73%) and approximately 60% were married. The groups with the highest representation were those aged 36–50 years (45.3%), those pursuing postgraduate education (48%) and those living in urban areas (80%). Contrarily, people aged over 60 years, those without secondary education, and those living in rural areas were the least represented groups in this study. Furthermore, most of the participants were in excellent health.

We conducted univariate analyses to compare the variation among participants' characteristics based on their exposure to social media. Social media exposure was higher among women (77.77%) than men (73.16%), and higher among married (71.23%) than unmarried (51.97%) participants. Moreover, middle-aged (aged 36–50 years) had higher social media exposure than older (aged 50–60 years) and younger (aged 26–35 years) individuals. Furthermore, participants with lower levels of education (middle and high school) had less exposure to social media than did those with higher education (undergraduate and graduate). Finally, participants from rural areas (87.37%) reported a higher rate of social media exposure than did those from urban areas (64.64%). Healthy participants (72%) were significantly more likely than others to have exposure to social media.

Table 2 presents the prevalence of anxiety, depression, and social isolation, which was 47.82%, 47.57%, and 46.42%, respectively. Furthermore, multivariate analyses indicated that the possibility of anxiety, depression and social isolation was lower among males. Further, there were no age-related differences in the incidence of anxiety and social isolation among males. However, the depression rate was higher among those aged 16–25 years as compared to

Table 1. Participants' characteristics and social media exposure.

Variables	N	Social media exposure			
		Frequently	Sometimes	Less	P-value
Overall	371 (100)	238 (64.27%)	105 (28.39%)	28 (7.34%)	
Gender					
Male	272 (73.3%)	199 (73.16%)	64 (23.52%)	9 (3.30%)	<0.001
Female	99 (26.7%)	77 (77.77%)	17 (17.17%	5 (5.05%)	
Marriage					
Married	219 (59.0%)	156(71.23%)	57 (26.02%)	6 (2.73%)	<0.01
No married	152 (41.0%)	79 (51.97%)	69 (45.39%)	4 (2.63%)	
Age					
16–25	74 (19.9%)	46 (62.16%)	27 (36.48%)	1 (1.35%)	<0.001
26–35	110 (29.6%)	65 (59.09%)	40 (36.36%)	5 (4.54%)	
36–50	168 (45.3%)	114 (67.85%)	44 (26.19%)	10 (5.95%)	
50–60	16 (4.3%)	4 (25%)	11(68.75%)	1 (6.25%)	
More than 60	3 (0.8%)	1(33.3%)	1(33.3%)	1(3.33%)	
Education					
Less than secondary	11 (3.0%)	9(97.81%)	1(9.09%)	1(9.09%)	0.035
Diploma / Secondary	34 (9.2%)	19 (55.88%)	10(29.41%)	5(14.70%)	
Bachelor	148 (39.9%)	102(68.91%)	45(30.40%)	1(0.67%)	
Postgraduate	178 (48.0%)	127(71.34%)	47(26.40%)	4(2.24%)	
Living Areas					
Urban	297 (80.1%)	192(64.64%)	99(33.33%)	6(2.02%)	<0.001
Rural	74 (19.9%)	58(87.37%)	14(18.91%)	2(2.70%)	
Health status					
Excellent	292 (78.7%)	201(68.83%)	85(29.10%)	6(2.05%)	0.025
Good	50 (13.5%)	36(72%)	12(24%)	2(4%)	
Sick	29 (7.8%)	17(58.62%)	11(37.93%)	1(3.44%)	

those aged over 60 years. Moreover, depression, anxiety, and social isolation were higher among those who did not have high school education. Participants in rural areas had a higher rate of anxiety, depression, and social isolation than did those in urban areas. However, those with lower levels of health had higher rates of anxiety, depression, and social isolation than did those with excellent health. Furthermore, it was found that participants with frequent exposure to social media had a higher level of anxiety, depression, and social isolation as compared to those with less frequent social media exposure. In this study, social media exposure was correlated with anxiety, depression, and social isolation.

To find the relationship between the social media exposure and anxiety, depression and social isolation, we used regression analysis and Table 3 illustrates this correlation.

Table 3 reveals the value of the correlation coefficient between social media exposure and anxiety, depression, and social isolation, which were (0.368), (0.355), and (0.342), respectively, and all correlation coefficients were significant at P-value (0.01). The table also shows that social media exposure has a relationship with the dependent variables (anxiety, depression, and social isolation) with a percentage variance of (0.135), (0.126), (0.117).

The results of simple linear regression analysis showed that the regression model was significant between the independent variable and the dependent variables. The level of significance for the P-value was less than (0.05). social media exposure has a variance ratio of (0.135), (0.126), (0.117), and this can also be deducted from the value of t and its significance on anxiety, depression, and social isolation.

Table 2. Prevalence of anxiety, depression and Social isolation and relevant factors.

Variables	N	Anxiety N (%)	P-value	Depression N (%)	P-value	Social isolation N (%)	P-value
overall	371 (100)	141 (38.14%)		148 (39.93%)		142 (39.06%)	
Gender							
Male	272 (73.3%)	121 (44.5%)	<0.001	123 (45.25)	<0.001	82 (30.2%)	<0.001
Female	99 (26.7%)	50) 51.25%)		51 (52.25%)		32) 33.2%)	
Marriage							
Married	219 (59.0%)	79 (36%)	<0.001	80 (36.8%)	<0.001	82 (37.7%)	<0.001
No married	152 (41.0%)	59 (38.8%)		46 (30%)		61 (40.2%)	
Age							
16–25	74 (19.9%)	28 (38%)	<0.001	30 (40.5%)	0.016	29 (40%)	0.025
26–35	110 (29.6%)	44 (38.4%)		44 (39.8%)		45 (40.75)	
36–50	168 (45.3%)	58 (34.8)		59 (35.4%)		62 (36.85)	
50–60	16 (4.3%)	6 (39.8%)		6 (38.4%)		7 (44%)	
More than 60	3 (0.8%)	1(33%)		1(33%)		1(33.5)	
Education							
Less than secondary	11 (3.0%)	5(45.6%)	0.035	4 (38.2%)	<0.001	5 (46.25%)	<0.001
Diploma / Secondary	34 (9.2%)	11 (32.2%)		13 (37.8%)		14 (40.15%)	
Bachelor	148 (39.9%)	52 (34.7%)		54 (36.2%)		57 (38.6%)	
Postgraduate	178 (48.0%)	69 (38.7%)		68 (36.2%)		68 (38.3%)	
Living Areas							
Urban	297 (80.1%)	108 (36.4%)	<0.001	112 (37.8%)	0.035	116 (39%)	<0.001
Rural	74 (19.9%)	29 (39.8%)		30 (40.6%)		28 (38%)	
Health status							
Excellent	292 (78.7%)	105 (35.9%)	<0.001	107 (36.5%)	0.045	110 (37.7%)	<0.001
Good	50 (13.5%)	20 (40.2%)		21 (41.2%)		21 (42%)	
Sick	29 (7.8%)	12 (42%)		12 (42%)		13 (44.25%)	
social media exposure							
Frequently	303 (81.67)	112 (37.2%)	<0.001	112 (39.2%)	<0.001	114 (37.6%)	<0.001
Sometimes	56 (15.09)	21 (37.0%)		22 (37%)		23 (41.8%)	
Less	12 (3.23)	3 (26.8%)		4 (29.2%)		5 (41%)	

Discussion

The last national survey in Saudi Arabia indicated a prevalence of 23%, 6%, and 5.6% for anxiety, depression, and social isolation, respectively [58]. In comparison, our cross-sectional study on a Saudi sample during the COVID-19 outbreak found higher prevalence rates for

Table 3. Regression results for outcome variables.

Dependent Variable	R	R Square	F	Sig.	Coefficients	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
						B	Std. Error	Beta		
Anxiety	.368	.135	57.828	.00	(Constant)	1.365	.071		19.352	.00
					Social media exposure	.304	.040	.368	7.604	.00
Depression	.355	.126	53.217	.00	(Constant)	1.453	.066		21.974	.00
					Social media exposure	.274	.038	.355	7.295	.00
Isolation	.342	.117	48.931	.00	(Constant)	1.286	.042		30.426	.00
					Social media exposure	.168	.024	.342	6.995	.00

Dependent Variable: Anxiety, Depression, Isolation.

Predictors: (Constant), Social media exposure.

these variables (38.14%, 39.93%, and 39.6%, respectively). These results are consistent with those of previous studies, indicating that not only general health issues but also pandemics or epidemics (including COVID-19 [18, 59–63], Ebola [64–66], and SARS outbreaks [67–69], can aggravate mental health issues in individuals.

Social media has been one of the primary sources of up-to-date COVID-19 information [15, 70]; a substantial proportion of our respondents (64%) were frequently exposed to social media. This current finding similarly assure previous finding which Saudi population is ranked within top 20 population using internet and social media compared to other population [42].This is often associated with a high risk of anxiety, depression, and social isolation [18, 34, 70, 71].

Findings of single studies related to the effects of social media on mental health in reality were contradictory [27]. It is possible that the use of social media in general may not have an impact on the mental health [72, 73]. But, during the outbreak of the pandemic, misleading information and false reports spread via social media. It raised concerns and anxiety among many users [13, 74] and may have confused and distracted people, while causing harm to their mental health [75]. Moreover, the spreading of misleading information is the most infectious disease resulting to more health problems including anxiety, depression and loneliness [12]. Besides, several individuals expressed negative feelings (such as anxiety, stress, fear, and nervousness) via social media, which may have increased similar feelings in others [76]. Hence, the WHO's Informatics team have been collaborating with communications divisions worldwide to provide accurate information to a broader audience [77]. Furthermore, the steps taken by the Saudi Arabia—such as the closure of schools, universities, Umrah, Hajj, domestic and international aviation, and other precautionary measures—were beneficial in limiting the spread of the virus and such measures gathered praise from the WHO. However, increasingly stringent measures in the Kingdom may induce more serious mental health problems among the Saudi population.

Conclusions

Our findings showed a significant prevalence of mental health problems within the Saudi society due to the COVID-19 pandemic; moreover, these issues are positively associated with the significant and frequent exposure to social media during the outbreak. Our results indicated that the Saudi Arabian government should pay more attention to the general population's mental health during the COVID-19 pandemic. The Saudi government was the first to implement precautionary measures to protect its citizens, which contributed significantly to the low levels of active cases or mortality as compared to several other developed countries. Moreover, the Saudi government has been providing mental health services through various channels, including electronic applications, hotlines, online counseling and courses, and outpatient consultation. [78] However, depression, anxiety, and social isolation need to be addressed more concertedly in order to prevent their effects on infected individuals' wellbeing. The Saudi government has also imposed numerous financial penalties and imprisoned those who published inaccurate and misleading information on social media. We suggest that, in addition to upscaling the legal actions related to the publishing of misleading COVID-19 information, the Kingdom needs to monitor social media, filter out false information, and promote the spread of accurate information through cooperation with the WHO.

Limitations of the study

Our study has a few limitations. First, it is a cross-sectional study, which presents challenges in terms of clarifying the causal relationships between social media exposure and mental health.

This can be addressed in future longitudinal studies, including case studies and cross-control studies. Furthermore, this is an intermediate sample; the survey was conducted online, which enabled rapid assessment. However, the bias created by the limited representation of elderly citizens could have affected our results. Finally, the study's findings can only be generalized to similar sample populations and societies.

Supporting information

S1 File.
(ENL)

Author Contributions

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References

1. Petropoulos F, Makridakis S. Forecasting the novel coronavirus COVID-19. PloS one. 2020; 15(3): e0231236. https://doi.org/10.1371/journal.pone.0231236 PMID: 32231392

2. Hossain MT, Ahammed B, Chanda SK, Jahan N, Ela MZ, Islam MN. Social and electronic media exposure and generalized anxiety disorder among people during COVID-19 outbreak in Bangladesh: A preliminary observation. Plos one. 2020; 15(9):e0238974. https://doi.org/10.1371/journal.pone.0238974 PMID: 32916691

3. Mian A, Khan S. Coronavirus: the spread of misinformation. BMC medicine. 2020; 18(1):1–2. https://doi.org/10.1186/s12916-019-1443-1 PMID: 31898501

4. Kim B. Effects of social grooming on incivility in COVID-19. Cyberpsychology, Behavior, and Social Networking. 2020. https://doi.org/10.1089/cyber.2020.0201 PMID: 32267163

5. Wiederhold BK. Social media use during social distancing. Mary Ann Liebert, Inc., publishers 140 Huguenot Street, 3rd Floor New . . .; 2020.

6. Pennycook G, McPhetres J, Zhang Y, Rand D. Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy nudge intervention. 2020.

7. Thelwall M, Thelwall S. Retweeting for COVID-19: Consensus building, information sharing, dissent, and lockdown life. arXiv preprint arXiv:200402793. 2020.

8. Merchant RM, Lurie N. Social media and emergency preparedness in response to novel coronavirus. JAMA. 2020. https://doi.org/10.1001/jama.2020.4469 PMID: 32202611

9. Murri R, Segala FV, Del Vecchio P, Cingolani A, Taddei E, Micheli G, et al. Social media as a tool for scientific updating at the time of COVID pandemic: Results from a national survey in Italy. Plos one. 2020; 15(9):e0238414. https://doi.org/10.1371/journal.pone.0238414 PMID: 32881933

10. Bastani P, Bahrami MA. COVID-19 Related Misinformation on Social Media: A Qualitative Study from Iran. Journal of medical Internet research. 2020. https://doi.org/10.2196/18932 PMID: 32250961.

11. Elmer T, Mepham K, Stadtfeld C. Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. PloS one. 2020; 15(7): e0236337–e. https://doi.org/10.1371/journal.pone.0236337 PMID: 32702065.

12. Lai D, Wang D, Calvano J, Raja AS, He S. Addressing immediate public coronavirus (COVID-19) concerns through social media: Utilizing Reddit's AMA as a framework for Public Engagement with Science. PloS one. 2020; 15(10):e0240326. https://doi.org/10.1371/journal.pone.0240326 PMID: 33021985

13. Hua J, Shaw R. Corona Virus (COVID-19)"Infodemic" and Emerging Issues through a Data Lens: The Case of China. International Journal of Environmental Research and Public Health. 2020; 17(7):2309. https://doi.org/10.3390/ijerph17072309 PMID: 32235433

14. Depoux A, Martin S, Karafillakis E, Preet R, Wilder-Smith A, Larson H. The pandemic of social media panic travels faster than the COVID-19 outbreak. Journal of Travel Medicine. 2020.

15. Cinelli M, Quattrociocchi W, Galeazzi A, Valensise CM, Brugnoli E, Schmidt AL, et al. The covid-19 social media infodemic. arXiv preprint arXiv:200305004. 2020. https://doi.org/10.1038/s41598-020-73510-5 PMID: 33024152

16. Fuoco MA. In a time of social distancing, social media is spreading false and misleading information about COVID-19. Article. Pittsburgh Post-Gazette (PA), 2020.

17. Ahmad AR, Murad HR. The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: online questionnaire study. Journal of medical Internet research. 2020; 22(5):e19556. https://doi.org/10.2196/19556 PMID: 32369026

18. Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S, et al. Mental health problems and social media exposure during COVID-19 outbreak. Plos one. 2020; 15(4):e0231924. https://doi.org/10.1371/journal.pone.0231924 PMID: 32298385

19. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. The Lancet Psychiatry. 2020; 7(4):300–2. https://doi.org/10.1016/S2215-0366(20)30073-0 PMID: 32085840

20. Garg K, Kumar CN, Chandra PS. Number of psychiatrists in India: Baby steps forward, but a long way to go. Indian journal of psychiatry. 2019; 61(1):104. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_7_18 PMID: 30745666

21. Li W, Yang Y, Liu Z-H, Zhao Y-J, Zhang Q, Zhang L, et al. Progression of Mental Health Services during the COVID-19 Outbreak in China. International Journal of Biological Sciences. 2020; 16(10):1732. https://doi.org/10.7150/ijbs.45120 PMID: 32226291

22. Sood S. Psychological effects of the Coronavirus disease-2019 pandemic. Research & Humanities in Medical Education. 2020; 7:23–6.

23. Daoust J-F. Elderly people and responses to COVID-19 in 27 Countries. PloS one. 2020; 15(7): e0235590. https://doi.org/10.1371/journal.pone.0235590 PMID: 32614889

24. Coyne SM, Rogers AA, Zurcher JD, Stockdale L, Booth M. Does time spent using social media impact mental health?: An eight year longitudinal study. Computers in Human Behavior. 2020; 104:106160.

25. Heffner J, Vives M-L, FeldmanHall O. Emotional responses to prosocial messages increase willingness to self-isolate during the COVID-19 pandemic. Personality and Individual Differences. 2021; 170:110420. https://doi.org/10.1016/j.paid.2020.110420 PMID: 33082614

26. Orben A, Przybylski AK. The association between adolescent well-being and digital technology use. Nature Human Behaviour. 2019; 3(2):173–82. https://doi.org/10.1038/s41562-018-0506-1 PMID: 30944443

27. Berryman C, Ferguson CJ, Negy C. Social media use and mental health among young adults. Psychiatric quarterly. 2018; 89(2):307–14. https://doi.org/10.1007/s11126-017-9535-6 PMID: 29090428

28. Garfin DR, Silver RC, Holman EA. The novel coronavirus (COVID-2019) outbreak: Amplification of public health consequences by media exposure. Health Psychology. 2020. https://doi.org/10.1037/hea0000875 PMID: 32202824

29. Kayes A, Islam MS, Watters PA, Ng A, Kayesh H. Automated Measurement of Attitudes Towards Social Distancing Using Social Media: A COVID-19 Case Study. 2020.

30. Li S, Wang Y, Xue J, Zhao N, Zhu T. The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users. International Journal of Environmental Research and Public Health. 2020; 17(6):2032.

31. Zheng Y, Goh E, Wen J. The effects of misleading media reports about COVID-19 on Chinese tourists' mental health: a perspective article. Anatolia. 2020:1–4.

32. Oh O, Agrawal M, Rao HR. Community intelligence and social media services: A rumor theoretic analysis of tweets during social crises. Mis Quarterly. 2013:407–26.

33. Oh O, Kwon KH, Rao HR, editors. An Exploration of Social Media in Extreme Events: Rumor Theory and Twitter during the Haiti Earthquake 2010. Icis; 2010.

34. Lin LY, Sidani JE, Shensa A, Radovic A, Miller E, Colditz JB, et al. Association between social media use and depression among US young adults. Depression and anxiety. 2016; 33(4):323–31. https://doi. org/10.1002/da.22466 PMID: 26783723

35. Zhang MW, Ho CS, Fang P, Lu Y, Ho RC. Usage of social media and smartphone application in assessment of physical and psychological well-being of individuals in times of a major air pollution crisis. JMIR mHealth and uHealth. 2014; 2(1):e16. https://doi.org/10.2196/mhealth.2827 PMID: 25098255

36. Ho CS, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. Ann Acad Med Singapore. 2020; 49(1):1–3. PMID: 32200391

37. Ornell F, Schuch JB, Sordi AO, Kessler FHP. "Pandemic fear" and COVID-19: mental health burden and strategies. Brazilian Journal of Psychiatry. 2020; 42(3):232–5. https://doi.org/10.1590/1516-4446-2020-0008 PMID: 32267343

38. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. General psychiatry. 2020; 33(2). https://doi.org/10.1136/gpsych-2020-100213 PMID: 32215365

39. Atlani-Duault L, Ward JK, Roy M, Morin C, Wilson A. Tracking online heroisation and blame in epidemics. The Lancet Public Health. 2020; 5(3):e137–e8. https://doi.org/10.1016/S2468-2667(20)30033-5 PMID: 32085818

40. Soltaninejad K. Methanol mass poisoning outbreak: a consequence of covid-19 pandemic and misleading messages on social media. Int J Occup Environ Med (The IJOEM). 2020. https://doi.org/10.34172/ijoem.2020.1983 PMID: 32225177

41. Llewellyn S. Covid-19: how to be careful with trust and expertise on social media. BMJ. 2020;368. https://doi.org/10.1136/bmj.m1160 PMID: 32213480

42. Statistics GAf. Internet usage in Saudi Arabia Saudi General Authority for Statistics 2020 [20/4/2020]. Available from: https://www.stats.gov.sa/.

43. DATAREPORTAL. DIGITAL 2020: SAUDI ARABIA: 2020; 2020 [cited 13/4/2020 13/4/2020]. Available from: https://datareportal.com/reports/digital-2020-saudi-arabia.

44. McKendry R, Rees G, Cox I, Johnson A, Edelstein M, Eland A, et al. Share mobile and social-media data to curb COVID-19. Nature. 2020; 580(7801):29. https://doi.org/10.1038/d41586-020-00908-6 PMID: 32235939

45. Vosoughi S, Roy D, Aral S. The spread of true and false news online. Science. 2018; 359(6380):1146–51. https://doi.org/10.1126/science.aap9559 PMID: 29590045

46. Arabiya A. Saudi Prosecution: Corruption promoter arrested Corona. . . severe penalties Saudi: Saudi; 2020. Available from: https://www.arabnews.com/node/1643451/saudi-arabia.

47. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine. 2006; 166(10):1092–7. https://doi.org/10.1001/archinte.166.10.1092 PMID: 16717171

48. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D. American journal of preventive medicine. 1994; 10(2):77–84. PMID: 8037935

49. Gierveld JDJ, Tilburg TV. A 6-item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. Research on aging. 2006; 28(5):582–98.

50. Frances AJ, Galanter M, Kleber HD. Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR®: American Psychiatric Pub; 2000.

51. García-Campayo J, Zamorano E, Ruiz MA, Pardo A, Pérez-Páramo M, López-Gómez V, et al. Cultural adaptation into Spanish of the generalized anxiety disorder-7 (GAD-7) scale as a screening tool. Health and Quality of Life Outcomes. 2010; 8(1):8. https://doi.org/10.1186/1477-7525-8-8 PMID: 20089179

52. Löwe B, Spitzer RL, Williams JB, Mussell M, Schellberg D, Kroenke K. Depression, anxiety and somatization in primary care: syndrome overlap and functional impairment. General hospital psychiatry. 2008; 30(3):191–9. https://doi.org/10.1016/j.genhosppsych.2008.01.001 PMID: 18433651

53. Zhong Q-Y, Gelaye B, Zaslavsky AM, Fann JR, Rondon MB, Sánchez SE, et al. Diagnostic validity of the Generalized Anxiety Disorder-7 (GAD-7) among pregnant women. PloS one. 2015; 10(4). https://doi.org/10.1371/journal.pone.0125096 PMID: 25915929

54. Sidik SM, Arroll B, Goodyear-Smith F. Validation of the GAD-7 (Malay version) among women attending a primary care clinic in Malaysia. Journal of Primary Health Care. 2012; 4(1):5–11. PMID: 22377544

55. Coelho GLdH Fonseca PNd, Gouveia VV Wolf LJ, Vilar R. De Jong Gierveld Loneliness Scale-Short Version: Validation for the Brazilian Context. Paidéia (Ribeirão Preto). 2018; 28.

56. Gierveld JDJ, Van Tilburg T. The De Jong Gierveld short scales for emotional and social loneliness: tested on data from 7 countries in the UN generations and gender surveys. European journal of ageing. 2010; 7(2):121–30. https://doi.org/10.1007/s10433-010-0144-6 PMID: 20730083

57. IBM. SPSS Statistics Version 21. International Business Machines Corp Boston; 2012.

58. Al-Tuwaijri Y, Al-Subaie A, Al-Habib A. Technical report of the Saudi National Mental Health Survey. Riyadh: King Salman Center for Disability Research; 2019. Available from: http://www. healthandstress.org.sa/Results/Saudi%20National%20Mental%20Health%20Survey%20-% 20Technical%20Report%20(Arabic).pdf.

59. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. International Journal of Social Psychiatry. 2020:0020764020915212. https://doi.org/10.1177/0020764020915212 PMID: 32233719

60. Imperatori C, Dakanalis A, Farina B, Pallavicini F, Colmegna F, Mantovani F, et al. Global Storm of Stress-Related Psychopathological Symptoms: A Brief Overview on the Usefulness of Virtual Reality in Facing the Mental Health Impact of COVID-19. Cyberpsychology, Behavior, and Social Networking. 2020. https://doi.org/10.1089/cyber.2020.0339 PMID: 32640852

61. Newby J, O'Moore K, Tang S, Christensen H, Faasse K. Acute mental health responses during the COVID-19 pandemic in Australia. medRxiv. 2020. https://doi.org/10.1371/journal.pone.0236562 PMID: 32722711

62. Kecojevic A, Basch CH, Sullivan M, Davi NK. The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study. PloS one. 2020; 15(9):e0239696. https:// doi.org/10.1371/journal.pone.0239696 PMID: 32997683

63. Islam MA, Barna SD, Raihan H, Khan MNA, Hossain MT. Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. PloS one. 2020; 15(8):e0238162. https://doi.org/10.1371/journal.pone.0238162 PMID: 32845928

64. Jalloh MF, Li W, Bunnell RE, Ethier KA, O'Leary A, Hageman KM, et al. Impact of Ebola experiences and risk perceptions on mental health in Sierra Leone, July 2015. BMJ global health. 2018; 3(2): e000471. https://doi.org/10.1136/bmjgh-2017-000471 PMID: 29607096

65. Ji D, Ji Y-J, Duan X-Z, Li W-G, Sun Z-Q, Song X-A, et al. Prevalence of psychological symptoms among Ebola survivors and healthcare workers during the 2014–2015 Ebola outbreak in Sierra Leone: a cross-sectional study. Oncotarget. 2017; 8(8):12784. https://doi.org/10.18632/oncotarget.14498 PMID: 28061463

66. Mohammed A, Sheikh TL, Gidado S, Poggensee G, Nguku P, Olayinka A, et al. An evaluation of psychological distress and social support of survivors and contacts of Ebola virus disease infection and their relatives in Lagos, Nigeria: a cross sectional study– 2014. BMC Public Health. 2015; 15(1):1–8. https://doi.org/10.1186/s12889-015-2167-6 PMID: 26307047

67. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. Emerging infectious diseases. 2004; 10(7):1206. https://doi. org/10.3201/eid1007.030703 PMID: 15324539

68. Mak IWC, Chu CM, Pan PC, Yiu MGC, Chan VL. Long-term psychiatric morbidities among SARS survivors. General hospital psychiatry. 2009; 31(4):318–26. https://doi.org/10.1016/j.genhosppsych.2009. 03.001 PMID: 19555791

69. Peng EY-C, Lee M-B, Tsai S-T, Yang C-C, Morisky DE, Tsai L-T, et al. Population-based post-crisis psychological distress: an example from the SARS outbreak in Taiwan. Journal of the Formosan Medical Association. 2010; 109(7):524–32. https://doi.org/10.1016/S0929-6646(10)60087-3 PMID: 20654792

70. Drouin M, McDaniel BT, Pater J, Toscos T. How Parents and Their Children Used Social Media and Technology at the Beginning of the COVID-19 Pandemic and Associations with Anxiety. Cyberpsychology, Behavior, and Social Networking. 2020. https://doi.org/10.1089/cyber.2020.0284 PMID: 32726144

71. Amedie J. The impact of social media on society. 2015.

72. Ferguson CJ, Muñoz ME, Garza A, Galindo M. Concurrent and prospective analyses of peer, television and social media influences on body dissatisfaction, eating disorder symptoms and life satisfaction in adolescent girls. Journal of youth and adolescence. 2014; 43(1):1–14. https://doi.org/10.1007/s10964-012-9898-9 PMID: 23344652

73. Ferguson CJ. 13 Reasons Why Not: A Methodological and Meta-Analytic Review of Evidence Regarding Suicide Contagion by Fictional Media. Suicide and Life-Threatening Behavior. 2019; 49(4):1178–86. https://doi.org/10.1111/sltb.12517 PMID: 30318609

74. Naeem SB, Bhatti R. The Covid-19 'infodemic': a new front for information professionals. Health Information & Libraries Journal. 2020. https://doi.org/10.1111/hir.12311 PMID: 32533803

75. Patel MP, Kute VB, Agarwal SK. "Infodemic" of COVID 19: More pandemic than the virus. Indian Journal of Nephrology. 2020; 30(3):188. https://doi.org/10.4103/ijn.IJN_216_20 PMID: 33013069

76. Kramer AD, Guillory JE, Hancock JT. Experimental evidence of massive-scale emotional contagion through social networks. Proceedings of the National Academy of Sciences. 2014; 111(24):8788–90. https://doi.org/10.1073/pnas.1320040111 PMID: 24889601

77. Organization WH. WHO Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. World Health Organization, Geneva Available via https://wwwwhoint/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020 Accessed. 2020;10.

78. Arabnews. In Saudi Arabia, COVID-19 patients are being offered psychological support. Arabnews. 2020.