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Gender differences in response towards COVID 19-related content on social media

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Abstract

Introduction: Due to the 'universal-scale' of the pandemic, an evaluation of the mental health status of different population sectors is necessary to prevent complications. Currently, social media networks are the preferred method for news acquisition and sharing. Public health researchers are studying and monitoring how this is affecting public health. The present study investigated possible gender differences in general attitude/behaviours and internalizing/externalizing emotions related to the COVID-19 pandemic and the use of social media platforms.

Method: An anonymous self-administered (Arabic/English) cross-sectional survey was distributed via social media across Saudi Arabia**.** The possible gender differences in the overall expression of negative feelings and attitudes related to the COVID-19 pandemic and the uses of social media platforms were compared.

Results: The results showed that females had the most negative measures, such as depression, fear, aggressiveness, and boredom. As expected, browsing COVID-19 related information on social media platforms increases negative feelings and behaviours. Circumstances associated with the pandemic, including long periods of quarantine, lack of healthy social interaction, stress caused by the economic fallout, and the considerable overall disturbance of the usual daily routine, intensify the impact of social media on the public.

Conclusion: Managing the mental implications emerged as a component of any pandemic managing strategy to prevent long-term consequences.

Introduction

The coronavirus disease (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1], emerged sometime during the third quarter of 2019 in Wuhan, China. According to the World Health Organization (WHO) official report, in January 2020, the Chinese authorities confirmed the diagnosis of 41 cases with a novel coronavirus infection. As a result, the WHO declared the outbreak as a Public Health Emergency of International Concern. In March of the same year, due to widespread transmission, the WHO declared the outbreak as a pandemic [2]. The management of the pandemic was challenging and resulted in significant political, economic, and psychosocial ramifications [3]. Early in the outbreak, the National Health Commission of China recognized the emotional and mental burden. The result was guidelines for local authorities to facilitate psychological crisis management for patients, medical staff, and civilians [4]. Epidemiological data regarding mental health in a pandemic indicate that people at a higher risk, such as older adults [5], being immunocompromised, prior clinical and psychiatric conditions, family members of infected patients, and healthcare professionals require mental-health assistance [6,7]. For COVID-19, the psychological impact is amplified through the isolation of quarantine, uncertainty about the nature of the infection, in addition to the financial consequences of the lockdown [8]. Gender differences in the psychological impact of the COVID pandemic have been highlighted in recent studies [9,10]. In this regard, the females are associated with a significantly higher vulnerability to stress and depression [10], as well as a high greater incidence of anxiety and depression [10,11]. Another critical element that may have played a significant role in increasing the mental and emotional burden [12,13], is the effect of online social media platforms. For all sectors of society regardless of age, gender, education, profession, and economical position, social media played a key role in spreading awareness and protection measures for COVID-19. However, at the same time, the dissemination of miss information intensified the panic of the public [14].

Media plays a vital role in times of crisis [15]; a few decades ago, people relayed on the traditional media portals to be informed. Whether

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Table 1. Demographic characteristics of survey participants (n=927)

Variable	Frequency	%
Gender		
Male	344	37.11
Female	583	62.89
Nationality		
Saudi	833	89.86
Other	94	10.14
Age		
≤20	50	5.39
21-30	279	30.10
31-40	299	32.25
41-50	185	19.96
>50	114	12.30
Education		
High School or less	145	15.64
Graduate or higher education	782	84.36
Occupation		
Student	161	17.37
Private / Non-health care worker	216	23.30
Government / Non-health care worker	185	19.96
Health care worker	96	10.36
Retired	96	10.36
None	173	18.66
Marital Status		
Single	386	41.64
Married	541	58.36
Have Children		
No	409	44.12
Yes	518	55.88
Self-rated health		
Excellent	673	72.6
Good	250	26.97
Poor	4	0.43
History of Respiratory Disease		
No	810	87.38
Yes	117	12.62

it was a war, natural disaster or an outbreak, television, radio, and newspapers were the main sources of information. Currently, the media environment has become complicated. With the growth of the Internet and social media platforms, people choose contemporary media as the preferred source of information. The main issue in this change is that in traditional media, to a certain extent, information is verified by experts before release, which is not the case in contemporary media. Anyone can create content and post it in the ether. If interesting enough, dissemination increases as each recipient shares the information. It is evident now that information sharing could have serious implications on a society. In a time of crisis, "fake news" or rumour spreading could constitute a burden on governmental media reporting, as they have to correct content that could create unrest in that society. In a crisis, individuals using social media platforms are bombarded with news, true and false, related to that crisis. This may result in initial panic, anger, or hate. After prolonged and constant exposure to the crisis-related content, as in this case COVID-19, people become numb to the crisis. More people develop pandemic fatigue and become less receptive to COVID-19 governmental guidance. This behavioural pattern of initial strong-negative feelings followed by desensitization is counterproductive during a crisis [16].

In this study, the present study investigated possible gender differences in general attitude/behaviours and emotional burden associated with the exposure to COVID-19-related content on social media platforms. The aim was to evaluate whether the behaviour on social media platforms is associated with the adverse effects and the requirement to impose rules and regulations governing the way people use social media platforms.

Materials and methods

Study participants and design

This study was approved by the IRB of King Abdullah International Medical Research Center, National Guard-Health Affairs Riyadh, Saudi Arabia, with the number RC20/352/R. The study has been conducted in accordance with the ethical standards required. An anonymous self-administered (Arabic/English) cross-sectional survey was distributed via social media to Saudi and non-citizen, 18 years and older, between April and May 2020 across Saudi Arabia.

Data collection

To maintain anonymity and confidentiality, no medical or personal information were collected, such as names, contact information, or addresses. As a result, data were collected anonymously using online Google Forms. Consent was provided electronically before completing the questionnaire. All participants were informed of the aims of the study and given the option to reject participation. Closed-ended questions, a multiple-choice format, and a tow-level Likert scale (agree and disagree) were included in the structured questionnaire. Different Social Media applications were used to distribute the questioner including WhatsApp and Twitter.

Questionnaire

The questionnaire consisted of two sections, (1) Socio-demographic characteristics including age, gender, education, employment, self-rated health, and history of respiratory disease, and (2) Descriptive questions to measure the expression of study-related information. The descriptive questions described two variables; a) the general attitude and behavior towards usage of social media platforms during the COVID-19 pandemic and b) the internalizing and externalizing emotions towards usage of social media platforms during the COVID-19 pandemic. Each question expresses its-related variable, with a two-level Likert scale (agree and disagree) focused on gender differences.

Data analysis

SAS statistical software (version 9.4) was used for data analysis. Data are presented as frequency and percentage for the categorical variables. A Fisher's Exact test or a Chi-square test was used to determine the association between the categorical variables. All statistical tests were considered significant with $P < 0.05$.

Results

In total 927 individuals responded to the study and the demographic characteristics are displayed in Table 1. The majority of the participants (62.89%) were female, Saudi (89.86%), college graduated or higher educational level (84.36%), and have excellent health status (72.6%).

The Self-rated behavioral/emotional changes towards COVID 19-related content on social media

The COVID-19-related mental and emotional burdens caused by social media platform use are summarized in Table 2. Interestingly,

Table 2. The COVID-19-related behavioral and emotional burdens caused by social media platform use

Variable	*Usage of Social Media for Browsing COVID-19-related Content		
	No No (%)	Yes No (%)	P value
1. I post information about COVID-19 on social media platforms each day			
Agree	61(20%)	238(80%)	< 0.0001
Disagree	30(8.6%)	319(91.4%)	
2. It is my responsibility for society to share any information that I hear/read in social media about COVID-19			
Agree	131(32.5)	271(67.5%)	0.0001
Disagree	237(45%)	287(55%)	
3. Overall, social media platforms have more favorable than adverse effects on people during quarantine amid the COVID-19 pandemic:			
Agree	184(35%)	342(65%)	0.0009
Disagree	182(37%)	215(63%)	
4. I feel depressed when I see updated posts about COVID-19			
Agree	253(37%)	437(63%)	0.0015
Disagree	114(49%)	120(51%)	
5. COVID-19 posts and updates on social media platforms is distracting me when I need to be productive			
Agree	232(37%)	399(63%)	0.005
Disagree	132(45%)	158(55%)	
6. Concern about COVID19 intensifies when I see too many updates and posts about it			
Agree	190(36%)	342(64%)	0.004
Disagree	178(45%)	214(55%)	
7. I want to break something when I see updated posts about COVID-19			
Agree	32(28%)	81(72%)	0.03
Disagree	335(41%)	474(59%)	
8. It is easy to relieve the tension from COVID-19 when I check into social media platforms			
Agree	151(33%)	302(67%)	<0.0001
Disagree	216(46%)	252(54%)	
9. I experienced depressive symptoms prolonged or severe enough to make me think about seeking professional help during quarantine:			
Agree	56(27%)	152(73%)	<0.001
Disagree	311(44%)	400(56%)	
10. When I check social media, I immediately think about COVID19			
Agree	50(19%)	210(81%)	<0.001
Disagree	317(48%)	347(52%)	

*Participants spend more than an hour daily searching only for COVID-19 updates.

the more the participants spend time on social media, the more they share COVID-19 updates (Table 2, statement 1; P<0.0001). Most agreed that sharing information with people about COVID-19 is their responsibility (Table 2; statement2; P<0.001) indicating that the more an individual used social media platforms, the more positive attitude they had towards these platforms. The positive attitude includes feeling that the platforms had a good effect on people during quarantine (Table 2, statement 3; P<0.001). However, the negative consequence was the more they browsed social media for COVID-19-related information, the more they experienced feelings related to depression (Table 2, statement; 4; P=0.0015), distraction (Table 2, statement; 5; P=0.005), anxiety (Table 2, statement; 6; P=0.004), aggressiveness (Table 3, statement; 7; P=0.03), and relief of pandemic-related stress (Table 2, statement; 8; P<0.0001) significantly more than the opposite group.

Though the group who browsed daily COVID-19 updates on social media was aware of the mental or emotional stress caused by their social media platform use habits, this did not motivate any behavioural changes to reduce the adverse effects (Table 2). They expressed a significantly higher intention of seeking professional assistance during the quarantine, compared to non-users (Table 2; statement 9; P<0.001). At the same time, this group expressed no intention to change their pattern of social media platform use (Table 2, Statement 10; P<0.001).

Gender differences in the general attitudes/behaviours towards usage of social media platforms during the COVID-19 pandemic

The association between general attitudes/behaviours toward social media platforms activities during the COVID-19 pandemic and gender differences is summarized in Table 3. The majority of participants (60%) who agreed that checking COVID-19 updates on social media platforms relieves stress and anxiety were females (Table 3, statement1; P=0.04). In contrast, 31% of males reduced their time on social media

Table 3. The general behavior/attitudes towards usage of social media platforms during the COVID-19 pandemic

Variable	Female	Male	Total	P value
1. Checking social media platforms relieve the tension from COVID-19				
Agree	271(60%)	183(40%)	454	0.04
Disagree	310(66%)	158(34%)	468	
2. As a result of the chaotic sharing of COVID-19 related information, I decided to reduce the time I spend on social media platforms				
Agree	231(69%)	105(31%)	336	0.005
Disagree	351(60%)	238(40%)	589	
3. It is my ethical responsibility to disseminate any information I hear/read about COVID-19				
Agree	244(61%)	158(39%)	402	0.2
Disagree	339(65%)	186(35%)	525	
4. To avoid misinformation about COVID-19, I never read and share any information on social media platforms				
Agree	171(69%)	76(31%)	247	0.03
Disagree	456(60%)	309 (40%)	765	
5. I only take Information about COVID-19 from WHO and official health organization accounts				
Agree	556(63%)	321(37%)	877	0.1
Disagree	26(53%)	23(47%)	49	
6. When I check social media, I immediately think about COVID19				
Agree	157(60%)	104(40%)	261	0.3
Disagree	425(64%)	239(36%)	664	

Table 4. The internalizing and externalizing emotions during the COVID-19 pandemic

Variable	Female	Male	Total	P value
1. I feel depressed every time I see updated COVID19 posts				
Agree	451(65%)	240(35%)	691	0.008
Disagree	130(55.5%)	104(45.5%)	234	
2. I want to break something when I see updated posts about COVID-19				
Agree	63(56%)	50(44%)	113	0.002
Disagree	519(70%)	219(30%)	738	
3. I feel stressed due to fear of supplies insecurity during the pandemic (Food and Drugs)				
Agree	76(53%)	68(47%)	144	0.006
Disagree	507(65%)	276(35%)	783	
4. I feel stressed due to long periods of curfews or quarantine				
Agree	296 (60%)	198(40%)	496	0.04
Disagree	287 (66%)	146(34%)	433	
5. due to lack of social interaction , I feel frustrated and stressed during the pandemic				
Agree	266(59%)	183(41%)	449	0.02
Disagree	317(66%)	161(34%)	478	
6. I experienced severe depression symptoms led me to seek professional help during the quarantine				
*__Heavy social media user__	124(56%)	98(44%)	222	0.01
Non heavy Social media user	196(66%)	100(34%)	296	
7. Social media platforms are shaping our response, including fears, towards the COVID-19 pandemic:				
Agree	409(63%)	236(37%)	645	0.7
Disagree	167(62%)	102(38%)	269	
8. I let social media derail my productivity.				
Agree	390(62%)	241(38%)	631	0.1
Disagree	193(66%)	98(34%)	291	

* Social media users spend more than one hour searching COVID-19 updates and share more than one COVID-19 update through social media platforms.

platforms due to the chaotic sharing of COVID-19 posts (Table 3, Statement 2; P=0.005).

Interestingly, 61% of females agreed that sharing information with people about COVID-19 is their responsibility; however, it was not statistically significant, whereas 69% of them never read or shared any COVID-19 updates on social media platforms to avoid misinformation (P=0.03) (Table 3, statements; 3 &4 respectively).

Gender differences in the emotional burden related to COVID-19 pandemic: focusing on social media platforms usage.

The association between internalizing/externalizing emotions during the COVID-19 pandemic and gender differences is summarized in Table 4. Generally, females reported a significantly higher mental or emotional burden than males (Table 4). Females showed significantly higher numbers than males in most statements expressing negative feelings related to social media platforms usage, including depression (Table 4, statement; 1; P=0.008) and aggressiveness (Table 4, statement; 2; P=0.002). Similarly, there was a significant association between gender and quarantine-related stress, including fear of supplies insecurity; such as food and drugs (Table 4, statement; 3; P=0.006), boredom (Table 4; statement; 4; P=0.04,) and lack of social interaction; (Table 4; statement 5; P=0.02) where the majority was females. Females who were social media platform users expressed a significantly higher intention of seeking professional assistance during the quarantine than male users (Table 4; statement 6; P=0.01).

Discussion

With over 3.8 billion people worldwide utilizing social media it is not surprising that the large volume of information acquired through these platforms influences how we interpret and cope with the present COVID-19 pandemic [17]. Even prior to the pandemic, patients, physicians, and scientists often obtained health and science-related information via social media channels [18]. These platforms are successfully used to disseminate awareness and protection measures about COVID-19 [19]. In addition, these platforms provide a much needed human connection and entertainment during the isolation of quarantine. However, social media platforms are also a source of false information, rumours, and conspiracy theories, which amplified fears and caused panic in the general public. The most believed rumours in the Saudi population are displayed in Supplementary Table 1. Previous outbreaks indicated that mental health issues caused by the associated circumstances can last long after the disease is eradicated [20]. In addition to protecting the mental health of a population, the psychosocial factors, including perceived risk and self-efficacy, are

Supplementary Table 1. The most popular rumor about COVID19 people hears/reads and believes it

Variable	Frequency	Percentage
Non		
No	884	95.36
Yes	43	4.64
The virus was manufactured and leaked from a research lab in China		
No	477	51.46
Yes	450	48.54
Asians are more vulnerable to COVID-19		
No	857	92.45
Yes	70	7.55
African race is less vulnerable to COVID19		
No	865	93.31
Yes	62	6.69
it is dangerous to eat at a Chinese restaurant or to receive a package from China		
No	872	94.07
Yes	55	5.93
Gargling with an antiseptic will protect against COVID19		
No	831	89.64
Yes	96	10.36
Virus 'sits' in the throat before passing into the lungs		
No	648	69.90
Yes	279	30.10
Hold your breath to test for infection		
No	841	90.72
Yes	86	9.28
In summer COVID19 will disappear		
No	566	61.06
Yes	361	38.94

considered critical for effective health behaviours [21,22]. During the Ebola outbreak in West Africa, it was reported that social media was a double edged sword, as healthcare providers were able to use these platforms to provide care and support, and had to work hard to counter miss information shared by the public through these portals [23,24]. While during the Middle East respiratory syndrome (MERS) outbreak in South Korea, a study examined the impact of traditional media versus social media during the epidemic. A two-wave online panel survey analysis revealed that while traditional media had a positive influence on MERS knowledge, social media had a direct influence on the public's behavioural responses [25]. Similarly, in the COVID-19 pandemic, content spreading through social media has evoked several behavioural abnormalities in the population. For example, in some countries people started stocking groceries in large quantities, despite the constant official assurance that all supermarkets will continue to be regularly restocked [26]. Social media propaganda has also been reported to elucidate criminal activities, as some countries reported an increase in hate crimes against people of Chinese descent [27,28].

The current study supported previous evidence [11,29,30] that the COVID-19 pandemic, and accompanying lockdown, caused severe behavioural and emotional stress. The global pandemic generated nation-wide negative feelings of fear and distress in the Saudi population [31,32]. This psychological stress is not only caused by the fear of the disease itself, but rather the quarantine and resulting isolation, restriction of movement and travel, financial losses, and fear of unemployment. Numerous risk factors were reported to be linked with depression symptoms in the COVID-19 pandemic. Females were found to be more likely to develop depressive symptoms than males [33-36]. These studies are in line with the current findings, where females are associated with higher stress levels and quarantine-related negative behaviours as compared to males. Gender differences are similar to those revealed prior to the pandemic, when females reported higher levels of psychological distress than males [37,38]. In the current study, these gender differences in distress may vary according to the context. The more they browsed social media for COVID-19-related information, the more they experienced a threat to well-being, mental health, and behavior towards the COVID-19 pandemic (Figure 1), especially females. When these findings are considered together, it is essential to address the needs of the general population who may require emotional support. However, according to the literature, being

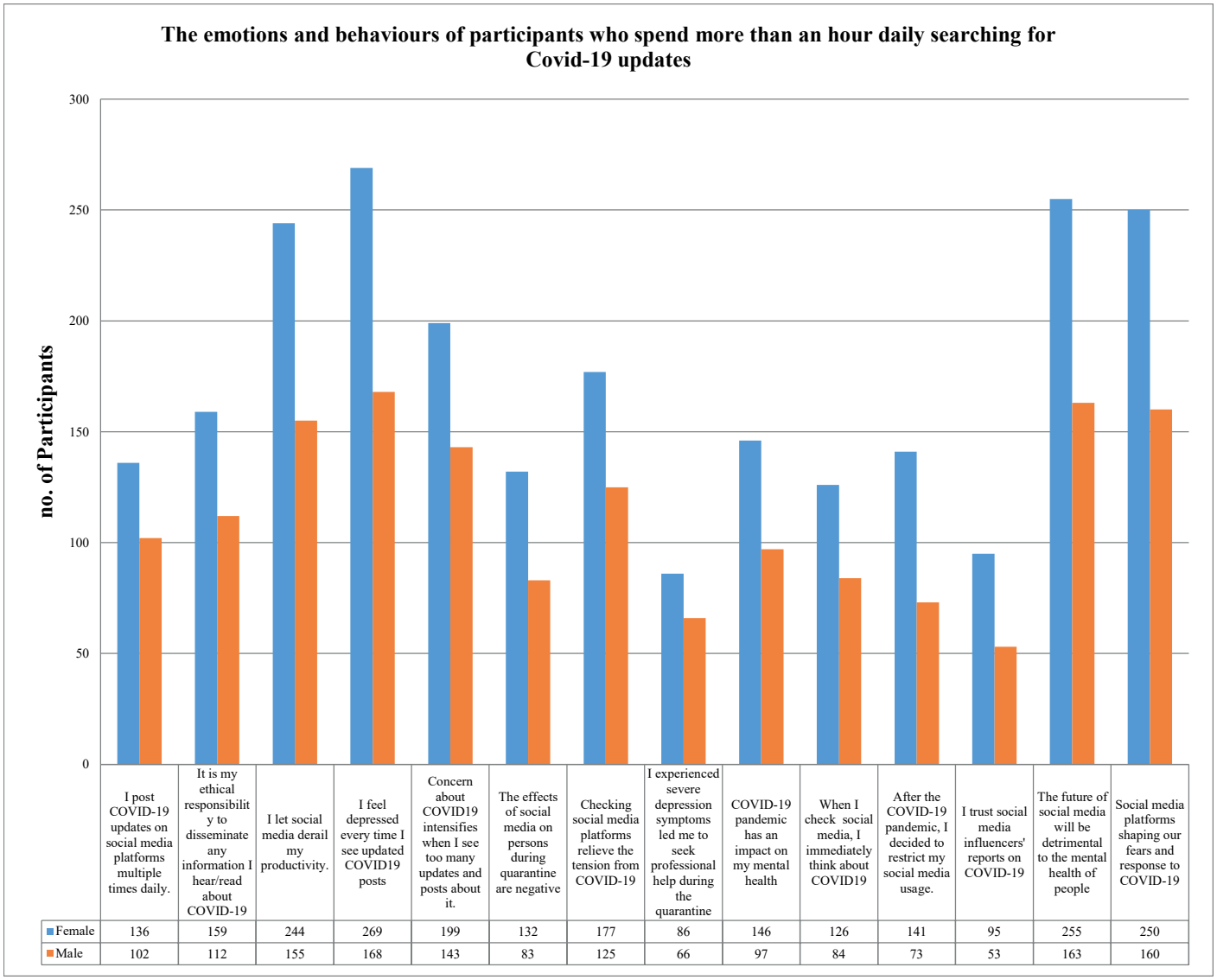

Figure 1. The emotions and behaviours of participants who spend more than an hour daily searching for Covid-19 updates.

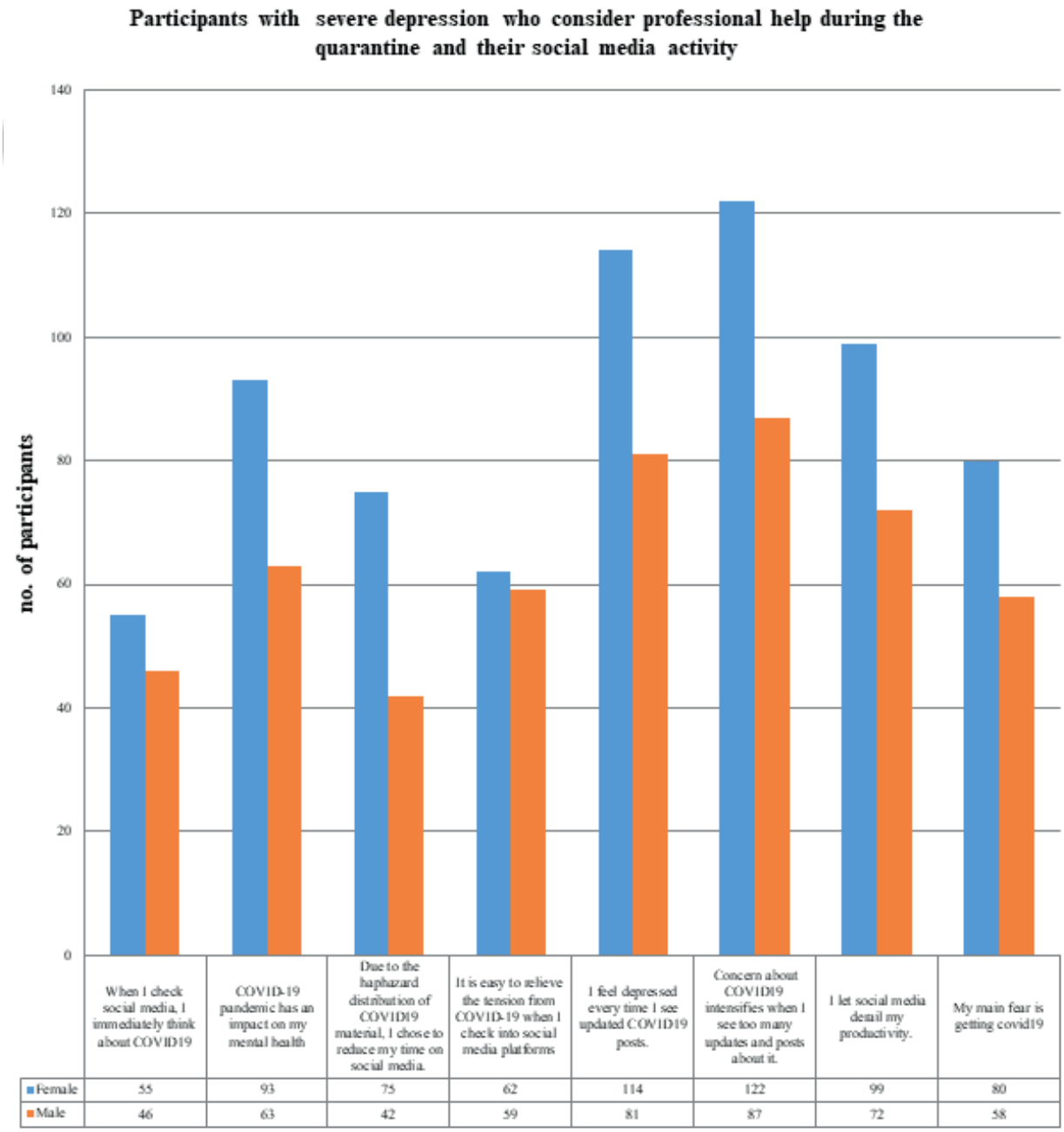

Figure 2. Participants with severe depression who consider professional help during the quarantine and their social media activity.

a woman is a risk factor for having worse emotional discomfort and mental health during the pandemic [39]. Therefore, there is a special need to consider the gender effects of the COVID pandemic.

To support transmission reduction measures, we must understand the factors that influence behaviour, including access, search, processing, and use of information in the digital media environment. In the current study, we examined the association between a person's attitude towards social media platforms and the level of use, searching or posting. The group, who browsed and was more active to COVID-19-related information on social media, experienced a more negative attitude towards these platforms. The association between the extent of social media platforms use and the overall expression of negative feelings related to the pandemic, highlighted that the more the use, the more negative feelings were expressed. Pantig et al. [40] support this observation, reporting that increased online time was linked to reduced social communication, contributing to increased feelings of depression and isolation. The group expressing a significantly higher level of negative feelings was aware that their social media habits could intensify these feelings and considered changing the habits. However, social media platform users who expressed severe depressive symptoms reported more unhealthy social media behaviour, especially in females (Figure 2).

Regardless of whether the emotional burden is caused by the use and pattern of behaviour on social media platforms or vice versa, that the use and pattern of behaviour is a result of mental and emotional burden, the cycle must be broken. This study demonstrates that self-

governing measures for social media platforms use will not work for the entire population. Susceptible individuals need to be protected from social media's adverse effects with regulations for both the platform developers, and governmental institutions. For example, in Saudi Arabia one of the most notable measures was the decision by the developers of the WhatsApp application. This popular platform in the region decided to restrict the message forwarding limit to control content sharing and limit rumour spreading [41]. The Public Prosecution of Saudi Arabia implemented a punishment of penalty or prison to any individual who spread miss information or rumours related to COVID-19 that could cause harm or panic [42]. Future regulations could include restricting the amount of time a user could spend on a given platform per day, for example automatic logout following 2 or 3 hours of being logged in.

Conclusion

The current study demonstrated a direct association between social media use and behavioural or emotional stress, and the need for institutional regulations to protect vulnerable users. These regulations will not only to protect the mental and emotional health of the population, but also the physical health. As mentioned in the introduction, constant and prolonged exposure to COVID-19-related content can result in an initial period of anxiety, resulting in mental fatigue and desensitisation to COVID-19 related content especially in females. This can seriously affect individual's perceived risk and self-efficacy, which may affect infection prevention and control measures [43]. Policymakers must include a social media 'action plan' as a part of a comprehensive public health response to any pandemic.

Ethical approval

This study was approved by the IRB of King Abdullah International Medical Research Center, National Guard-Health Affairs Riyadh, Saudi Arabia, with the number RC20/352/R. The study has been conducted in accordance with the ethical standards required.

Consent to participate

Consent was provided electronically before completing the questionnaire.

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