

The Impact of the COVID-19 “Infodemic” on Well-Being: A Cross-Sectional Study

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Introduction: The COVID-19 pandemic created a crisis in the world of information and digital literacy. The amount of misinformation surrounding COVID-19 that has circulated through social media (SM) since January 2020 is notably significant and has been linked to rising levels of anxiety and fear amongst SM users.

Aim: This study aimed to assess SM practices during COVID-19 and investigated their impact on users' well-being.

Methods: An online survey was distributed between June 10 and July 31 2020 via different SM platforms in the United Arab Emirates and other Arabic-speaking countries. Adults above 18 years of age who spoke Arabic or English were invited to complete the survey which covered multiple domains, use and practices related to social media platforms and mental health questions, including the WHO-5 Well-Being Index.

Results: Out of 993 participants, 73% were females, 76% were non-Emirati, 91% were university graduates, and 50% were employed in various occupations, of which 20% were health care professionals. Participants indicated that they acquired COVID-19 related information primarily from social media and messaging applications of which WhatsApp was the most used. Most participants reported sharing information after verification. The mean well-being score was 12.6 ± 5.6 , with 49% of participants reporting poor well-being (WHO-5 score <12.5). Adjusted linear regression showed that Facebook usage was negatively associated with well-being scores. Additionally, high time use was associated with poorer well-being. When adjusting for other factors, including low confidence in information around COVID-19 and poor knowledge overall, SM usage was significantly associated with poorer well-being.

Conclusion: The study sheds light on the use of SM during the pandemic and its impact on well-being throughout the novel coronavirus pandemic. Social media practices during emergencies and disasters may impact public well-being. Authorities are advised to step in to minimize the spread of misinformation and more frequent use of social media as it may influence well-being. Public health specialists, information technology and communication experts should collaborate to limit the infodemic effect on communities.

Keywords: COVID-19, infodemic, social media, WHO-5 Well-Being Index, internet use, mental health

Article Summary

To the best of our knowledge, this research is one of the earliest to investigate social media practices during the pandemic and their possible impact on well-being using the WHO-5 Well-Being Index (WHO-5) score. Results from an online study distributed in the United Arab Emirates and other Arabic speaking countries through SurveyMonkey has revealed a potentially negative relationship between social media use and general well-being, with most participants scoring “poor” well-being. The study findings indicate that people are using social media to access and share information related to COVID-19, claiming that they verify the information before sharing. This study highlights the possible effect of social

media on well-being during this pandemic and other future crises. Therefore, global and local health authorities should be better equipped with strategies and interventions to tackle these issues in the future. However, further studies, including control group will be needed to investigate how social media practices directly impact well-being.

Introduction

An outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) appeared in Wuhan, China, leading to the emergence of a coronavirus disease 2019 (COVID-19) pandemic in 2020 worldwide.¹ Regional and local efforts and policies have been influential in curbing the spread of this pandemic in community and health care settings.^{2,3} The uncertainty associated with COVID-19 has led to excessive global circulation and the spread of messages, information, disinformation and misinformation about the pandemic, its prevention, causes, complications and effects through the internet and social media.^{4,5} As of the date of the preparation of this manuscript, misinformation and disinformation are still spreading, especially with the appearance of variants. False information typically revolve around the origins of COVID-19, its long-term effects and its influence on different groups such as the elderly and children, as well as prevention measures and available vaccines.⁵

Social media platforms are communication tools hosted on and accessed via the internet that allow users to selectively communicate with others and acquire information from user-generated content.⁶ It has become an excellent means for sharing information, including medical and health information.⁷ Reliance on social media to collect information and news has increased significantly over the last two decades and reached its peak with the emergence of the COVID-19 pandemic.⁸

It is claimed that COVID-19 is the first true social media infodemic due to the accelerated rate of information and misinformation transmission around the globe, fuelling panic and fear within the global population.⁵ Consequently, the World Health Organization (WHO) issued a warning statement regarding the infodemic's impact on people's digital literacy, its effect on health literacy, and reactions to COVID-19.⁵ The WHO defined "infodemic" as "an overabundance of information—some accurate and some not—that makes it hard for people to find trustworthy sources and reliable guidance when they need it, and which involves outbreak response and an influx of information about the disease, its spread and prevention."⁵ This influx of information also dilutes the public's trust in official and verifiable sources and generates fear and panic due to unverified rumours and exaggerated claims. It has also promoted xenophobia and racism toward certain ethnic groups such as those of Chinese and East-Asian heritage. As well as having a tremendous psychological impact on general and vulnerable populations such as adolescents and youth overall.^{5,9–13}

The internet, and specifically popular social media platforms such as Twitter, Instagram and Facebook, have been extensively used in the last two decades to analyse, detect, and forecast infections and epidemics, and to predict patterns of human behavior regarding health.^{4,14–16} Internet use is very much linked to behavior related to health information; users write posts concerning their health on different social media platforms, often seeking information and advice. Information epidemiology, known as Infodemiology, is a domain in health informatics designated as "the science of distribution and determinants of information in an electronic medium with the ultimate aim to inform public health and public policy".^{17–19} However, SM's role in disseminating information has proven beneficial for both society and authorities in managing the response to the pandemic. Social media use, frequency, and eHealth literacy were also associated with people adopting more preventive behaviors.^{4,20} It was also shown to improve information spread, health literacy levels, and changing perceptions and attitudes.²¹ Globally, people's reliance on their traditional support groups has seen a reduction due to them substituting it with digital communication to share and connect with others. However, this was shown to increase anxiety and mental health issues following sudden restrictions in how we socialize with others.^{12,14,17,22,23} Many studies have pointed to the impact of social media use on mental health.^{24–27} This link was augmented during the pandemic due to the widespread physical, social distancing and isolation, fear, panic, and socio-political and economic factors induced by the pandemic.²⁸

According to the media dependency theory by Ball-Rokeach, during a critical public disruption, there is a fundamental necessity for information and sense-making by people; in the modern world, mass media is typically best-suited to meet this need.²⁹ During a crisis such as this pandemic, people choose social media platforms to seek information and share their opinions.^{13,30–33} Moreover, during the pandemic, misuse and political agendas were being

pushed through social media.³⁴ People tend to search for information to reduce the anxiety produced by the resulting ambiguity in a crisis event.^{32,33} Moreover, vulnerable groups are affected mentally mostly by the pandemic and tend to search social media platforms for information, especially Facebook.^{35,36} Schønning et al found that studies that have looked at positive and negative outcomes of social media use on mental health and wellbeing among adolescents are rare. In another study, the overall use of social media was not reported to have an impact on adolescents' well-being, however, it was reported that it made them feel better. Social media navigators use the platforms to express their sentiments, opinions, and feelings, which can be a relevant source of data for researching mental health.³⁷ In a recent study, students were found to seek emotional support and improve their social belongingness through social media use.³⁸ Fake news distribution and sharing information reached their peak during the Covid-19 pandemic.^{39,40} People's tendency to share "fake news" related to COVID-19 may depend on several factors and may be impacted by social media dependency and information-seeking needs. Understanding why people share fake news became the interest of many researchers worldwide during the pandemic.³⁹ Evidence suggests that symptoms of anxiety, depression and self-reported stress are common psychological reactions to the COVID-19 pandemic and may affect sleep patterns and the general well-being of individuals.^{41,42}

This study aims to explore social media practices and use during the COVID-19 pandemic and investigate the effect of social media on an individual's well-being. Moreover, this study explores the use of social media to seek knowledge about COVID-19, treatment, and prevention during the pandemic.

Methods

Reporting Guidelines

We followed the CHERRIES checklist for reporting results of web-based surveys⁴⁵ ([Table S1](#)).

Design and Study Participants

A cross-sectional study design was used to conduct this research during the COVID-19 outbreak between June 10, 2020 and July 31, 2020. Study participants were adults aged 18 years and above, of both genders who spoke Arabic or English. Participants were invited using a distribution through the researchers' networks, social media and using snowball sampling techniques to complete the online survey hosted on the SurveyMonkey platform.⁴⁶ The survey link was shared with participants via email, WhatsApp, Instagram, and Facebook in the UAE and other Arabic-speaking countries. We also invited Arabic speaking subjects who lived in western countries like (Australia, Canada, the United States and Europe).

Additionally, participants who completed the survey were asked to share the survey link with their contacts. The first page of the survey described the research objectives and assured participants of their anonymity and confidentiality. Only those who agreed to participate in the survey could initiate it by clicking "yes I agree to participate". Ethical approval was obtained from the Abu Dhabi University Institutional Review Board on May 16, 2020 (CHS-20-05-00014).

Data Collection

A questionnaire comprising 25 questions was developed to achieve the study's objectives. The questions were divided into four main sections: demographics, social media use and practices during the COVID-19 pandemic, impact of COVID-19 on health-related knowledge, and the overall well-being and impact of COVID-19 on mental health. Well-being was measured using the WHO-5 Well-Being Index⁴⁴ and questions adapted from "Assessing mental health and psychosocial needs and resources toolkit for humanitarian settings" (section B).⁴⁷ This paper presents data related to the WHO-5 Well-Being Index score and social media use.

WHO-5 Well-Being Index Score

The WHO-5 Well-Being Index (WHO-5) ([Table S2](#)) is a short global rating scale that measures subjective well-being. The WHO-5 questions ([Table S2](#)) include five items: i) "I have felt cheerful and in good spirits", ii) "I have felt calm and relaxed", iii) "I have felt active and vigorous", iv) "I woke up feeling fresh and rested" and v) "My daily life has been filled with things that interest me". Each item is scored from 0 to 5. The total raw score ranges from 0–25. The score is

multiplied by four to achieve a score in percentage (%), with 0 representing the worst imaginable well-being and 100 representing the best imaginable well-being.⁴⁸ A cut-off score of 12.5 multiplied by four was used to differentiate between good and poor well-being in this study. The WHO Well-Being index is scored based on a cut-off score of 50 with a total raw score ranging from 0–25 that is multiplied by four to give the final score, with 0 representing the worst imaginable well-being and 100 representing the best imaginable well-being.⁴³ We used the cut-off score of 12.5 multiplied by 4 out of 25 to be the score used in this study as used in other literature.⁴⁹

Social Media Platforms and Messaging Applications

The most commonly used social media platforms and messaging applications globally and in the region were included in this study. These included WhatsApp, Facebook, Snapchat, Twitter, Instagram, LinkedIn, YouTube and Reddit. Whilst WhatsApp, Instagram, and Facebook are all grouped under Facebook, Inc., WhatsApp is a messaging platform. It differs in format from Instagram and Facebook, whereas the latter two function via user posts on an algorithmically served timeline. However, all of these platforms are generally used to share information. Regardless of the social media platform used, information on these tools might be accepted and shared without validation and adequate supervision from authorities on content.²⁰

Previous studies have classified the WhatsApp and Snapchat messaging applications under social media platforms.^{36,50} Therefore, we decided to include them in our study as also being social media platforms yet refer to them as messaging applications. The questionnaire was developed in English, translated to Arabic, and – back translated to ensure translation accuracy and validity. The questionnaire was piloted among 25 students and health care professionals to ensure face and content validity. The survey was also sent to five public health experts to assess content validity and to ensure that survey questions assessed the constructs being measured. No modifications were made based on the pilot testing. The underlying constructs, “types of social media”, “practices of looking for information”, and “attitudes and beliefs in abilities and knowledge of social media”, showed moderate to high levels of internal consistency with Cronbach’s alpha of 0.744, 0.688 and 0.791 respectively.

The survey was distributed mainly in the UAE and through social media and to other Arabs in other countries. Only one survey entry was allowed from the same IP address to avoid multiple participant entries.

Sampling

The minimum required sample size was calculated as being 384 adults considering a 95% confidence level, a margin error of 5%, and a power of 80%. However, to account for low response rate attrition and sensitivity analysis, we increased our sample size by 60%, making the minimum required sample 615 participants.

Statistical Analysis

Data were extracted in Microsoft Excel and analyzed in Stata version 16.0.⁴⁸ Qualitative variables were tabulated as frequencies with corresponding percentages (%) and quantitative variables as mean with corresponding standard deviations (\pm SD). The overall well-being score was computed by summing up WHO-5 questions and further categorized into poor (<12.5) and good well-being (≥ 12.5). Unpaired t-tests and one-way analysis of variance (ANOVA) tests were applied to compare the mean well-being score with qualitative variables as appropriate. Chi-square or Fisher Exact tests were applied to compare well-being status with qualitative variables as appropriate. The p-value <0.05 was chosen to determine statistical significance. Simple and multiple linear regression was applied to assess the association of well-being score with social media use. In simple linear regression, crude estimates (β) of well-being score with social media use were reported with corresponding 95% confidence intervals (CI) and p-values. In multiple regression, the well-being score with each question related to social media use was adjusted for age, sex, marital status, education, nationality, and job. Upon initial analysis, we found no significant difference in well-being score among participants from different nationalities and countries and no differences in terms of social media practices and use. To ensure comparisons were meaningful and statistically appropriate, the responses “disagree“ and ”strongly disagree” and ‘agree’ and ‘strongly agree’ were merged.

Results

Demographics

A total of 999 responses were collected. Only six surveys were returned incomplete and were excluded from the analysis (Table 1). The majority of study participants were females (73%) with a mean age of 34 ± 12.2 years. Most participants had either undergraduate or post-graduate education. Almost three-quarters of the participants were non-Emiratis (76%), with (64%) residing in the UAE. Half of the participants (50%) reported that they were working. Of those employed, the majority were health care professionals, followed by professionals in the education sector and academia.

Sources of Information and Frequency of Use

The majority of participants (72.3%) reported using social media platforms as a main source of information for COVID-19. Television was the third most commonly used tool for information on COVID-19, while newspapers, radio and scientific publications were less commonly used as sources of information (Figures 1). WhatsApp was reported as the most commonly used social media platform and was reportedly used for at least 1–3 hours a day (39.2%) (Figures 2). While most participants reported using Snapchat, Twitter, Instagram, and YouTube between 1–5 hours a day on average (Table 2). The least used platforms by participants were Reddit (91.2% do not use) and LinkedIn (71.2% do not use). Almost half of the respondents reported using the internet to access information about COVID-19.

Social Media Practices and Frequency of Use

When asked about sharing information about COVID-19, 86% of participants claimed they validated information before sharing. In contrast, 62% reported they felt responsible for sharing knowledge. Moreover, 78% stated that they felt confident in their abilities to differentiate between false and correct information about COVID-19 and 65% agreed that they would send back comments or advice to the sender if they felt that information was dubious. Only 4.1% felt that their health-related knowledge and awareness had not increased due to the pandemic, while 17% had no opinion.

Well-Being Score and Comparison with Other Variables

Overall, almost half (51.5%) of participants in this study scored above average in the WHO well-being score (Table S3). Further analysis was performed to compare between sociodemographic factors and well-being scores, social media use and well-being scores. It was found that being a non-Emirati and a blue-collar worker was negatively associated with well-being score ($p \leq 0.001$ and $P = 0.03$) respectively (Table 1). At the same time, non-Facebook users had significantly higher well-being scores than Facebook users ($p \leq 0.001$) (Table 3). Additionally, participants who felt confident with their ability to differentiate between false and correct information and those who were likely to inform the sender of dubious information had significantly higher well-being scores ($p \leq 0.001$ and $p = 0.027$) (Table 4). Furthermore, participants who indicated an increase in knowledge and awareness of health-related information due to the COVID-19 pandemic reported higher well-being scores ($p = 0.005$) (Table 3).

Regression Analysis of Social Media Use with Well-Being Scores

Simple and multiple linear regression analysis of well-being scores with social media use showed that Facebook use was a significant predictor of well-being score even after adjusting for covariates (Table 5). More use significantly predicted lower well-being scores, with 1–3 hours use compared to no use ($\beta = -1.53$, 95% CI = $-2.79 - -0.27$, $p = 0.017$) and over 5 hours use ($\beta = -0.32$, 95% CI = $-5.78 - -0.55$, $p = 0.018$) than no use. Similarly, the use of Reddit for less than one hour predicted lower well-being scores than no use ($\beta = -2.24$, 95% CI = $-3.98 - -0.51$, $p = 0.011$). Additionally, often looking up COVID-19 information and updates predicted lower well-being scores ($\beta = -2.99$, 95% CI = $-5.03 - -0.95$, $p = 0.004$). An increase in knowledge and awareness of health-related issues due to the COVID-19 pandemic did not remain a significant predictor of well-being scores after adjusting for covariates ($\beta = 0.69$, 95% CI = $-0.47 - -1.86$, $p = 0.244$).

Table 1 Demographic Characteristics and Comparison with Well-Being Scores

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥12.5)	Poor Well-Being (<12.5)	P-value*
Overall	993	12.6 ±5.6	–	511 (51.5)	481 (48.5)	–
Age, Mean ±SD	34.2 ±12.2	–0.02 [†]	0.581	34.1 ±12.1	34.3 ±12.4	0.813
Age groups, n (%)						
<20 years	88 (8.9)	12.8 ±4.8	0.344	42 (47.7)	46 (52.3)	0.602
20–29 years	320 (32.3)	12.6 ±5.3		160 (50.0)	160 (50.0)	
30–39 years	252 (25.5)	13.2 ±5.9		111 (44.1)	141 (55.9)	
40–49 years	194 (19.6)	12.1 ±5.6		98 (50.5)	96 (49.5)	
50+ years	136 (13.7)	12.5 ±6.1		68 (50.0)	68 (50.0)	
Sex, n (%)						
Female	726 (73.2)	12.5 ±5.5	0.119	361 (49.7)	365 (50.3)	0.063
Male	266 (26.8)	13.1 ±5.7		150 (56.4)	116 (43.6)	
Education, n (%)						
Primary	7 (0.7)	13.1 ±9.2	0.060	4 (57.1)	3 (42.9)	0.074
Secondary	80 (8.1)	12.3 ±5.7		41 (51.3)	39 (48.7)	
Undergraduate	469 (47.3)	12.2 ±5.4		222 (47.3)	247 (52.7)	
Postgraduate	436 (43.9)	13.2 ±5.7		244 (56.0)	192 (44.0)	
Marital status, n (%)						
Single	448 (45.2)	12.5 ±5.2	0.429	226 (50.5)	222 (49.5)	0.636
Married	495 (49.9)	12.8 ±5.8		263 (53.1)	232 (46.9)	
Divorced	39 (3.9)	11.9 ±6.3		17 (43.6)	22 (56.4)	
Widow(er)	10 (1.0)	10.5 ±7.0		5 (50.0)	5 (50.0)	
Nationality, n (%)						
Emirati	180 (23.1)	14.1 ±5.2	<0.001	295 (49.3)	304 (50.7)	<0.001
Non-Emirati	599 (76.9)	12.4 ±5.6		115 (63.9)	65 (36.1)	
Country of Residence, n (%)						
UAE	644 (64.9)	12.6 ±5.6	0.519	337 (52.3)	307 (47.7)	0.189
Saudi Arabia	112 (11.3)	13.4 ±5.4		64 (57.1)	48 (42.9)	
Lebanon	88 (8.9)	11.6 ±6.2		33 (37.5)	55 (62.5)	
Egypt	27 (2.7)	12.2 ±5.9		14 (51.9)	13 (48.1)	
Other Arab countries	43 (4.3)	13.0 ±5.1		22 (51.2)	21 (48.8)	
Australia	33 (3.3)	12.0 ±4.5		15 (45.5)	18 (54.5)	
Canada/USA	16 (1.6)	14.7 ±4.6		10 (62.5)	6 (37.5)	
Europe	18 (1.8)	12.8 ±5.9		8 (44.4)	10 (55.6)	

(Continued)

Table 1 (Continued).

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
Other	11 (1.1)	13.5 \pm 6.5		8 (72.7)	3 (27.3)	
Job, n (%)						
Employed for wages	451 (45.5)	13.1 \pm 5.6	0.122	241 (53.4)	210 (46.6)	0.718
Self-employed	45 (4.5)	12.9 \pm 6.3		25 (55.6)	20 (44.4)	
Unemployed	119 (12.0)	11.9 \pm 5.8		56 (47.1)	63 (52.9)	
Retired/Cannot work	19 (1.92)	10.4 \pm 6.8		9 (47.4)	10 (52.6)	
Home-maker	92 (9.3)	11.8 \pm 5.6		43 (46.7)	49 (53.3)	
Student	266 (26.8)	12.6 \pm 5.2		137 (51.5)	129 (48.5)	
Field of work, n (%)						
Medical/Healthcare	203 (20.5)	12.9 \pm 5.5	0.030	111 (54.7)	92 (45.3)	0.065
Education sector	150 (15.1)	12.2 \pm 5.7		68 (45.3)	82 (54.7)	
Academic/Research	142 (14.3)	13.7 \pm 6.0		86 (60.6)	56 (39.4)	
White-collar	57 (5.7)	11.5 \pm 5.5		26 (45.6)	31 (54.4)	
Police/Military	21 (2.1)	14.4 \pm 6.8		14 (66.7)	7 (33.3)	
Blue-collar	8 (0.8)	10.0 \pm 6.4		3 (37.5)	5 (62.5)	

Notes: *Unpaired t-tests or one-way analysis of variance (ANOVA) were applied to compare the mean well-being score with qualitative variables as appropriate. Chi-square and Fisher Exact tests were applied to compare binary variable of well-being with qualitative variables as appropriate. ¹Pearson correlation coefficient. The bold value represents the number of participants.

Discussion

This study explored social media use and its impact on well-being during the COVID-19 pandemic in the UAE, and other Arab-speaking countries. It also explored the use of social media as a mean for seeking knowledge about COVID-19. Over half of participants in our study reported an above-average well-being score, with lower scores found among participants who were non-Emirati and blue-collar workers. Participants who reported using any social media had poorer well-being scores. Being a health care worker and an Emirati showed poorer well-being. Specifically, using Facebook for extended periods and to seek COVID-19 information and updates predicted lower well-being scores. In this study, most participants believed in their abilities to validate shared information and shared it as a social responsibility. However, further research should be undertaken to investigate the accuracy of the practice of validating information and the sources used and accessed for validation. According to Figueiras et al, trust in authorities and information sources impacts behaviors and preventive measures during the pandemic.⁵¹

Although this study cannot indicate a direct and causal relationship between social media use and poorer well-being, these effects should not be ignored. In fact, other studies have investigated anxiety, stress, and depression related to the COVID-19 pandemic in the community and among subgroups. For example, Zhong et al suggested that social media may mediate impact on mental well-being. Also, during the pandemic, social media was described as a sources of information about COVID-19 and a means to share information.²⁷

Despite social media being a valuable means of communication, evidence from previous outbreaks suggests a negative impact on people's knowledge, practices, beliefs, and mental health status. Earlier studies have identified social media's role in intensifying anxiety, stress and depression during the Ebola, SARS, ZIKA and MERS outbreaks.

Table 2 General Media Sources Use and Well-Being Score by Media Use

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
Medium of information on COVID-19						
Social media						
No	275 (27.7)	13.1 \pm 5.5	0.134	157 (57.1)	118 (42.9)	0.029
Yes	717 (72.3)	12.5 \pm 5.6		354 (49.4)	363 (50.6)	
Internet						
No	488 (49.2)	12.6 \pm 5.6	0.909	253 (51.8)	235 (48.2)	0.837
Yes	504 (50.8)	12.7 \pm 5.6		258 (51.2)	246 (48.8)	
TV						
No	570 (57.5)	12.5 \pm 5.6	0.593	298 (52.3)	272 (47.7)	0.573
Yes	422 (42.54)	12.7 \pm 5.5		213 (50.5)	209 (49.5)	
Newspaper						
No	861 (86.8)	12.7 \pm 5.6	0.553	448 (52.0)	413 (48.0)	0.400
Yes	131 (13.2)	12.3 \pm 5.7		63 (48.1)	68 (51.9)	
Radio						
No	940 (94.8)	12.7 \pm 5.6	0.419	485 (51.6)	455 (48.4)	0.823
Yes	52 (5.2)	12.0 \pm 5.1		26 (50.0)	26 (50.0)	
Health agencies						
No	958 (96.6)	12.6 \pm 5.6	0.280	492 (51.4)	466 (48.6)	0.604
Yes	34 (3.4)	13.6 \pm 5.5		19 (55.9)	15 (44.1)	
Scientific literature						
No	975 (98.3)	12.6 \pm 5.6	0.413	504 (51.7)	471 (48.3)	0.467
Yes	17 (1.7)	11.5 \pm 6.8		7 (41.2)	10 (58.8)	
Word of mouth						
No	979 (98.7)	12.6 \pm 5.6	0.373	503 (51.4)	476 (48.6)	0.581
Yes	13 (1.3)	14.0 \pm 5.0		8 (61.5)	5 (38.5)	
Hospital/healthcare professional						
No	984 (99.2)	12.6 \pm 5.6	0.851	507 (51.5)	477 (48.5)	1.000
Yes	8 (0.8)	13.0 \pm 6.7		4 (50.0)	4 (50.0)	

Notes: *Unpaired tests were applied to compare well-being scores with social media. Chi-square or Fisher Exact tests were applied to compare binary variable of well-being with social media.

A study in South Korea (2020) found that social media use was related to anger and fear. It significantly increased preventive behaviors via risk perceptions and substantially influenced public perceptions of risk issues. Other studies that focused on H1N1 flu,⁵² Avian flu,⁵³ and bovine spongiform encephalopathy also suggested similar findings to the South Korean study.⁵⁴ Similarly, a recent study published in China showed that mental health problems, specifically depression

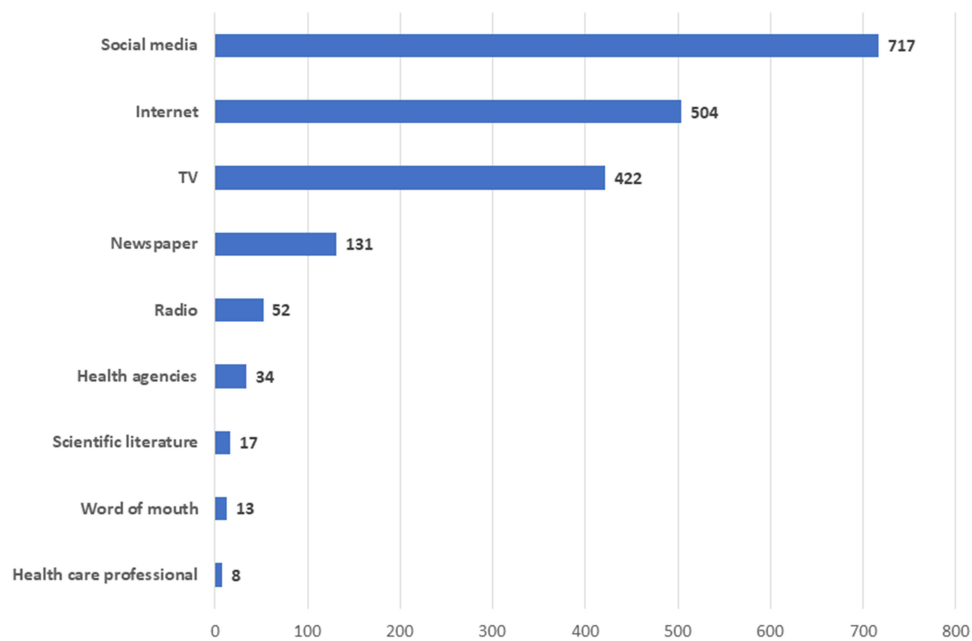


Figure 1 Medium of information of COVID-19 (N:993).

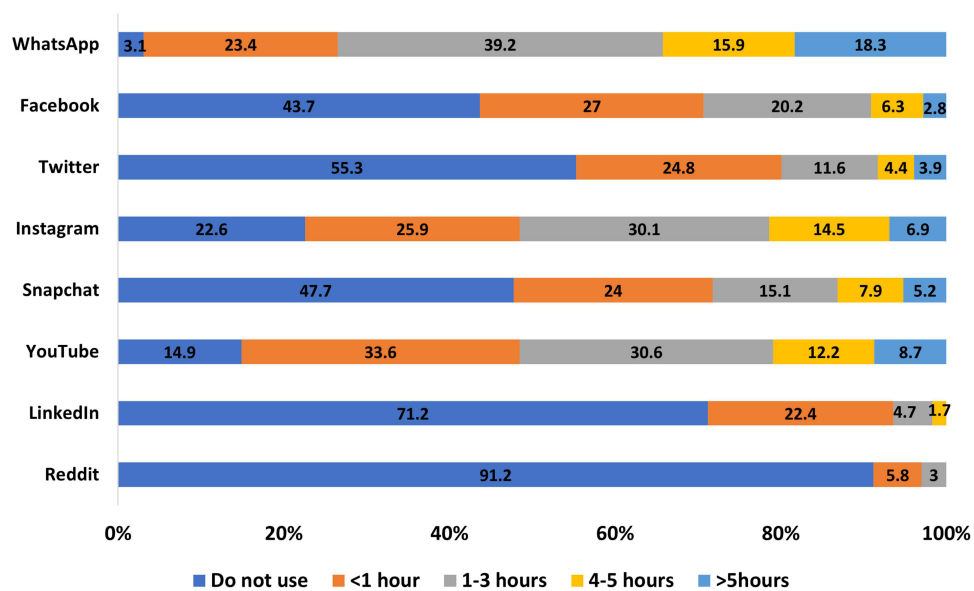


Figure 2 Use of social media (hours per day) (N: 993).

and anxiety, were prevalent and positively associated with social media use during the COVID-19 outbreak, highlighting the significant role of governments in combatting the “infodemic”.⁵⁵

In this study, being Emirati indicated poorer well-being when associated with social media use. This might be explained by the fact that our sample was mainly Emiratis, or due to the high amount of misinformation that spread at the early stages of the UAE pandemic compared to other neighbouring countries.⁵⁶

Social media platforms are becoming more commonly used to acquire news and information and behavioral change.⁵⁷ This study has shown high use of social media among participants compared to other traditional media platforms such as newspapers, television, and radio programs. However, in this study overuse of certain social media platforms was

Table 3 Frequency of Social Media Use and Comparison with a Well-Being Score

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
Social media						
No	275 (27.7)	13.1 \pm 5.5	0.134	157 (57.1)	118 (42.9)	0.029
Yes	717 (72.3)	12.5 \pm 5.6		354 (49.4)	363 (50.6)	
Facebook						
Do not use	406 (43.7)	13.4 \pm 5.4	<0.001	243 (59.9)	163 (40.1)	<0.001
<1 hour	251 (27.0)	12.6 \pm 5.7		127 (50.6)	124 (49.4)	
1–3 hours	188 (20.2)	11.3 \pm 5.5		71 (37.8)	117 (62.2)	
3–5 hours	59 (6.3)	12.5 \pm 5.5		27 (45.8)	32 (54.2)	
>5 hours	26 (2.8)	9.5 \pm 6.3		9 (34.6)	17 (65.4)	
Twitter						
Do not use	498 (55.3)	12.4 \pm 5.7	0.224	246 (49.4)	252 (50.6)	0.193
<1 hour	223 (24.8)	13.3 \pm 5.2		130 (58.3)	93 (41.7)	
1–3 hours	104 (11.6)	12.4 \pm 5.8		49 (47.1)	55 (52.9)	
3–5 hours	40 (4.4)	13.7 \pm 5.1		22 (55.0)	18 (45.0)	
>5 hours	35 (3.9)	12.6 \pm 5.7		19 (54.3)	16 (45.7)	
Instagram						
Do not use	211 (22.6)	12.4 \pm 5.9	0.130	104 (49.3)	107 (50.7)	0.352
<1 hour	242 (25.9)	12.9 \pm 5.7		129 (53.3)	113 (46.7)	
1–3 hours	281 (30.1)	12.9 \pm 5.6		147 (52.3)	134 (47.7)	
3–5 hours	136 (14.5)	13.0 \pm 4.9		76 (55.9)	60 (44.1)	
>5 hours	65 (6.9)	11.1 \pm 5.4		27 (41.5)	38 (58.5)	
YouTube						
Do not use	140 (14.9)	12.3 \pm 5.7	0.221	72 (51.4)	68 (48.6)	0.716
<1 hour	316 (33.6)	13.1 \pm 5.7		168 (53.2)	148 (46.8)	
1–3 hours	288 (30.6)	12.8 \pm 5.3		149 (51.7)	139 (48.3)	
3–5 hours	115 (12.2)	12.9 \pm 5.3		63 (54.8)	52 (45.2)	
>5 hours	82 (8.7)	11.6 \pm 5.7		37 (45.1)	45 (54.9)	
LinkedIn						
Do not use	638 (71.2)	12.6 \pm 5.5	0.345	320 (50.2)	318 (49.8)	0.472
<1 hour	201 (22.4)	13.0 \pm 5.5		111 (55.2)	90 (44.8)	
1–3 hours	42 (4.7)	12.4 \pm 5.9		24 (57.1)	18 (42.9)	
>3 hours	15 (1.7)	14.7 \pm 5.5		9 (60.0)	6 (40.0)	

(Continued)

Table 3 (Continued).

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
Reddit						
Do not use	798 (91.2)	12.8 \pm 5.6	0.102	419 (52.5)	379 (47.5)	0.287
<1 hour	51 (5.8)	11.1 \pm 5.1		21 (41.2)	30 (58.8)	
≥ 1 hours	26 (3.0)	13.0 \pm 4.7		13 (50.0)	13 (50.0)	

Notes: *One-way ANOVA tests were applied to compare well-being scores with the frequency of social media use. Chi-square or Fisher Exact tests were applied to compare binary variable of well-being with the frequency of social media use.

negatively associated with well-being; participants who used social media platforms for longer periods of time had lower well-being scores. A similar study showed that social media influenced people's mental health and psychological well-being in Iraq, Kurdistan, and its usage was correlated with fear spread and panic.¹⁰ In the US, the pandemic was linked to a longitudinal decrease in well-being and poorer mood as presented by social media.⁵⁸

In general, over half of the participants scored above average on well-being, highlighting that there might be an equitable effect for social media in accessing information. Our participants indicated strong confidence in their knowledge, practices, and the ability to control the spread of information through WhatsApp and other social media platforms.²⁷ This confidence might be because most participants were educated (health care professionals, academics, and students), or that large amounts of information were transmitted before and during the time of data collection for this study and the onset of the pandemic. Zhong et al discussed similar findings that social media affects mental health because younger people rely more on social media to receive information about the pandemic.²⁷ It is worth noting that our sample had a considerable number of respondents stating that they are health care workers, which may introduce bias to our results. However, when we controlled our sample by occupation, the differences were not significant. Furthermore, based on recent research, it may be argued that health care professionals have shown higher rates of depression and anxiety during the COVID-19 pandemic, affecting their well-being.^{59–62} Two different studies conducted in the UAE during the COVID-19 pandemic found that health care workers in the UAE suffer from anxiety, psychological distress and burnout.^{62,63} However, our study mainly correlated the well-being of participants with social media practices, not with the type of work.^{59–61}

In particular, WhatsApp messaging has been used to help families cope with social isolation and support social inclusion.³³ WhatsApp was the most common and often used social media platform among participants in our study. Although we did not investigate the reasons for the use of WhatsApp in our research, the everyday use of this platform as a tool for social networking is consistent with other findings.³³ In the internet-driven information age, there is significant pressure on governmental entities, health officials, and public health specialists to come up with ways to combat the considerable damage of social media on trust in scientific evidence. These effects will likely be felt for more time to come, even after the COVID-19 pandemic wanes. It is becoming increasingly necessary for health and government officials to promote digital literacy as a method to combat the spread of false, misleading, or unreliable information. Several studies reported the role of social media in promoting health protection and highlighted the significance of public health messaging. For example, past research conducted by Collinson et al. showed the value of controlling the dissemination of influenza and decreasing the infection outcomes on a population.¹⁴ Social media campaigns regarding epidemics or pandemics are in communicating information to the general public, thereby producing positive attitudes and behaviors that may reduce the spread of the disease by means such as hand-washing and social distancing.^{4,17,19,57} It is worth pointing out that answering "very often" and "often" to the question of "how often do you look up information" may be an indicator for anxiety and may reflect negatively on well-being. However, in our results, this was not significant and has not shown any impact on well-being.

Various studies have shown a high prevalence of COVID-19 awareness and its impact on practices and attitudes being propagated by the rapid spread of information across the globe through many platforms, including social media. It is

Table 4 Social Media Practices and Comparison with a Well-Being Score

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
How often do you look up information and updates about COVID-19?						
Not at all	39 (3.9)	13.1 \pm 6.0	0.146	22 (56.4)	17 (43.6)	0.342
Rarely	113 (11.4)	12.1 \pm 5.4		60 (53.1)	53 (46.9)	
Occasionally	268 (27.0)	12.9 \pm 5.4		141 (52.6)	127 (47.4)	
Often	371 (37.4)	12.6 \pm 5.9		176 (47.4)	195 (52.6)	
Very often	201 (20.3)	13.8 \pm 5.2		112 (55.7)	89 (44.3)	
Do you follow influencers on social media for COVID-19 information and updates?						
Yes	208 (21.0)	12.9 \pm 5.9	0.354	110 (52.9)	98 (47.1)	0.622
No	654 (65.9)	12.4 \pm 5.4		330 (50.5)	324 (49.5)	
I do not know any influencer	130 (13.1)	13.1 \pm 5.8		71 (54.6)	59 (45.4)	
I only share COVID-19 related information from official sources or after validating from the official sources?						
Strongly Disagree/ Disagree	39 (3.9)	13.6 \pm 7.3	0.021	24 (61.5)	15 (38.5)	0.069
Neither disagree nor agree	100 (10.1)	11.2 \pm 5.6		42 (42.0)	58 (58.0)	
Strongly Agree/ Agree	853 (86.0)	12.8 \pm 5.5		445 (52.2)	408 (47.8)	
I share COVID-19 related information because: via social media						
It gives me some sense of satisfaction						
No	819 (82.6)	12.5 \pm 5.5	0.093	410 (50.1)	409 (49.9)	0.047
Yes	173 (17.5)	13.3 \pm 5.9		101 (58.4)	72 (41.6)	
I want to stay socially interactive						
No	863 (87.0)	12.6 \pm 5.6	0.579	444 (51.5)	419 (48.5)	0.917
Yes	129 (13.0)	12.9 \pm 5.3		67 (51.9)	62 (48.1)	
I have no specific reason						
No	859 (86.6)	12.8 \pm 5.5	0.018	454 (52.9)	405 (47.1)	0.032
Yes	133 (13.4)	11.6 \pm 6.0		57 (42.9)	76 (57.1)	
I was asked to forward it						
No	956 (69.4)	12.7 \pm 5.6	0.436	495 (51.8)	461 (48.2)	0.387
Yes	36 (3.6)	11.9 \pm 4.9		16 (44.4)	20 (55.6)	
I feel responsible to share knowledge						
No	377 (38.0)	12.3 \pm 6.1	0.201	192 (50.9)	185 (49.1)	0.773
Yes	615 (62.0)	12.8 \pm 5.3		319 (51.9)	296 (48.1)	
I wish to stay informed						
No	948 (95.6)	12.6 \pm 5.6	0.607	491 (51.8)	457 (48.2)	0.411

(Continued)

Table 4 (Continued).

Variable	All	Well-Being Score	P-value*	Good Well-Being (≥ 12.5)	Poor Well-Being (< 12.5)	P-value*
Yes	44 (4.4)	12.2 \pm 5.6		20 (45.5)	24 (54.5)	
I am confident in my ability to differentiate between true and false information related to COVID-19?						
Strongly disagree/Disagree	38 (3.8)	14.1 \pm 5.5	≤ 0.001	24 (63.2)	14 (36.8)	≤ 0.001
Neither disagree nor agree	180 (18.1)	11.1 \pm 5.3		64 (35.6)	116 (64.4)	
Strongly agree/ Agree	774 (78.0)	13.0 \pm 5.6		423 (54.7)	351 (45.3)	
When I receive dubious or false COVID-19 related information, I inform the sender or try to correct them						
Strongly disagree/ Disagree	23 (2.3)	9.7 \pm 4.8	0.011	7 (30.4)	16 (69.6)	0.027
	73 (7.4)	12.4 \pm 5.6		32 (43.8)	41 (56.2)	
Neither disagree nor agree	251 (25.3)	12.1 \pm 5.5		120 (47.8)	131 (52.2)	
Strongly agree /Agree	349 (35.2)	12.7 \pm 5.3		183 (52.4)	166 (47.6)	
	296 (29.8)	13.3 \pm 5.9		169 (57.1)	127 (42.9)	
My knowledge and awareness of health-related issues has increased as a result of the COVID-19 pandemic						
Strongly disagree/Disagree	41 (4.1)	13.0 \pm 5.9	0.046	23 (56.1)	18 (43.9)	0.003
Neither disagree nor agree	169 (17.0)	11.7 \pm 5.7		67 (39.6)	102 (60.4)	
Strongly agree/ agree	782 (78.8)	12.8 \pm 5.5		421 (53.8)	361 (46.2)	

Notes: *Unpaired t-tests or one-way ANOVA tests were applied to compare well-being score with the frequency of social media use. Chi-square or Fisher Exact tests were applied to compare binary variable of well-being with the frequency of social media use.

worth noting that during the COVID-19 pandemic, both the virus and the information/misinformation around the outbreak spread very fast.^{3,5,18} This awareness could provide valuable context to the levels of confidence that participants of this study expressed they had in their knowledge and their indication that they only shared correct information and confirmed the truthfulness of information before disseminating it further. It can be argued that factors that may have led to amplified use of social media during this pandemic can be linked to the pandemic, its subsequent social isolation, and stringent containment measures that led to marked restrictions in typical social communication, unlike any of the previous historical epidemics and pandemics.⁶⁴

Throughout pandemics, the primary research on social media was during the 2009 H1N1 outbreak, tracing the prevalence of misinformation (reported as 4.5%), terminology use (H1N1 or swine flu), public attitudes and fear, and relationships between case incidence and public concern.⁶⁵ Furthermore, some individuals generate assumptions regarding disease transmission, often based on incorrect risk perceptions and pre-existing social prejudices, to ease the anxiety felt by the accusers or stigmatize those who are blamed. This was reported in April 2009 when a new strain of human influenza H1N1 emerged in Mexico and spread quickly worldwide.⁶⁶ This resulted in an economic crisis that affected Mexican goods as they were considered disease vectors.⁶⁷ To decrease the adverse outcomes of stigmatization during pandemics, public health officials must attempt to identify the dynamics that underlie this process, with particular attention given to protecting disadvantaged people.^{10,21,57,68,69}

Moreover, a past study investigating media dependency amongst Chinese nationals during the SARS epidemic of 2003 found that the internet was a unique empowerment tool that allowed people to avoid official authority and challenge official claims during the crisis.³¹ In 2015, Misra et al. developed a model to explore the impact of awareness realized by social media campaigns on infectious disease prevalence. The study findings revealed that social media health campaigns

Table 5 Crude and Adjusted Linear Regression Analysis of Well-Being Score with Social Media Use and Practices

Variable	Unadjusted Estimate (95% CI)	P-value*	Adjusted Estimate (95% CI)	P-value*
Facebook				
<1 hour/	-0.78 (-1.65-0.09)	0.078	-0.19 (-1.30-0.92)	0.734
1-3 hours/	-2.09 (-3.04 - -1.13)	<0.001	-1.53 (-2.79 - -0.27)	0.017
3-5 hours/ Do not use	-0.95 (-2.45-0.56)	0.216	-0.04 (-2.00-1.91)	0.965
>5 hours/ Do not use	-3.87 (-6.05 - -1.68)	0.001	-0.317 (-5.78 - -0.55)	0.018
R ²	0.028		0.054	
Twitter				
<1 hour/ Do not use	0.92 (0.05-1.80)	0.039	0.85 (-0.17-1.87)	0.101
1-3 hours/ Do not use	0.01 (-1.17-1.18)	0.998	-0.38 (-1.67-0.92)	0.569
3-5 hours/ Do not use	1.23 (-0.56-3.02)	0.179	0.74 (-1.23-2.71)	0.461
>5 hours/ Do not use	2.07 (-1.70-2.11)	0.831	-0.52 (-2.67-1.63)	0.633
R ²	0.006		0.046	
Instagram				
<1 hour/ Do not use	0.46 (-0.57-1.49)	0.381	1.08 (-0.10-2.26)	0.072
1-3 hours/ Do not use	0.48 (-0.51-1.49)	0.339	0.54 (-0.67-1.76)	0.379
3-5 hours/ Do not use	0.62 (-0.58-1.82)	0.313	0.13 (-1.37-1.64)	0.860
>5 hours/ Do not use	-1.33 (-2.88-0.21)	0.091	-1.09 (-2.92-0.73)	0.241
R ²	0.008		0.048	
You \Tube				
<1 hour/ Do not use	0.76 (-0.35-1.87)	0.178	0.27 (-1.03-1.58)	0.683
1-3 hours/ Do not use	0.45 (-0.67-1.57)	0.433	-0.22 (-1.57-1.13)	0.748
3-5 hours/ Do not use	0.58 (-0.80-1.95)	0.411	-0.27 (-1.89-1.34)	0.738
>5 hours/ Do not use	-0.75 (-2.27-0.76)	0.329	-0.98 (-2.78-0.82)	0.285
R ²	0.006		0.040	
LinkedIn				
<1 hour/ Do not use	0.48 (-0.40-1.36)	0.285	0.99 (-0.11-2.09)	0.078
1-3 hours/ Do not use	-0.18 (-1.91-1.55)	0.838	0.55 (-1.58-2.69)	0.610
>3 hours/ Do not use	2.17 (-0.67-5.01)	0.133	2.40 (-1.08-5.88)	0.177
R ²	0.004		0.047	
Reddit				
<1 hour/ Do not use	-1.70 (-3.26 - -0.13)	0.034	-2.24 (-3.98 - -0.51)	0.011
≥1 hours/ Do not use	0.19 (-1.98-2.35)	0.865	1.42 (-1.50-4.34)	0.341
R ²	0.005		0.050	

(Continued)

Table 5 (Continued).

Variable	Unadjusted Estimate (95% CI)	P-value*	Adjusted Estimate (95% CI)	P-value*
How often do you look up information and updates about COVID-19?				
Rarely/ Not at all	-1.29 (-3.22-0.74)	0.214	-2.13 (-4.36-1.00)	0.060
Occasionally/ Not at all	-0.98 (-2.85-0.90)	0.307	-2.08 (4.16 - -0.01)	0.050
Often/ Not at all	-1.74 (-3.58-0.11)	0.065	-2.99 (-5.03 - -0.95)	0.004
Very often/ Not at all	-0.78 (-2.69-1.14)	0.427	-1.91 (-4.04-0.23)	0.080
R ²	0.007		0.055	
Do you follow influencers on social media for COVID-19 information and updates?				
Yes/ No	0.47 (-0.40-1.34)	0.291	0.21 (-0.77 - -1.19)	0.680
I do not know any influencer/ No	0.63 (-0.42-1.68)	0.241	0.20 (-1.01-1.40)	0.749
R ²	0.002		0.041	
I only share COVID-19 related information from official sources or after validating from the official sources?				
Disagree/ Neither disagree nor agree	2.24 (-0.29-4.77)	0.083	1.34 (-1.54-4.22)	0.362
Strongly disagree/ Neither disagree nor agree	2.51 (-0.43-5.45)	0.094	3.78 (0.36-7.20)	0.030
Agree/ Neither disagree nor agree	0.99 (-0.31-2.30)	0.137	0.67 (-0.85-2.19)	0.389
Strongly agree/ Neither disagree nor agree	1.70 (0.52-2.88)	0.005	1.11 (-0.29-2.50)	0.121
R ²	0.011		0.048	
I share COVID-19 related information because:				
It gives me some sense of satisfaction (Yes/No)	0.79 (-0.13-1.70)	0.093	0.83 (-0.20-1.85)	0.115
R ²	0.003		0.044	
I want to stay socially interactive (Yes/No)	0.29 (-0.74-1.33)	0.579	-0.21 (-1.38-0.96)	0.720
R ²	0.001		0.041	
I have no specific reason (Yes/No)	-1.23 (-2.24 - -0.21)	0.018	-0.89 (-2.05-0.27)	0.131
R ²	0.006		0.044	
I was asked to forward it (Yes/No)	-0.74 (-2.60-1.12)	0.436	-2.05 (-4.19-0.09)	0.060
R ²	0.001		0.045	
I feel responsible to share knowledge (Yes/No)	0.47 (-0.25-1.18)	0.202	0.19 (-0.62-1.01)	0.646
R ²	0.002		0.041	
I wish to stay informed (Yes/No)	-0.44 (-2.13-1.25)	0.606	-0.82 (-2.58-0.95)	0.364
R ²	0.001		0.042	
I am confident in my ability to differentiate between true and false information related to COVID-19?				
Disagree or Strongly disagree/ Neither disagree nor agree	3.02 (1.08-4.96)	<0.001	2.81 (0.49-5.13)	0.018
Agree/ Neither disagree nor agree	1.52 (0.56-2.48)	0.002	1.61 (0.52-2.70)	0.004

(Continued)

Table 5 (Continued).

Variable	Unadjusted Estimate (95% CI)	P-value*	Adjusted Estimate (95% CI)	P-value*
Strongly agree/ Neither disagree nor agree	2.31 (1.30–3.31)	0.002	1.70 (0.56–2.83)	0.003
R ²	0.023		0.056	
When I receive dubious or false COVID-19 related information, I inform the sender or try to correct them				
Disagree/ Neither disagree nor agree	0.32 (–1.13–1.77)	0.662	–0.92 (–2.55–0.71)	0.267
Strongly disagree/ Neither disagree nor agree	–2.43 (–4.81 – –0.06)	0.045	–2.50 (–5.13–0.13)	0.063
Agree/ Neither disagree nor agree	0.63 (0.27–1.53)	0.172	0.35 (–0.69–1.38)	0.509
Strongly agree/ Neither disagree nor agree	1.18 (0.25–2.12)	0.013	0.57 (–0.51–1.64)	0.301
R ²	0.013		0.051	
My knowledge and awareness of health-related issues has increased as a result of the COVID-19 pandemic				
Disagree or Strongly disagree/ Neither disagree nor agree	1.33 (–0.57–3.23)	0.170	0.98 (–1.29–3.25)	0.396
Agree/ Neither disagree nor agree	0.91 (–0.07–1.90)	0.068	0.49 (–0.61–1.60)	0.380
Strongly agree/ Neither disagree nor agree	1.50 (0.45–2.53)	0.005	0.69 (–0.47–1.86)	0.244
R ²	0.008		0.043	

Note: The multiple linear regression model was adjusted for age, sex, education, marital status, nationality, and job.

lead to behavioral changes among individuals, causing them to isolate themselves and protect themselves from infection, thereby decreasing the number of infected people.³²

In the earlier stages of the pandemic (during the survey distribution period), misinformation and disinformation spread was at its peak. Interventions by leading authorities around the globe and international organizations started to appear as the infodemic effect started, especially with vaccine uptake and testing and preventive measures. The UAE's efforts to contain the pandemic and spread awareness were especially impressive, placing it at the top of the list of countries with effective mass-testing and spread awareness was especially remarkable, with effective mass-testing and vaccine coverage.⁷⁰ Globally, governments and corporations have used various means to try and stem the tide of misinformation. Recently, YouTube and Twitter tried to introduce terms and policies regarding content deemed to be COVID-19 and vaccination misinformation. Programs and calls for e-literacy and digital health education are already in place to combat the social media-caused negative impact on knowledge and awareness, which we hope will decrease the negative effect on well-being.⁶⁹

We acknowledge that there are limitations to this study, including the cross-sectional design and online nature of the survey, which may lead to bias. Moreover, other confounding factors may affect well-being scores such as self-esteem, family relations, physical health, and other factors not considered in this study. Additionally, not having a control group of non-social media users for comparison of baseline well-being scores is a limitation to this study and future studies should consider this. As the survey was online, there is potential for more educated, younger, and affluent people with internet access to respond. However, given the nature of the pandemic and the limitations associated with conducting research using more robust methods, the results are helpful for providing baseline data to inform further research investigating the impact of social media on well-being in the future.

Conclusion

This study confirms the importance of authority intervention and guidelines that may be needed to control facets of social media use and reduce the negative impacts on health and well-being. Awareness campaigns and collaborative efforts

between public health authorities and specialists and information technology and communication specialists, are needed. Further studies on the impact of social media during pandemics are needed too to ensure responsible and constructive use of social media. Providing factual, evidence-based information and making them accessible to consumers is highly important to reduce negative impact on the well-being. Public health communities need to learn how to engage the public to make healthy choices while raising public awareness.

Ethics Approval and Informed Consent

The study was approved by the Ethics Committees of the Abu Dhabi University (on May 16, 2020) (CHS-20-05-00014) and was in complete agreement with the Declaration of Helsinki. All participants received information about the study via weblink before starting the questionnaire. Only those who agreed to participate were able to complete the survey.

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Author Contributions

IE conceived the idea and prepared the study design, questionnaire, acquisition of the data, drafting the paper and critically reviewing the article. BS, MG, EB, ES and DEL reviewed the questionnaire. FA analysed the data and presented the tables. All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. Mao R, Liang J, Shen J, et al. Implications of COVID-19 for patients with pre-existing digestive diseases. *Lancet Gastroenterol Hepatol.* 2020;5(5):425–427. doi:10.1016/s2468-1253(20)30076-5
2. Centre for Disease control and Prevention (CDC). Public health response to the initiation and spread of pandemic COVID-19 in the United States, February 24–April 21, 2020. Available from: <https://www.cdc.gov/mmwr/volumes/69/wr/mm6918e2.htm>. Accessed January 24, 2022.
3. Alwan NA, Burgess RA, Ashworth S, et al. Scientific consensus on the COVID-19 pandemic: we need to act now. *Lancet.* 2020;396(10260):e71–e72. doi:10.1016/S0140-6736(20)32153-X
4. Al-Dmour H, Masa'deh R, Salman A, Abuhashesh M, Al-Dmour R. Influence of social media platforms on public health protection against the COVID-19 pandemic via the mediating effects of public health awareness and behavioral changes: integrated model. *J Med Internet Res.* 2020;22(8):e19996. doi:10.2196/19996
5. World Health Organization. Managing the covid-19 infodemic: promoting healthy behaviors and mitigating the harm from misinformation and disinformation. Available from: <https://www.who.int/news/item/23-09-2020-managing-the-covid-19-infodemic-promoting-healthy-behaviours-and-mitigating-the-harm-from-misinformation-and-disinformation>. Accessed January 24, 2022.
6. Carr CT, Hayes RA. Social media: defining, developing, and divining. *Atl J Commun.* 2015;23(1):46–65. doi:10.1080/15456870.2015.972282
7. McGowan BS, Wasko M, Vartabedian BS, Miller RS, Freiherr DD, Abdolrasulnia M. Understanding the factors that influence the adoption and meaningful use of social media by physicians to share medical information. *J Med Internet Res.* 2012;14(5):e117. doi:10.2196/jmir.2138
8. Li L, Zhang Q, Wang X, et al. Characterizing the propagation of situational information in social media during COVID-19 epidemic: a case study on Weibo. *IEEE Trans Comput Soc Syst.* 2020;7(2):556–562. doi:10.1109/TCSS.2020.2980007
9. Su Z, McDonnell D, Wen J, et al. Mental health consequences of COVID-19 media coverage: the need for effective crisis communication practices. *Global Health.* 2021;17(1):4. doi:10.1186/s12992-020-00654-4
10. Ahmad AR, Murad HR. The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: online questionnaire study. *J Med Internet Res.* 2020;22(5):e19556. doi:10.2196/19556
11. Arora T, Grey I, Östlundh L, Lam KBH, Omar OM, Arnone D. The prevalence of psychological consequences of COVID-19: a systematic review and meta-analysis of observational studies. *J Health Psychol.* 2020;1359105320966639. doi:10.1177/1359105320966639

12. Brooks SK, Smith LE, Woodland L, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*. 2020;395(10227):912–920. doi:10.1016/S0140-6736(20)30460-8
13. Cauberghe V, Van Wesenbeeck I, De Jans S, Hudders L, Ponnet K. How adolescents use social media to cope with feelings of loneliness and anxiety during COVID-19 lockdown. *Cyberpsychol Behav Soc Netw*. 2020;24(4):250–257. doi:10.1089/cyber.2020.0478
14. Collinson S, Khan K, Heffernan JM. The effects of media reports on disease spread and important public health measurements. *PLoS One*. 2015;10(11):e0141423. doi:10.1371/journal.pone.0141423
15. Sarah Vieweg ALH, Starbird K, Palen L. Microblogging during two natural hazards events: what twitter may contribute to situational awareness; 2010:1079–1088.
16. Weinstein E. The social media see-saw: positive and negative influences on adolescents' affective well-being. *New Media Soc*. 2018;20(10):3597–3623. doi:10.1177/1461444818755634
17. Mavragani A. Infodemiology and infoveillance: scoping review. *J Med Internet Res*. 2020;22(4):e16206. doi:10.2196/16206
18. Swire-Thompson B, Lazer D. Public health and online misinformation: challenges and recommendations. *Annu Rev Public Health*. 2020;41(1):433–451. doi:10.1146/annurev-publhealth-040119-094127
19. Hernández-García I, Giménez-Júlvez T. Assessment of health information about COVID-19 prevention on the internet: infodemiological study. *JMIR Public Health Surveill*. 2020;6(2):e18717. doi:10.2196/18717
20. Li X, Liu Q. Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic: cross-sectional study on Chinese Netizens. *J Med Internet Res*. 2020;22(10):e19684. doi:10.2196/19684
21. Harris M. Coronavirus fears have inspired shaming and death threats online. This is how public concern turns into harassment. The insider; 2020.
22. Woo H, Cho Y, Shim E, Lee JK, Lee CG, Kim SH. Estimating influenza outbreaks using both search engine query data and social media data in South Korea. *J Med Internet Res*. 2016;18(7):e177. doi:10.2196/jmir.4955
23. Eysenbach G. Infodemiology and infoveillance: framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the Internet. *J Med Internet Res*. 2009;11(1):e11. doi:10.2196/jmir.1157
24. Abi-Jaoude E, Naylor KT, Pignatiello A. Smartphones, social media use and youth mental health. *CMAJ*. 2020;192(6):E136–E141. doi:10.1503/cmaj.190434
25. Karim F, Oyewande AA, Abdalla LF, Chaudhry Ehsanullah R, Khan S. Social media use and its connection to mental health: a systematic review. *Cureus*. 2020;12(6):e8627. doi:10.7759/cureus.8627
26. Escobar Echavarría J, Montoya González LE, Restrepo Bernal D, Mejía Rodríguez D. Cyberbullying and suicidal behavior: what is the connection? About a case]. *Rev Colomb Psiquiatr*. 2017;46(4):247–251. doi:10.1016/j.rcp.2016.08.004
27. Zhong B, Jiang Z, Xie W, Qin X. Association of social media use with mental health conditions of nonpatients during the COVID-19 outbreak: insights from a national survey study. *J Med Internet Res*. 2020;22(12):e23696. doi:10.2196/23696
28. Alradhawi M, Shubber N, Sheppard J, Ali Y. Effects of the COVID-19 pandemic on mental well-being amongst individuals in society- A letter to the editor on "The socio-economic implications of the coronavirus and COVID-19 pandemic: a review". *Int J Surg*. 2020;78:147–148. doi:10.1016/j.ijsu.2020.04.070
29. Burnap P, Williams ML, Sloan L, et al. Tweeting the terror: modelling the social media reaction to the Woolwich terrorist attack. *Soc Netw Anal Min*. 2014;4(1):206. doi:10.1007/s13278-014-0206-4
30. McCauley M, Minsky S, Viswanath K. The H1N1 pandemic: media frames, stigmatization and coping. *BMC Public Health*. 2013;13(1):1116. doi:10.1186/1471-2458-13-1116
31. Tai Z, Sun T. Media dependencies in a changing media environment: the case of the 2003 SARS epidemic in China. *New Media Soc*. 2007;9(6):987–1009. doi:10.1177/1461444807082691
32. Misra AK, Sharma A, Shukla JB. Stability analysis and optimal control of an epidemic model with awareness programs by media. *Biosystems*. 2015;138:53–62. doi:10.1016/j.biosystems.2015.11.002
33. Stip E, Mugaddam FA, Amiri L. Facing confinement, the comfort of whatsapp groups in mental health communities. *Can J Psychiatry*. 2020;706743720949341. doi:10.1177/0706743720949341
34. Mejova Y, Kalimeri K. COVID-19 on Facebook Ads: competing agenda around a public health crisis; June, 2020:22–31.
35. Radwan E, Radwan A, Radwan W. The role of social media in spreading panic among primary and secondary school students during the COVID-19 pandemic: an online questionnaire study from the Gaza Strip, Palestine. *Heliyon*. 2020;6(12):e05807. doi:10.1016/j.heliyon.2020.e05807
36. Beyens I, Pouwels JL, van Driel II, Keijsers L, Valkenburg PM. The effect of social media on well-being differs from adolescent to adolescent. *Sci Rep*. 2020;10(1):10763. doi:10.1038/s41598-020-67727-7
37. 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. *J Travel Med*. 2020;27(3). doi:10.1093/jtm/taaa031
38. Ostic D, Qalati SA, Barbosa B, et al. Effects of social media use on psychological well-being: a mediated model. *Front Psychol*. 2021;12:2381. doi:10.3389/fpsyg.2021.678766
39. Apuke OD, Omar B. Modelling the antecedent factors that affect online fake news sharing on COVID-19: the moderating role of fake news knowledge. *Health Educ Res*. 2020;35(5):490–503. doi:10.1093/her/cyaa030
40. Pennycook G, McPhetres J, Zhang Y, Lu JG, Rand DG. Fighting COVID-19 misinformation on social media: experimental evidence for a scalable accuracy-nudge intervention. *Psychol Sci*. 2020;31(7):770–780. doi:10.1177/0956797620939054
41. Wongkoblap A, Vadillo MA, Curcin V. Researching mental health disorders in the era of social media: systematic review. *J Med Internet Res*. 2017;19(6):e228. doi:10.2196/jmir.7215
42. Gao J, Zheng P, Jia Y, et al. Mental health problems and social media exposure during COVID-19 outbreak. *PLoS One*. 2020;15(4):e0231924. doi:10.1371/journal.pone.0231924
43. Sibai AM, Chaaya M, Tohme RA, Mahfoud Z, Al-Amin H. Validation of the Arabic version of the 5-item WHO well being index in elderly population. *Int J Geriatr Psychiatry*. 2009;24(1):106–107. doi:10.1002/gps.2079
44. World Health Organization. Wellbeing measures in primary health care/The Depcare Project; 1998. Available from: https://www.euro.who.int/__data/assets/pdf_file/0016/130750/E60246.pdf. Accessed January 24, 2022.

45. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res.* 2004;6(3):e34. doi:10.2196/jmir.6.3.e34
46. Survey Monkey Inc [homepage]. Available at: <https://www.surveymonkey.com/>. Accessed June 24, 2020.
47. UN High Commissioner for Refugees (UNHCR). Assessing mental health and psychosocial needs and resources - Toolkit for humanitarian settings; 2012. Available from: <https://www.refworld.org/docid/55b889c34.html>. Accessed January 23, 2021.
48. Child Outcomes Research Consortium (CORC). The World Health Organization Five Well-Being Index (WHO-5). Available from: <https://www.corc.uk.net/outcome-experience-measures/the-world-health-organisation-five-well-being-index-who-5/>. Accessed February 02, 2020.
49. Topp CW, Østergaard SD, Sondergaard S, Bech P. The WHO-5 well-being index: a systematic review of the literature. *Psychother Psychosom.* 2015;84(3):167–176. doi:10.1159/000376585
50. Schønning V, Hjetland GJ, Aarø LE, Skogen JC. Social media use and mental health and well-being among adolescents – a scoping review. *Front Psychol.* 2020;11:1949. doi:10.3389/fpsyg.2020.01949
51. Figueiras MJ, Ghorayeb J, Coutinho MVC, Marôco J, Thomas J. Levels of trust in information sources as a predictor of protective health behaviors during COVID-19 pandemic: a UAE cross-sectional study. *Front Psychol.* 2021;12:2780. doi:10.3389/fpsyg.2021.633550
52. Jung Oh H, Hove T, Paek H-J, Lee B, Lee H, Kyu Song S. Attention cycles and the H1N1 pandemic: a cross-national study of US and Korean newspaper coverage. *Asian J Commun.* 2012;22(2):214–232. doi:10.1080/01292986.2011.642395
53. Fung TK, Namkoong K, Brossard D. Media, social proximity, and risk: a comparative analysis of newspaper coverage of Avian Flu in Hong Kong and in the United States. *J Health Commun.* 2011;16(8):889–907. doi:10.1080/10810730.2011.561913
54. Paek HJ, Oh SH, Hove T. How fear-arousing news messages affect risk perceptions and intention to talk about risk. *Health Commun.* 2016;31(9):1051–1062. doi:10.1080/10410236.2015.1037419
55. Zhao N, Zhou G. Social media use and mental health during the COVID-19 pandemic: moderator role of disaster stressor and mediator role of negative affect. *Appl Psychol Health Well Being.* 2020;12(4):1019–1038. doi:10.1111/aphw.12226
56. Cheikh Ismail L, Mohamad MN, Bataineh MF, et al. Impact of the coronavirus pandemic (COVID-19) lockdown on mental health and well-being in the United Arab Emirates. *Front Psychiatry.* 2021;12:265. doi:10.3389/fpsyg.2021.633230
57. Ali KF, Whitebridge S, Jamal MH, Alsafy M, Atkin SL. Perceptions, knowledge, and behaviors related to COVID-19 among social media users: cross-sectional study. *J Med Internet Res.* 2020;22(9):e19913. doi:10.2196/19913
58. Bathina KC, Ten Thij M, Valdez D, Rutter LA, Bollen J. Declining well-being during the COVID-19 pandemic reveals US social inequities. *PLoS One.* 2021;16(7):e0254114. doi:10.1371/journal.pone.0254114
59. Abo-Ali EA, Al-Rubaki S, Lubbad S, et al. Mental well-being and self-efficacy of healthcare workers in Saudi Arabia during the COVID-19 pandemic. *Risk Manag Healthc Policy.* 2021;14:3167–3177. doi:10.2147/RMHP.S320421
60. Wright HM, Griffin BJ, Shoji K, et al. Pandemic-related mental health risk among front line personnel. *J Psychiatr Res.* 2021;137:673–680. doi:10.1016/j.jpsychires.2020.10.045
61. De Brier N, Stroobants S, Vandekerckhove P, De Buck E. Factors affecting mental health of health care workers during coronavirus disease outbreaks (SARS, MERS & COVID-19): a rapid systematic review. *PLoS One.* 2020;15(12):e0244052. doi:10.1371/journal.pone.0244052
62. Saddik B, Elbarazi I, Temsah MH, et al. Psychological distress and anxiety levels among health care workers at the height of the COVID-19 pandemic in the United Arab Emirates. *Int J Public Health.* 2021;66:1604369. doi:10.3389/ijph.2021.1604369
63. Ajab S, Adam B, Al Hammadi M, et al. Occupational health of frontline healthcare workers in the United Arab Emirates during the COVID-19 pandemic: a snapshot of summer 2020. *Int J Environ Res Public Health.* 2021;18(21):11410. doi:10.3390/ijerph182111410
64. González-Padilla DA, Tortolero-Blanco L. Social media influence in the COVID-19 Pandemic. *Int Braz J Urol.* 2020;46:120–124.
65. Chew C, Eysenbach G. Pandemics in the age of Twitter: content analysis of Tweets during the 2009 H1N1 outbreak. *PLoS One.* 2010;5(11):e14118. doi:10.1371/journal.pone.0014118
66. Del Rio C, Guarner J. The 2009 influenza A (H1N1) pandemic: what have we learned in the past 6 months. *Trans Am Clin Climatol Assoc.* 2010;121:128–140.
67. Chaabane S, Chaabna K, Abraham A, Mamtani R, Cheema S. Physical activity and sedentary behaviour in the Middle East and North Africa: an overview of systematic reviews and meta-analysis. *Sci Rep.* 2020;10(1):9363. doi:10.1038/s41598-020-66163-x
68. Bhanot D, Singh T, Verma SK, Sharad S. Stigma and discrimination during COVID-19 pandemic. *Front Public Health.* 2020;8:577018. doi:10.3389/fpubh.2020.577018
69. Xu J, Sun G, Cao W, et al. Stigma, discrimination, and hate crimes in Chinese-speaking world amid Covid-19 pandemic. *Asian Journal of Criminology.* 2021;16(1):51–74. doi:10.1007/s11417-020-09339-8
70. Al-Hosani F, Al-Mazrouei S, Al-Memari S, Al-Yafei Z, Paulo MS, Koornneef E. A review of COVID-19 mass testing in the United Arab Emirates. *Front Public Health.* 2021;9:528. doi:10.3389/fpubh.2021.661134