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Impact of mass and social media on psychobehavioural responses to COVID-19: A survey of medical university students in Fujian, China during the downward trend of COVID-19

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Abstract

Background: Overwhelmed COVID-related information swirling about on mass and social media since the novel coronavirus (COVID-19) epidemic first broke out in Wuhan, China, in late December 2019.

Objective: This study assessed the psychobehavioural responses to the COVID-19 outbreak and examined their associations with mass and social media exposure.

Methods: A cross-sectional study among university students from the Fujian Medical University, Fuzhou, China, was conducted from 6 to 22 April 2020.

Results: A total of 2,086 complete responses were received. In multivariable analyses, four constructs of the Health Belief Model (HBM), namely, higher perception of susceptibility (OR = 1.44; 95% CI 1.07–1.94), severity (OR = 1.32; 95% CI 1.10–1.59), self-efficacy (OR = 1.61; 95% CI 1.21–2.15), and perceived control or intention to carry out prevention measures (OR = 1.32; 95% CI 1.09–1.59), were significantly associated with a higher mass media exposure score, whereas only three constructs, namely, higher perception of severity (OR = 1.43; 95% CI 1.19–1.72), self-efficacy (OR = 1.85; 95% CI 1.38–2.48) and perceived control or intention to carry out prevention measures (OR = 1.32; 95% CI 1.08–1.58), were significantly associated with a higher mass media exposure score. Lower emotional consequences and barriers to carry out prevention measures were also significantly associated with higher mass and social media exposure. The finding on anxiety levels revealed that 38.1% (95% CI 36.0–40.2) of respondents reported moderate-to-severe anxiety. A lower anxiety level was significantly associated with higher mass and social media exposure in the univariable analyses; however, the associations were not significant in the multivariable analyses.

Conclusions: Higher exposure of both mass and social media related to the COVID-19 epidemic increase positive attitudes in all the domains of the HBM. Emotional consequences and behavioural prevention barriers also reduced with higher use of both mass and social media. In essence, both mass and social media are useful means of getting health messages across and contribute to the betterment of psychobehavioural responses to COVID-19 to ensure the declining infection trend continues.

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Preprint JMIR Publications

Impact of mass and social media on psychobehavioural responses to COVID-19: A survey of medical university students in Fujian, China during the downward trend of COVID-19

Abstract

Background: There was an overwhelmed COVID-related information surfacing through mass

and social media in China during the novel coronavirus (COVID-19) epidemic. To date, there is limited evidence on how the infodemic may have the potential to influence psychobehavioural responses to the crisis.

Objective: This study assessed the psychobehavioural responses to the COVID-19 outbreak and examined their associations with mass and social media exposure.

Methods: A cross-sectional study among medical university students from the Fujian Medical University, Fuzhou, China, was conducted from 6 to 22 April 2020.

Results: A total of 2,086 complete responses were received. In multivariable analyses, four constructs of the Health Belief Model (HBM), namely, higher perception of susceptibility (OR = 1.44; 95% CI 1.07–1.94), severity (OR = 1.32; 95% CI 1.10–1.59), self-efficacy (OR = 1.61; 95% CI 1.21–2.15), and perceived control or intention to carry out prevention measures (OR = 1.32; 95% CI 1.09–1.59), were significantly associated with a higher mass media exposure score, whereas only three constructs, namely, higher perception of severity (OR = 1.43; 95% CI 1.19–1.72), self-efficacy (OR = 1.85; 95% CI 1.38–2.48) and perceived control or intention to carry out prevention measures (OR = 1.32; 95% CI 1.08–1.58), were significantly associated with a higher social media exposure score. Lower emotional consequences and barriers to carry out prevention measures were also significantly associated with higher mass and social media exposure. The finding on anxiety levels revealed that 38.1% (95% CI 36.0–40.2) of respondents reported moderate-to-severe anxiety. A lower anxiety level was significantly associated with higher mass and social media exposure in the univariable analyses; however, the associations were not significant in the multivariable analyses.

Conclusions: In essence, both mass and social media are useful means of getting health messages across and contribute to the betterment of psychobehavioural responses to COVID-19 to ensure the declining infection trend continues. Findings imply the importance of the credibility of information shared in the mass and social media as well as a viable strategy to counter misinformation during a pandemic.

Keywords: psychobehavioural; COVID-19; mass media; social media; China

Introduction

Both mass and social media have a prominent role to play in modern society following the rapid dispersion of Internet use. In China, there were approximately 688 million Internet users, of whom 75.1% were aged 10–39 years [1]. With an increasing sense of health among the general public, the popularity of social media as a means of acquiring health-related information has grown in recent years [2,3]. Of note, social media tools are readily accessible on the Internet and have become even easier to access via applications on smartphones. As a result, the role of social media as a pathway to news is overwhelmingly popular [4]. Of concern, social media users may be exposed to untrustworthy news or information of questionable accuracy. Inaccurate information acquisition could have detrimental effects, as a study revealed that passive acquisition through social media, particularly the WeChat moments, was an important medium for health information acquisition among college students in China [2]. Of note, the WeChat is the most popular social media platform in China that includes instant messaging

and service platforms to carry out payment, marketing, and promotion activities. The WeChat moments is an interactive platform that allows users to share information/news articles, photos, and video. Moreover, almost 60% of social media users admitted that Internet health information impacted their health management strategy [5]. Mass media, in contrast, provides more credible information and has been used as a means of communication of scientifically accurate information about health more than social media. Of advantage, mass media was found to influence health behaviours and promote health behaviour change in the public [6].

In late December 2019, an unusual pneumonia surfaced in Wuhan, China, and rapidly spread across the globe. As of the end of April, the overall number of the novel coronavirus (COVID-19) cases worldwide increased to 2,878,196 and the death count reached 198,668 [7]. In China, after over 3 months of battling the new coronavirus, the country has managed to bring the outbreak under control. Nonetheless, the community at large in China remains vulnerable and prevention from rebound is essential following the ease of lockdown. During the early phase and the peak of the COVID-19 epidemic in China, various issues surrounding mental distress among the general public caught the attention of researchers. Studies showed that a great proportion of the general public was found to have severe depressive symptoms, even during the early phase of the outbreak [8,9]. It is important to address mental health issues during a disease outbreak, as it may result in weakening in social and other areas of functioning, including an impairment in prevention measures [10,11]. Of important note, psychobehavioural responses have been understudied after the cessation of the outbreak of COVID-19 in China, and this warrants attention. The lay public's psychobehavioural responses during a disease outbreak play an equally important role in bringing the outbreak under control [10]. Hence, to avoid a resurgence of infections, investigation into the preventive behavioural responses in addition to the psychological well-being of the public post-COVID-19 desire great attention. Attitude is a key factor that determines behavioural intention. Health Belief Model (HBM) has been used as the theoretical framework to explain health behaviours of individuals. It includes concepts namely perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy [12,13]. Adopting the HBM to explain phsychobehavioral changes during the COVID-19 outbreak is essential.

A study in China, which was conducted during the early phase of the outbreak, found a high prevalence of mental health problems among the public, which positively associated with frequent exposure to social media [14]. To the best of our knowledge, little has been studied regarding social or mass media exposure now that China has entered the downward trend of transmission of COVID-19. Thus, investigation of exposure to both mass and social media and linking the exposure of both media to the psychobehavioural health outcomes of the public is essential. Accurate information seeking during the COVID-19 outbreak has important implications for health-related behaviour change and may strengthen infection prevention and control. As the traditional mass media is message-driven, in contrast, social media is conversation-driven, and during the COVID-19 outbreak, it is unclear which form of media influences the public and shapes their psychobehavioural responses. Therefore, this study aimed to 1) assess the level of mass and social media exposure related to COVID-19 and 2) identify the association between both media exposure with Health Belief Model (HBM) constructs, psychological and behavioural responses, and anxiety levels.

Methods

Study participant and study design

An anonymous Internet-based, cross-sectional, open survey was performed from 6 to 22 April 2020. Participants were all students enrolled in Fujian Medical University, Fuzhou, China. Convenience sampling was conducted to recruit subjects for this study. The link to the survey questions was sent to administrators or lecturers of all the departments to be disseminated to all the registered students in the university. In an attempt to reach comprehensive recipient coverage, the link to the survey was also sent to students' social media groups or forums. All respondents were informed that their participation was voluntary and consent was implied through their completion of the questionnaire. No incentives were provided to the study participants.

The questionnaire was developed in English, then translated into Chinese. Local experts performed face validation on the content of the questionnaire. The online questionnaire was subsequently pilot tested for readability and clarity of the items on 30 participants from the general public. A minor revision was made based on the results of the pilot study. The revised questionnaire was further pre-tested before field administration. The survey consisted of questions that assessed demographic background, mass media and social media exposure, constructs from the HBM, psychological and behavioural responses, and anxiety levels associated with the COVID-19 outbreak.

Instruments

Mass media and social media exposure

Questions on mass media (8 items) and social media (10 items) exposure consist of questions that queried participants about types of information acquisition. The response options were also scored on a 4-point Likert scale: 0, never; 1, rarely; 2, sometimes; and 3, often. The scores were summed, with higher scores representing higher usage. The possible score range for mass media exposure and social media exposure was 0–24 and 0–30, respectively. The participants were noted that the term mass media is used in the context of both traditional and online mass media (written or broadcast), including television, radio, advertising, newspapers, magazines, and newsfeeds. In contrast, social media refers to websites and applications such as WeChat, Weibo, and Youku, which are among the most commonly used social media platforms in China. Of note, China's Weibo shares similar features as Twitter, where it allows users to share content up to a 140-Chinese-character limit. On the other hand, Youku, often called the Youtube of China, is an online video and streaming service platform.

Health Belief Model constructs

Questions related to HBM constructs include perceived severity, perceived susceptibility, perceived efficacy, and perceived control or intention [12,13,15]. Perceived severity was measured using a one-item question (How serious do you think COVID-19 is?) on a 4-point scale (*not at all serious* to *very serious*). Perceived susceptibility was a one-item question (What do you think are your chances of getting COVID-19?) on a 4-point scale (not at all to very large chance). Perceived efficacy was measured using a one-item question (Do you think that you will

manage to carry out prevention measures currently recommended by the authorities?) on a 4-point scale (certainly cannot to most certainly yes). Perceived control or intention was measured using a one-item question (Would you carry out prevention measures currently recommended by the authorities?) on a 4-point scale (certainly cannot to most certainly yes).

Psychological and behavioural responses

Psychological responses measure the emotional consequences of the COVID-19 outbreak. The emotional consequences consist of questions about feelings of fear, avoidance, keeping a secret, embarrassment, and stigma associated with COVID-19 (five items). Optional answers were on a 4-point Likert scale, with the items scored as 1 (strongly disagree), 2 (disagree), 3 (agree), or 4 (strongly agree). The possible total emotional consequences score ranged from 5 to 20, with higher scores representing higher levels of emotional consequences.

Behavioural responses measures preventive barriers consists of five sections (eight items) that comprise questions about personal protection (three items), cough etiquette (three items), and contact precautions (two items). The question queried participants' level of difficulties in practising physical prevention measures. The response option was on a 4-point Likert scale, with the items scored as 1 (very easy), 2(easy), 3 (difficult), or 4 (very difficult). The possible total physical prevention barriers score ranged from 8 to 32, with higher scores representing higher difficulty levels of physical prevention.

Anxiety

Anxiety was measured using the six-item state version of the State-Trait Anxiety Inventory (STAI-6) [16,17]. The respondents rated the frequency of experiencing six emotional states, namely, being calm, tense, upset, relaxed, content and worried, concerning the current COVID-19 outbreak. A 4-point scale was used (1 = not at all, 2 = somewhat, 3 = moderately, and 4 = very much). The scores on the three positively worded items were reverse-coded. The total summed scores were prorated (multiplied by 20/6) to obtain scores that were comparable with those from the full 20-item STAI (giving a range from 20 to 80) [17]. A cut-off score of 44 was used to indicate moderate-to-severe symptoms [10,18].

Statistical Analysis

The reliability of the scales used was evaluated by assessing the internal consistency of the items representing the scores. The mass media and social media exposure items had reliability (Cronbach's α) of 0.958 and 0.940, respectively. The emotional consequences and prevention barrier behaviour items had reliability (Cronbach's α) of 0.794 and 0.840, respectively. The reliability computed for the STAI-6 items in the assessment of anxiety was 0.793.

Multivariable logistic regression analysis, using a simultaneous forced-entry method, was used to determine the factors influencing mass media and social media exposure. All variables found to have a statistically significant association (two-tailed, P <.05) in the univariable analyses were entered into the multivariable logistic regression analyses. Odds ratios (ORs), 95% confidence intervals (95% CIs), and P values were calculated for each independent variable. All statistical analyses were performed using the Statistical Package for the Social Sciences, version 20.0 (IBM Corp., Armonk, NY, USA). The level of significance was set at P< .05.

Ethical considerations

This research was approved by the Research Ethics Committee of the Fujian Medical University. Written informed consent was not acquired from the participants. The committee approved that consent was implied through completion and submission of the survey link.

Results

A total of 2,086 complete responses were received. Figure 1 showed the trend of number of daily new cases in China since the beginning of the COVID-19 [19] and the duration of our data collection. As shown in Figure 1, the data collection was carried out past the peak of the COVID-19 outbreak.

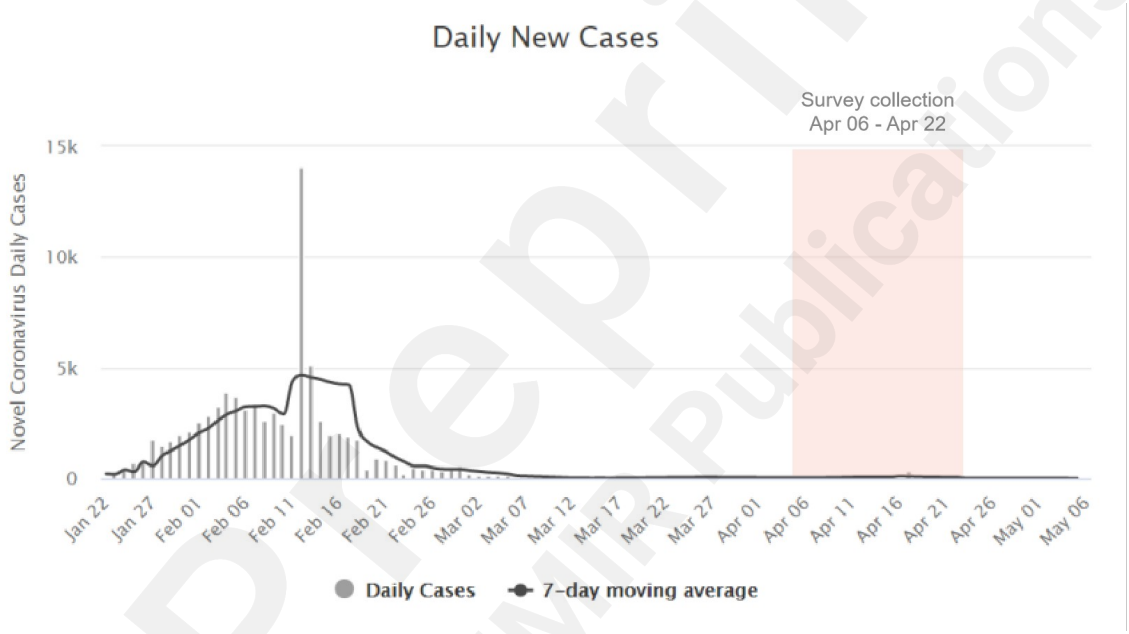

Figure 1 The trend of daily new cases in China since the beginning of the COVID-19 and the duration of our data collection

As shown in the first and second columns of Table 1, slightly over half of the participants were 18–20 years old (57.4%). Two-thirds of the birthplaces of participants were in the rural areas (65.5%). Most of the participants reported that their annual family income was below CNY50,000 (46.9%) and CNY50,000–120,000 (37.2%). The distribution by grades was approximately equal.

Mass media and social media exposure

Figure 2 shows the proportion of *often* responses and its corresponding 95% CIs for the usage of mass and social media.The majority rely on mass media for staying up-to-date with information about the number of confirmed COVID-19 cases or deaths (58.7%), followed by information seeking related to prevention (57.7%), transmission (54.9%), symptoms (53%), and risk (48.5%) associated with COVID-19. Most common exposure to social media was information seeking about prevention (51.1%), transmission (50.2%), and symptoms (48.7%) of COVID-19.

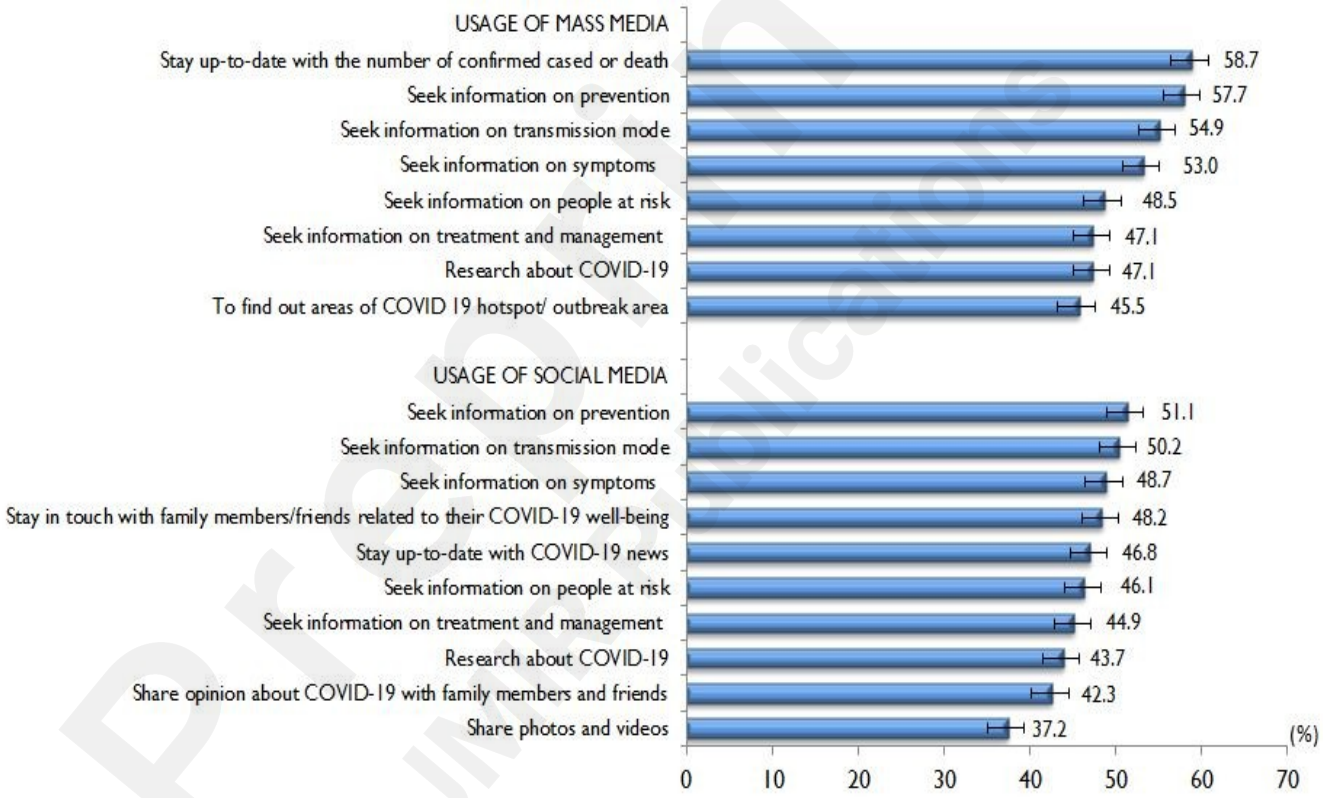

Figure 2 Proportion of 'often' usage of mass media and social media (N=2086)

The mean and standard deviation (SD) for the mean total mass media exposure was 19.3 (SD ± 4.9; range 0 to 24) out of a possible score of 24. The median was 20.0 (interquartile range [IQR] 16.0 – 24.0). The total mass media exposure scores were categorized as a score of 20 to 24 or 0 to 23, based on the median split; as such, a total of 1,113 (53.5%; 95% CI 51.2 – 55.5) were categorized as having a score of 20 to 24 and 973 (46.6%; 95% CI 44.5 – 48.8) had a score of 0 to 23. The mean and SD for the mean total social media exposure was 23.2 (SD ± 5.8; range 0 to 30) out of a possible score of 30. The median was 23.0 (IQR 20.0 – 29.0). The total social media exposure scores were categorized as a score of 23 to 30 or 0 to 22, based on the

median split; as such, a total of 1,096 (52.5%; 95% CI 50.4 – 54.7) were categorized as having a score of 23 to 30 and 990 (47.5%; 95% CI 45.3 – 49.6) had a score of 0 to 22.

Health Belief Model constructs

The vast majority (74.7%, 95% CI 72.8–76.5) reported certainly yes/probably yes in perception of susceptibility of getting COVID-19 infection. A relatively lower proportion perceived COVID-19 as very serious (47.2%, 95% CI 45.1–49.4). The majority also reported certainly yes (72.2%, 95% CI 70.2–74.1) in self-efficacy to carry out recommended prevention measures. A relatively lower proportion reported certainly yes (62.2%, 95% CI 60.1–64.3) in intention to carry out recommended prevention measures

Psychological and behavioural responses

Figure 3 shows the proportion and the corresponding 95% CI of responses for items on emotional consequences. As shown in the figure, nearly half reported strongly agree/agree with regard to avoidance behaviour (46.1%). The proportion of strongly agree/agree for embarrassment and fear was reported by 21.2% and 17.9%, respectively. The mean and SD for the total emotional consequences score was 9.4 (SD ± 2.7; range 5 to 20). The median was 10 (IQR 7 to 11). The total emotional consequences scores were categorized as a score of 10–20 or 5–9, based on the median split; as such, a total of 1,082 (51.9%; 95% CI 49.7 – 54.0) were categorized as having a score of 10 to 20 and 1,004 (48.1%; 95% CI 46.0 – 50.3) were categorized as having a score of 5 to 9.

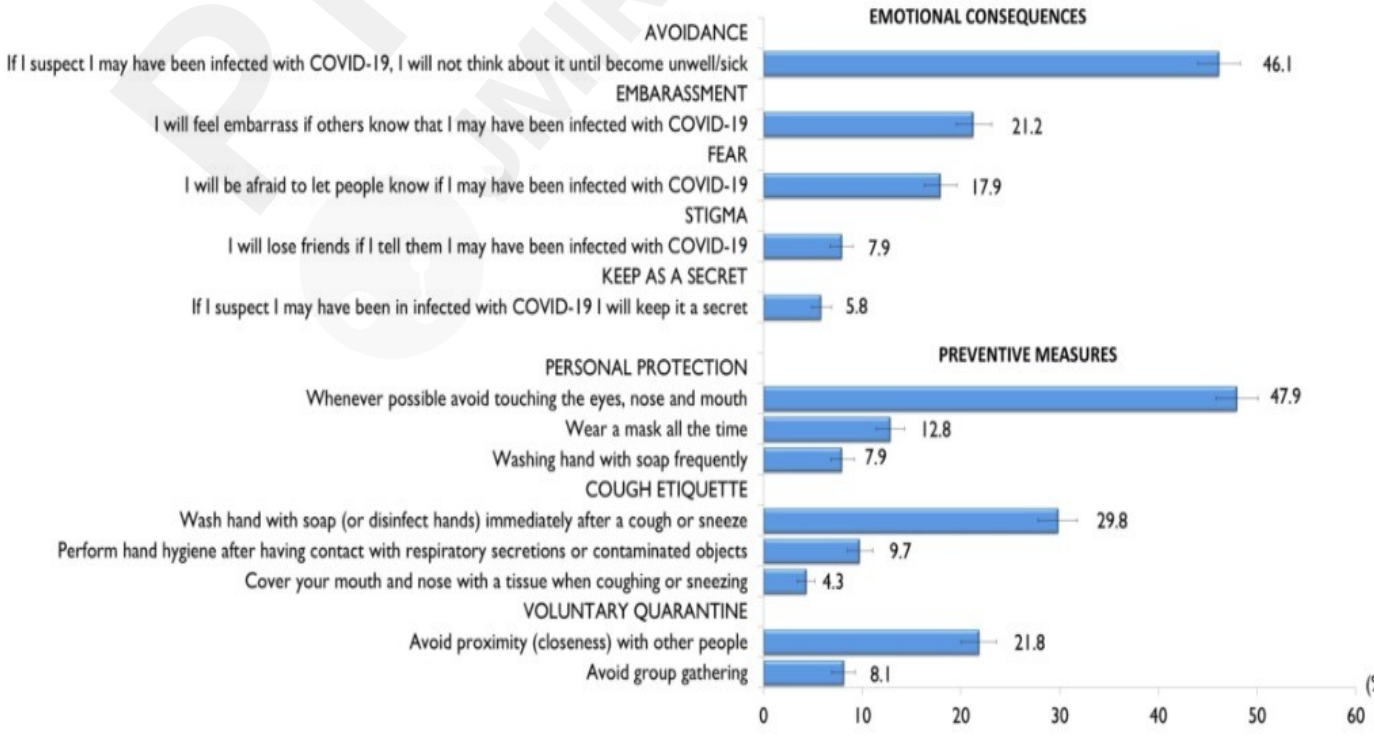

Figure 3 Proportion of 'agree/strongly agree' in emotional consequences and 'difficult/very difficult' in carrying out preventive measures (N=2086)

The proportions of 'difficult/very difficult' responses and the corresponding 95% CIs for difficulties in carrying out preventive measures are also shown in Figure 3. difficulties in carrying out preventive measures. The greatest difficulty reported was avoiding touching the eyes, nose and mouth (47.9%). Difficulties in avoiding proximity with other people and wearing a mask all the time was also reported by 21.8% and 12.8%, respectively. The mean and standard deviation (SD) for the total barriers to carry out preventive measure score was 15.0 (SD ± 3.7; range 8 to 32). The median was 16 (IQR 12 to 17). The total barriers to carry out preventive measure score were categorized as a score of 16–32 or 8–15, based on the median split; as such, a total of 1,100 (55.7%; 95% CI 50.6 – 54.9) were categorized as having a score of 16 to 32 and 986 (47.3%; 95% CI 45.1 – 49.4) were categorized as having a score of 8 to 15.

Anxiety

The mean and SD for the overall anxiety score was 40.4 (SD ± 10.8; range 20 to 80). Using a cut-off score of 44 for the STAI score, a total of 38.1% (n=795) (95% CI 36.0–40.2) of the participants reported moderate-to-severe anxiety (score of 44–80). By demographics, participants in the age group 18–20 years (39.8%) reported the highest proportion with moderate-to-severe anxiety, followed by 21–22 years (37.8%) and 23–29 years (27.4%) (Chi square [χ^2] 10.027, df = 2, P = .007). There was a gradual decrease in the proportion of moderate-to-severe anxiety by grades, whereby 41.4% of participants of grade 1 reported moderate-to-severe anxiety compared to 40.0% among grade 2, 39.8% among grade 3, and only 25.6% among grade 4 (χ^2 = 26.198, df = 3, P < .001).

Influence of mass and social media on psychobehavioural responses

As shown in Table 1, multivariable regression analysis of factors influencing a higher score of mass media exposure showed significant associations with all the HBM constructs. Higher perception of severity (OR = 1.33; 95% CI 1.10–1.60), self-efficacy (OR = 2.03; 95% CI 1.64–2.52), and perceived control or intention to carry out prevention measures (OR = 1.29; 95% CI 1.07–1.56) were significantly associated with a higher mass media exposure score. Lower emotional consequences (OR = 1.51; 95% CI 1.25–1.83) and barriers to carry out preventive measures (OR = 1.50; 95% CI 1.26–1.84) were also significantly associated with a higher mass media exposure score.

Multivariable regression analysis of factors influencing a higher score of social media exposure showed significant associations with three of the HBM constructs. Higher perception of severity (OR = 1.41; 95% CI 1.17–1.69), self-efficacy (OR =

2.01; 95% CI 1.67–2.58), and perceived control or intention to carry out prevention measures (OR = 1.27; 95% CI 1.05–1.53) were significantly associated with a higher social media exposure score. Likewise, lower emotional consequences (OR = 1.50; 95% CI 1.24–1.67) and barriers to carry out preventive measures (OR = 1.39; 95% CI 1.15–1.67) were also significantly associated with a higher social media exposure score.

A lower anxiety score was significantly associated with higher mass and social media exposure in the univariable analyses; however, the associations were not significant in the multivariable analyses.

Discussion

Principal Results

This study assessed both mass and social media exposure related to COVID-19 and investigated the association between media exposure and HBM constructs, psychological and behavioural responses, and anxiety levels. This study targeted university students, as university students are among the highest users of the Internet and social media [20]. The study being conducted when the country was in the downturn of the COVID-19 outbreak has the advantage of identifying detrimental psychobehavioural factors to provide insight for interventions to prevent a resurgence of infections. Of note, during the data collection period, the nationwide lockdown and movement control have started to ease; nevertheless, schools and universities in China have not yet reopened.

The high mean total score of both mass and social media exposure implies that university students have high exposure in both mass media and social media during the COVID-19 outbreak. This finding replicates evidence from research across the globe, indicating the high use of online media (particularly social media) among the younger generation and specifically university students [21-24]. In this study, we also found that university students were exposed to equal COVID-19-related information from both mass and social media. Both mass and social media were equally used as information sources for the prevention of infection, symptoms, risk, and mode of transmission.

On a positive note, despite the country being in the downturn of the COVID-19 outbreak, the study participants showed a high perceived risk of COVID-19 infection. However, a relatively lower perception of severity of COVID-19 infection was observed. Many also reported high self-efficacy in carrying out recommended prevention measures. During the early phase of the outbreak, the country carried out aggressive public health interventions, such as early detection of cases, contact tracing, and population behavioural change, which has been reported to have contributed enormously to containing the epidemic [25]. The positive psychobehavioural responses found in this study indicate the country population

behavioural change interventions have brought about positive behavioural as well as attitudinal changes up until the present time, which is reflected in the success in curbing the spread of the virus to the wider community as observed in a continuous slowdown in COVID-19 cases in China.

The study also found an overall low level of emotional consequences among the study participants after the off-peak of COVID-19 outbreak, as shown in the low mean value of the total emotional consequences score. Despite a low level of emotional consequences found, it should be noted that continuous mitigating the emotional well-being of the public during an infectious disease outbreak is important in controlling transmission [26]. In the severe acute respiratory syndrome (SARS) epidemic, persons who are feared and stigmatized may delay seeking care and remain in the community undetected. Also, a noteworthy finding is that the most prominent emotional consequence found was avoidance behaviour, as it was reported by nearly half of the study participants. It is important to note that cognitive avoidance contributes to a delay in taking precautions to prevent the spread of COVID-19. The implication of this is that, during the downturn of the outbreak, the public enlightenment on prompt action and immediate seeking of medical care upon suspected infection with COVID-19 is still needed. Likewise, this study also found a low difficulty in carrying out preventive measures. Also, another noteworthy finding is that the most prominent difficulty in carrying out preventive measures found was avoiding touching the eyes, nose, and mouth, with nearly half reporting having had this difficulty. The importance of refraining from touching the eyes, nose, and mouth with unwashed hands in prevention of transmission of COVID-19 has been noted [27] As habitual face-touching behaviour has been commonly reported [28], thus improving hand hygiene compliance should be encouraged to avoid this route of transmission. Public health interventions to promote and encourage desirable hand-hygiene-compliant behaviors are crucial although the coronavirus outbreak was largely under control.

During the early phase of the COVID-19 outbreak, over half (53.8%) of the general public in China reported the psychological impact of the outbreak as moderate or severe [8]. In this study, slightly over one-third (38.1%) of the university students reported moderate-to-severe anxiety. Although relatively lower anxiety levels were observed after the peak of the epidemic, with over one-third reporting moderate-to-severe anxiety, implies that the COVID-19 outbreak is still spurring fear on some segments of society. In the case of the Ebola outbreak, anxiety and depression were still prevalent 1 year after the outbreak, especially among those who had been in quarantine and witnessed death associated with the disease [29]. Findings from this study imply that anxiety associated with the COVID-19 outbreak deserves special attention among university students. Therefore, it is suggested that continuous assessment and monitoring of COVID-19-associated mental health issues when the university students resume their studies on the campus is essential. Mental health service provision or psychological intervention services to help students who experience loss of family members or friends related to COVID-19 should be encouraged in all universities in China, especially in Wuhan, China's

coronavirus epicentre. Furthermore, the study also found that younger university students were more vulnerable to moderate-to-severe anxiety, warranting higher attention among the university authorities to monitor the mental well-being of these students.

The results of the multivariate analyses of this study provide evidence of the important role of both mass and social media in shaping individual health beliefs using the HBM constructs. High mass media exposure was associated with having higher perception of severity and higher perceived control or intention to carry out prevention measures. Similarly, social media exposure shapes individual health beliefs using the HBM constructs. However, high social media exposure was associated with all the HBM constructs investigated, except the perception of risk.

Previous reports have noted that emotional consequences such as fear, stigma and discrimination during the COVID-19 outbreak among the people in China were fuelled by misinformation and unfounded rumours [30]. In our study, multivariate analyses revealed higher mass and social media exposure were also associated with lower emotional consequences, namely, perception of avoidance, embarrassment, fear, and keeping infection a secret. This perhaps implies our study participants were exposed to credible and accurate information from both mass and social media, and hence not negatively impacted. Of note, the Chinese government implemented viable strategies to counter misinformation and fake news during the pandemic such as immediate actions removing fake news in the media and strict penalties for offenders.

A more positive note was that the behavioural influence of both mass and social media were also evident in this study. Higher mass and social media exposure were also associated with lower barriers to carrying out prevention practices. Findings imply the importance of continuously providing the public with accurate and credible information through mass and social media to enhance emotional well-being and prevention behaviours. It is also vital for media authorities to ensure the credibility of information shared in the mass and social media during the infectious pandemic to elevate negative psychological impact and enhance prevention behaviours. It has been suggested that quick and targeted intervention oriented to delegitimize the sources of fake information in the media is important to reduce their negative consequences [31]. As such, the findings of this study provide insights into the importance of government authorities in countries currently affected by COVID-19 pandemic to develop prompt strategies to counter misinformation.

In short, the findings of this study suggest that both mass and social media are useful means of getting health messages across and contribute to the betterment of psychobehavioural responses to COVID-19. Although traditionally the trustworthiness and authenticity of information sourced from social media in relation to mass media has been an issue of concern, this study showed otherwise. Both mass and social media contributed similarly to favourable psychobehavioural responses to COVID-19.

Interesting, the univariable analyses also observed that both high levels of mass and social media usage were significantly associated with lower anxiety levels. However,, the association was not significant in the multivariable analyses. Our finding is contradicting the recent finding that reported a high prevalence of mental health problems among the public in China, which was positively associated with frequent exposure to social media [14]. Of note, our study participants were medical and health sciences students, and this perhaps implies that they were more proficient at identifying and consuming credible information on social media than the general public. In addition, our study has also demonstrated that those medical and health sciences student at higher exposure of mass and social media tend to have lower negative emotional consequences and fewer barriers to carry out prevention measures, which might partly contribute to their lower anxiety level. Thus, their higher social media usage does not result in a higher level of mental health problems. This possibly suggests that the proper use of social media for information purposes is beneficial is shaping psychological and behavioural responses during an infectious disease outbreak.

Limitations

This current study has several limitations that should be considered. The first pertains to the convenience sampling and cross-sectional nature of the study. Thus, it cannot be used to infer causality. Despite of the recruitment of a large and diverse sample, the relatively high proportion of young age participants in this study may introduce bias toward greater social media usage.Second, the responses were based on self-report and may be subject to recall bias, self-reporting bias and a tendency to report socially desirable responses. A third limitation is that the participants were health science and medical students, hence warrants careful interpretation owing to their better knowledge and attitudes about COVID-19 as well as higher affinity for health information. Forth, the associations found in this study should be interpreted with caution as the psychobehavioral responses were obtained during the off-peak COVID-19 outbreak. Therefore, the results should be interpreted with caution. Despite these limitations, the study data contribute tremendously to the understanding of the influence of both mass and social media on psychobehavioural responses to the COVID-19 outbreak in China.

Conclusions

Higher exposure of both mass and social media related to the COVID-19 outbreak increases positive attitudes in all the domains of the HBM. Emotional consequences and behavioural prevention barriers also reduced with higher exposure to both mass and social media. In conclusion, based on our results, both mass and social media are useful means of getting health messages across and contribute to the betterment of psychobehavioural responses to COVID-19. Findings imply that university students are proficient at identifying and consuming credible

information on social media. With much information circulating on the Internet, it is challenging for the public to stay informed with reliable, credible and trustworthy information from the Internet. The general public should be enlightened about proper online health information seeking during disease outbreaks to avoid detrimental psychological and behavioural impacts that may deter the management and control of disease outbreaks.

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Author contribution

LPW,YL and ZH conceived the study. YL collected data. LPW and HA analyzed the data. LPW wrote the manuscript. All authors have approved the manuscript.

Conflicts of Interest

None declared.

Abbreviations

CI: Confidence interval
HBM: Health Belief Model
OR: Odd Ratio
SARS: Severe acute respiratory syndrome
STAI-6: Six –item State-Trait Anxiety Inventory

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Supplementary Files

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Multimedia Appendixes

Table 1 Factors associated with mass media and social media exposure (N=2086).
URL: https://asset.jmir.pub/assets/6bc797d2ed4ed3040bf20a2941f12a19.doc

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Figures

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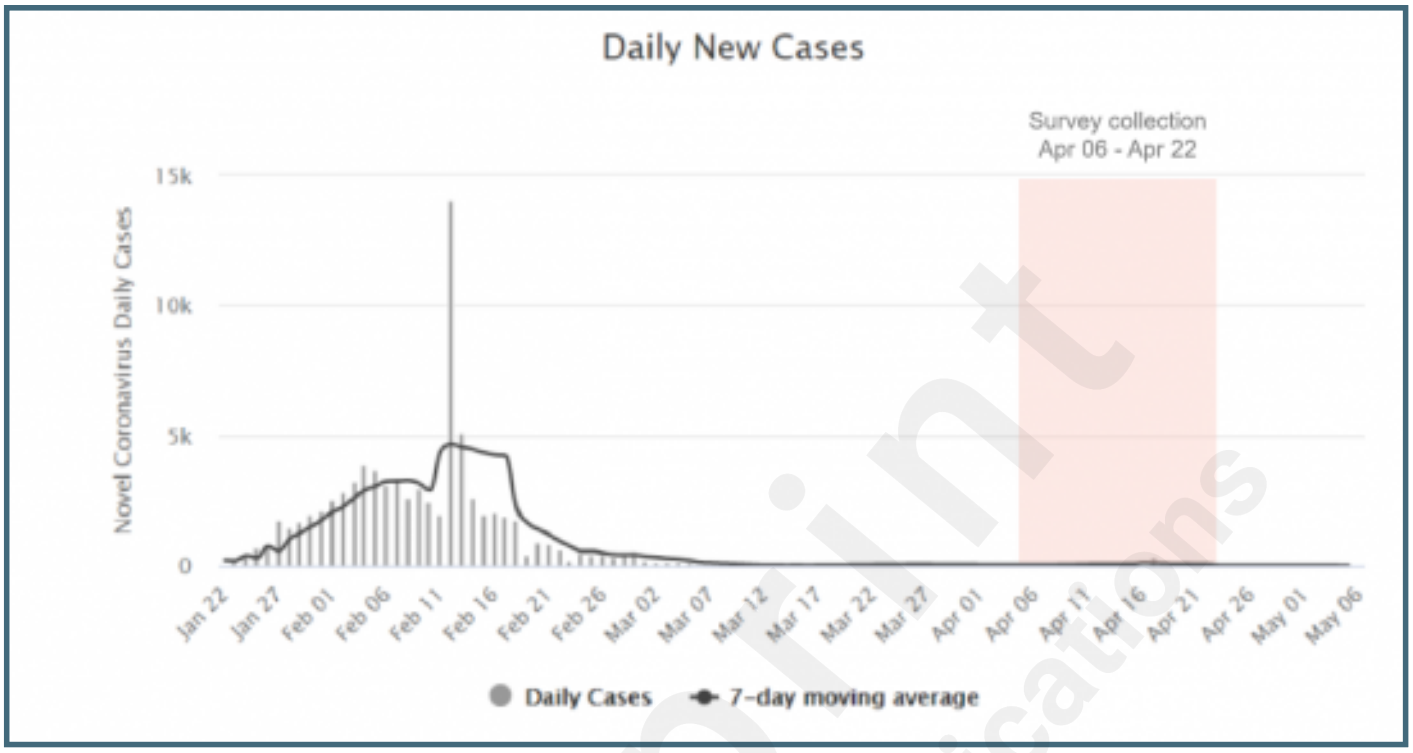
The trend of daily new cases in China since the beginning of the COVID-19 and the duration of our data collection.



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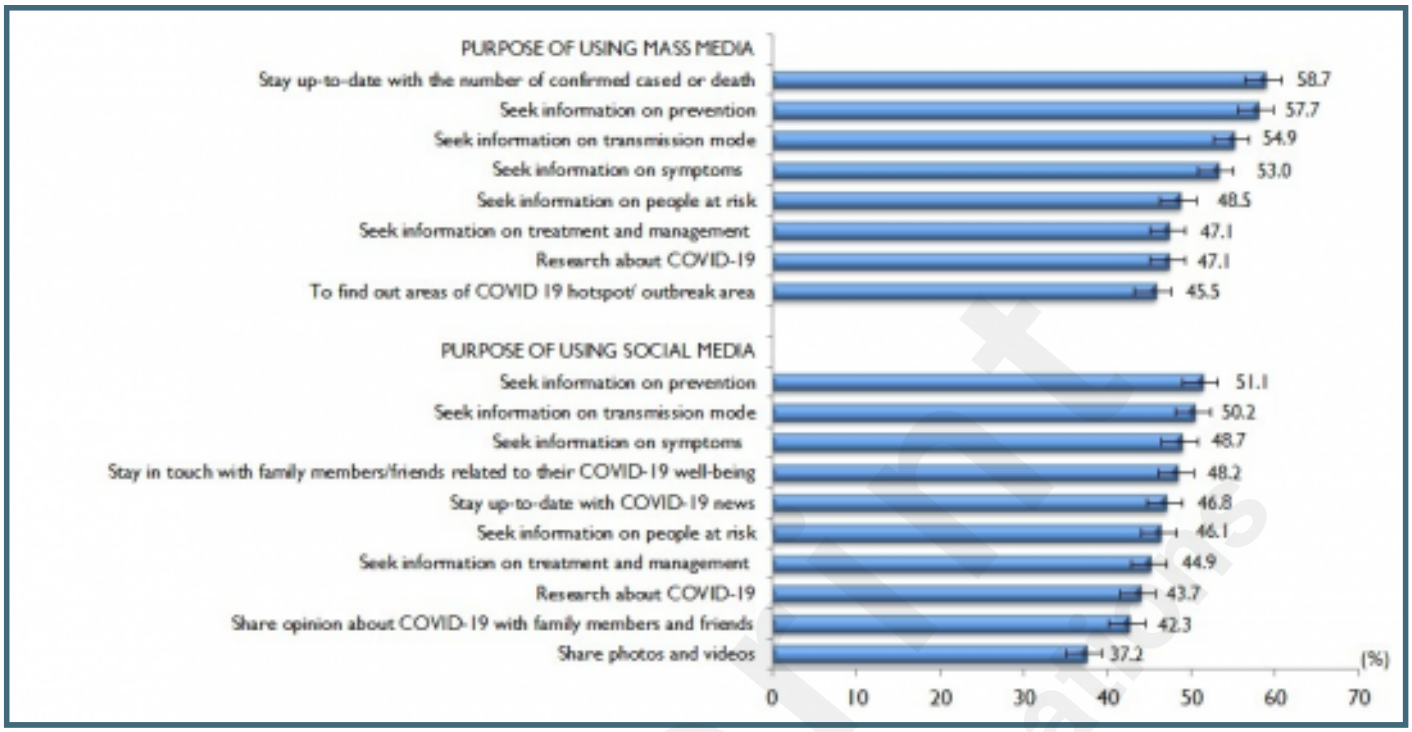
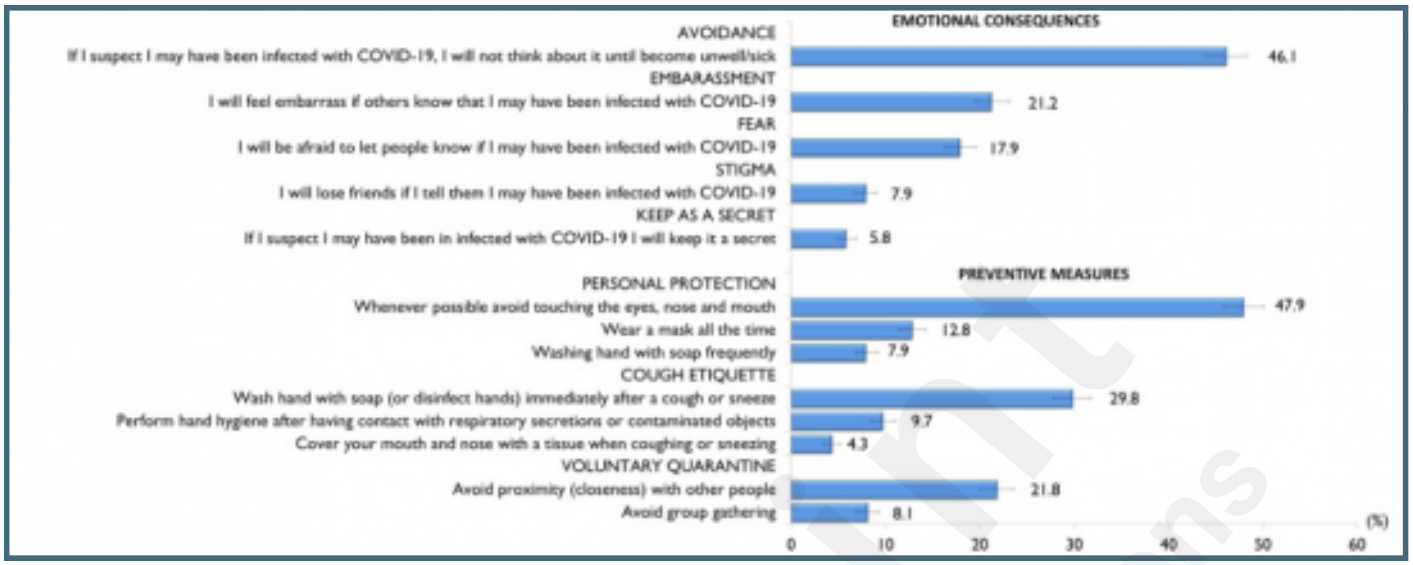
Proportion of ‘often’ usage of mass media and social media (N=2086).



Proportion of ‘agree/strongly agree’ in emotional consequences and ‘difficult/very difficult’ in carrying out preventive measures (N=2086).



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