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Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_1032_20

# Social media exposure and mental health problems during coronavirus disease 2019 pandemic in Indonesia

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## Abstract:

**BACKGROUND:** Several preventive measures were used by governments around the world to suppress the transmission of SARS-CoV-2, including quarantine. During quarantine more people are at risk of developing mental health problems as social media exposure was increasing.

**OBJECTIVES:** The objective is to investigate the impact of social media exposure during coronavirus disease 2019 (COVID-19) pandemic on depression, anxiety, and stress.

**MATERIALS AND METHODS:** A cross-sectional study was conducted between April and May 2020 during the large scale social restriction in Indonesia using online questionnaire Indonesian citizens over 18 years of age were invited to take part by answering online questionnaire through Google forms (<http://bit.ly/duniamayaCOVID>). Data gathered were demographic data, depression, anxiety, and stress that were assessed using Depression Anxiety Stress Scale-21, duration of social media usage, and social media platforms used during COVID-19 pandemic. Data was analysed using Pearson Chi-square and ANOVA. Statistically significant variables and additional risk factors was analyzed using multinomial logistic regression.

**RESULTS:** The median age was 24 years (range 17–56 years), 121 (55,0%) samples were female. The three most frequent social media platforms used by participants were Instagram, WhatsApp, and YouTube. Female were more likely to suffer from mild-moderate depression compared to male (odds ratio [OR]: 2.344; 95% confidence interval [CI]: 1.105–4.972;  $P = 0.026$ ) and more likely to suffer from severe-extremely severe anxiety (OR: 2.066; 95% CI: 1.019–4.187;  $P = 0.044$ ). Social media exposure was associated with less likelihood to suffer from severe-extremely severe depression, mild-moderate, and severe-extremely severe anxiety, mild-moderate stress.

**CONCLUSION:** Social media exposure was associated with less depression, anxiety, and stress in the COVID-19 pandemic era. Medical professionals and government officials could use social media to disseminate knowledge about COVID-19 to bring positive psychological effect.

## Keywords:

Coronavirus disease 2019, mental health, social media

## Introduction

In the early December 2019, pneumonia outbreak of unknown etiology was found in Wuhan City of Hubei Province, Central China. On January 2020, genomic sequencing demonstrated a novel coronavirus that is officially named by the World Health Organization (WHO) as Coronavirus disease 2019 (COVID-19).<sup>[1]</sup> Until the present

time, this COVID-19 pandemic has affected countries worldwide.<sup>[2]</sup> Until April 30, 2020, there were 3,090,184 confirmed cases and 217,759 deaths from 34 countries in a study based on the WHO reports.<sup>[3]</sup> In Indonesia, as to date, the number was over 22,000 of confirmed cases along with over 1,300 death cases.<sup>[4]</sup> Due to the alarming rate of new and death cases, there are several actions taken. There are a few strategies to control the

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**How to cite this article:** Lugito NP, Damay V, Chyntya H, Sugianto N. Social media exposure and mental health problems during coronavirus disease 2019 pandemic in Indonesia. J Edu Health Promot 2021;10:200.

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Received: 15-08-2020  
Accepted: 19-10-2020  
Published: 31-05-2021

spread of the infections by increasing awareness, wearing protective clothing, improving treatment, and perhaps vaccination.<sup>[5]</sup> Since vaccination and antiviral treatment are not available, thus containing further spread by isolation, hospitalization and safety measures are the key.<sup>[6,7]</sup> One of the currently used measure by government all over the world is isolation, quarantine, and social distancing.<sup>[8]</sup> Specifically in Indonesia, the government use large-scale social restriction (LSSR) method, which people are encouraged to stay at home except for those who need to work outside, for example, health-care personnel, journalist, security, and restricting and/or limiting public activities.<sup>[9]</sup>

Social interaction has been known to interlink with psychological well-being, social opportunities, and employment; thus restriction by these measures could possibly cause a major distressing.<sup>[10]</sup> The LSSR policy causes most people to start working or even study from home, loss of income, separation from family, serious health fears, some might even suffer from losing their love ones. Social media usage is increasing, some to help them with work, and others used them to get an update about the pandemic situation besides for work.<sup>[11]</sup>

As social media exposure during COVID-19 outbreak is increasing, people are at risk in developing mental health problems. Although official organizations share information to improve awareness of prevention and intervention strategies of COVID-19 through website and social media,<sup>[12]</sup> other information on social media might be misleading, which in turn may cause mental health problems.<sup>[13]</sup> The WHO bring about the underlying reasons of insecurity, fear, anxiety of misinformation and rumor through social media.<sup>[14]</sup>

Prior study in Shanghai, China, during COVID-19 pandemic showed that the prevalence of depression, anxiety and depression-anxiety combined are 48.3%, 22.6%, and 19.4% respectively from total of 4872 samples. Among the samples with mental health problems, 83.0% frequently access social media.<sup>[15]</sup> With the lockdown policy was applied in China, there are two sides of quality of life resulting from the outbreak, i.e., majority of participants who are paying more attention to their mental health by doing lifestyle changes like spending more time with family, relaxing or doing activities that they have never done before the pandemic. On the other hand, there are some participants who had financial burden which increase stress and lead to avoidance behavior leading to worsen mental health, thus resulting in more passive lifestyle.<sup>[16]</sup> A study in Hong Kong showed that out of 500 respondents, 19% and 14% had depression and anxiety respectively, 25.4% reported mental health deterioration since the COVID-19 pandemic.<sup>[17]</sup> Another study in Australia found that

negative changes in physical activity, sleep, smoking, and alcohol consumption were associated with higher depression, anxiety and stress.<sup>[18]</sup>

Our study aims to investigate whether there was an impact of social media exposure during COVID-19 pandemic on mental health, particularly depression, anxiety, and stress in Indonesia.

## Materials and Methods

### Participants

A cross-sectional study was conducted from April to May 2020 using online questionnaire. Indonesian citizens over 18 years of age were invited to take part by answering online questionnaire through Google forms (<http://bit.ly/duniamayaCOVID>). A total of 220 participants completed the survey.

### Ethical consideration

This study has been approved by the Ethical Committee of Faculty of Medicine, Pelita Harapan University no. 142/K-LKJ/ETIK/IV/2020.

### Sociodemographic data

In this study, sociodemographic data, we collected including sex, age, marital status, number of housemate, education, occupation as health-care personnel, working online or offline, presence of family member working as health-care personnel and family member infected with SARS-CoV-2, social media duration and platforms used.

### Measurements

#### *Mental health problem*

In this study, we assessed depression, anxiety and stress using Depression Anxiety Stress Scale-21 (DASS-21) which consist of 5 types of severity (normal, mild, moderate, severe, extremely severe) for depression, anxiety and stress each. Depression was classified as normal (score 0–4), mild (score 5–6), moderate (score 7–10), severe (score 11–13), extremely severe (score above 13). Anxiety was classified as normal (score 0–3), mild (score 4–5), moderate (score 6–7), severe (score 8–9), extremely severe (score above 9). Stress was classified as normal (score 0–7), mild (score 8–9), moderate (score 10–12), severe (score 13–16), extremely severe (score above 16). The severity was grouped into three category for analysis purpose: normal, mild-moderate, and severe-extremely severe. Response options were “did not apply to me at all”, “applied to me to some degree, or some of the time,” “applied to me to a considerable degree or a good part of time,” “applied to me very much or most of the time,” scored as 0, 1, 2, 3 respectively. A study showed the Cronbach’s alpha ( $\alpha$ ) that measures the reliability of DASS-21 according were  $\alpha = 0.076$  for depression,  $\alpha = 0.82$  for anxiety, and  $\alpha = 0.75$  for stress.

As for the validity, the  $r$  value between anxiety and stress ( $r = 0.713$ ), depression and stress ( $r = 0.698$ ), and depression and anxiety ( $r = 0.68$ ), showed close, positive, and strong relationship between those factors.<sup>[19]</sup>

### Social media exposure

We ask each participant about the duration of social media usage (hour per day). We also obtain data regarding which social media platforms the participants used during COVID-19 pandemic.

### Statistical analyses

Data were analyzed using SPSS for Windows, version 23.00; IBM Corporation, Armonk, NY, USA. The categorical data were presented in frequency (%), while numerical data were presented in median (range). The Pearson Chi-square and ANOVA analyses were used to describe prevalence of depression, anxiety, and stress by categorical variables and covariates including social media exposure. Adjusted ORs and 95% confidence intervals (CIs) for the association between the prevalence of depression, anxiety, and stress and social media exposure after controlling for categorical variables of independent variables were described using multiple logistic regression analyses.

## Results

In total, 220 samples were approached. The median age was 24 years (minimum 17 years, maximum 56 years), 121 (55.0%) samples were female, most of the samples were single/not married (60.9%), and living alone (80.9%). One hundred and forty-nine samples (67.7%) were employed, whereas the majority was not health-care personnel (84.5%), and 55.0% were working from home. Most of samples did not have family member who works as healthcare personnel (71.4%) and 98.2% did not have family members who were suffering from COVID-19. The three most frequent social media platforms used by participants were Instagram, WhatsApp, and YouTube [Table 1].

Samples that suffered from mild-moderate and severe-extremely severe depression were 65 (29.5%) and 102 (46.4%), mild-moderate and severe-extremely severe anxiety were 43 (19.6%) and 134 (60.9%), and mild-moderate and severe-extremely severe stress were 36 (16.3%) and 84 (38.2%), respectively.

Sociodemographic characteristics of the samples associated with depression, anxiety, and stress were shown in Table 2. Female were more likely to suffer from depression (mild-extremely severe) compared to male (72.6% vs. 67.7%,  $P = 0.036$ ). Median age (range) of samples who did not had depression compared to samples who had mild-moderate, and severe-extremely severe

**Table 1: Sociodemographic characteristic of the samples**

Characteristics	Total (n=220)
Sex, n (%)	
Male	99 (45.0)
Female	121 (55.0)
Age (years), median (minimum-maximum)	24 (18-56)
Marital status, n (%)	
Single	134 (60.9)
Married	86 (39.1)
House, n (%)	
Owned	178 (80.9)
Rented	42 (19.1)
Number of housemate, median (minimum-maximum)	4 (0-15)
Education, n (%)	
High school	39 (17.7)
Beyond High school	181 (82.3)
Occupation, n (%)	
Employed	71 (32.3)
Unemployed	149 (67.7)
Health-care personnel, n (%)	
No	186 (84.5)
Yes	34 (15.5)
Work, n (%)	
Work from home	121 (55)
Work outside	37 (16.8)
Alternate work outside and work from home	62 (28.2)
Family member working as health-care personnel, n (%)	
Yes	63 (28.6)
No	157 (71.4)
Family member infected with SARS-CoV-2, n (%)	
No	216 (98.2)
Yes	4 (1.8)
Social media duration, median (minimum-maximum)	5 (1-15)
Social media platforms used by participants, n (%)	
Instagram	210 (95.5)
WhatsApp	209 (95)
YouTube	193 (87.7)
Line	148 (67.3)
Spotify	129 (58.6)
Zoom	105 (47.7)
Online shopping	97 (44.1)
Facebook	94 (42.7)
Twitter	50 (22.7)
Online movie streaming	91 (41.4)
Online news	66 (30)
Online trading	26 (11.8)
Other	5 (2.4)

depression were not significantly different ( $P = 0.144$ ). Samples who rented a place were more likely to suffer from depression compared to samples who lived in their own house (80.9% vs. 64.7%,  $P = 0.297$ ). Samples who were still employed and had depression were relatively higher than those who were unemployed (78.6% vs. 70.5%,  $P = 0.417$ ). Samples who did not worked as healthcare personnel samples had higher frequency

**Table 2: Sociodemographic characteristic of the samples associated with depression, anxiety, and stress**

<b>Depression</b>	<b>Total (n=220)</b>	<b>Normal (n=53)</b>	<b>Mild-moderate (n=65)</b>	<b>Severe-extremely severe (n=102)</b>	<b>P</b>
Sex					
Male	99 (45.0)	32 (32.3)	26 (26.3)	41 (41.4)	0.036
Female	121 (55.0)	21 (17.4)	39 (32.2)	61 (50.4)	
Age (years), median (minimum-maximum)	24 (18-56)	24 (18-50)	24 (17-51)	24 (17-56)	0.144
Marital status					
Single	134 (60.9)	31 (23.1)	41 (30.6)	62 (46.3)	0.878
Married	86 (39.1)	22 (25.6)	24 (27.9)	40 (46.5)	
House					
Owned	178 (80.9)	45 (25.3)	55 (20.9)	78 (43.8)	0.297
Rented	42 (19.1)	8 (19.01)	10 (23.8)	25 (57.1)	
Number of housemate, median (minimum-maximum)	4 (0-15)	4 (0-9)	4 (0-10)	4 (0-15)	0.551
Education					
High school	39 (17.7)	9 (23.2)	13 (33.3)	17 (43.6)	0.848
Beyond High school	181 (82.3)	44 (24.3)	52 (28.7)	85 (47.0)	
Occupation					
Unemployed	71 (32.3)	21 (29.6)	19 (26.8)	31 (43.7)	0.417
Employed	149 (67.7)	32 (21.5)	46 (30.9)	71 (47.7)	
Health-care personnel					
No	186 (84.5)	44 (23.7)	51 (27.4)	91 (48.9)	0.162
Yes	34 (15.5)	9 (26.5)	14 (41.2)	11 (32.4)	
Work					
Work from home	121 (55.0)	26 (21.5)	40 (33.1)	55 (45.5)	0.742
Work outside	37 (16.8)	10 (27)	9 (24.3)	18 (48.6)	
Alternate work outside and work from home	62 (28.2)	17 (27.4)	16 (25.8)	29 (46.8)	
Family member working as health-care personnel					
Yes	63 (28.6)	15 (23.8)	22 (34.9)	26 (41.3)	0.507
No	157 (71.4)	38 (24.2)	43 (27.4)	76 (48.4)	
Family member infected with SARS-CoV-2					
No	216 (98.2)	53 (24.5)	64 (29.6)	99 (45.8)	0.421
Yes	4 (1.8)	0 (0.0)	1 (25.0)	3 (75.0)	
Social media duration, median (minimum-maximum)	5 (1-15)	5 (1-15)	5 (1-15)	5 (1-15)	0.928
<b>Anxiety</b>	<b>Total (n=220)</b>	<b>Normal (n=43)</b>	<b>Mild-moderate (n=43)</b>	<b>Severe-extremely severe (n=134)</b>	<b>P</b>
Sex					
Male	99 (45.0)	25 (25.3)	20 (20.5)	54 (54.5)	0.120
Female	121 (55.0)	18 (14.9)	23 (19.0)	80 (66.1)	
Age (years), median (minimum-maximum)	24 (18-56)	24 (18-50)	24 (18-51)	24 (18-56)	0.049
Marital status					
Single	134 (60.9)	23 (17.2)	29 (21.6)	82 (61.2)	0.413
Married	86 (39.1)	20 (23.3)	14 (16.3)	52 (60.5)	
House					
Owned	178 (80.9)	36 (20.2)	36 (20.2)	106 (59.6)	0.697
Rented	42 (19.1)	7 (16.7)	7 (16.7)	28 (66.7)	
Number of housemate, median (minimum-maximum)	4 (0-15)	4 (0-9)	4 (0-10)	4 (0-15)	0.694
Education					
High school	39 (17.7)	6 (15.4)	10 (25.6)	23 (59.0)	0.509
Beyond High school	181 (82.3)	37 (20.4)	33 (18.2)	111 (11.3)	
Occupation					
Unemployed	71 (32.3)	18 (25.4)	12 (16.9)	41 (57.7)	0.308
Employed	149 (67.7)	25 (16.8)	31 (20.8)	93 (62.4)	
Health-care personnel					
No	186 (84.5)	36 (19.4)	32 (17.2)	118 (63.4)	0.097
Yes	34 (15.5)	7 (20.6)	11 (32.4)	16 (47.1)	
Work					
Work from home	121 (55.0)	21 (27.0)	24 (24.3)	76 (48.6)	0.853

Contd...

**Table 2: Contd...**

<b>Depression</b>	<b>Total (n=220)</b>	<b>Normal (n=53)</b>	<b>Mild-moderate (n=65)</b>	<b>Severe-extremely severe (n=102)</b>	<b>P</b>
Work outside	37 (16.8)	7 (3.2)	8 (3.6)	22 (10.0)	
Alternate work outside and work from home	62 (28.2)	15 (27.4)	11 (25.8)	36 (46.8)	
Family member working as health-care personnel					
Yes	63 (28.6)	13 (20.6)	15 (23.8)	35 (55.6)	0.525
No	157 (71.4)	30 (29.1)	28 (17.8)	99 (63.1)	
Family member infected with SARS-CoV-2					
No	216 (98.2)	43 (19.9)	43 (19.9)	130 (60.2)	0.271
Yes	4 (1.8)	0 (0.0)	0 (0.0)	4 (100.0)	
Social media duration, median (minimum-maximum)	5 (1-15)	5 (1-15)	5 (1-15)	5 (1-15)	0.062
<b>Stress</b>	<b>Total (n=220)</b>	<b>Normal (n=100)</b>	<b>Mild-moderate (n=36)</b>	<b>Severe-extremely severe (n=84)</b>	<b>P</b>
Sex					
Male	99 (45.0)	52 (52.5)	11 (11.1)	36 (36.4)	0.075
Female	121 (55.0)	48 (20.7)	25 (39.7)	48 (21.8)	
Age (years), median (minimum-maximum)	24 (18-56)	24 (18-51)	23 (18-39)	23 (18-56)	
Marital status					
Single	134 (60.9)	62 (46.3)	18 (13.4)	54 (40.3)	0.324
Married	86 (39.1)	38 (44.2)	18 (20.9)	30 (34.9)	
House					
Owned	178 (80.9)	85 (47.8)	29 (16.3)	64 (36.0)	0.317
Rented	42 (19.1)	15 (35.7)	7 (16.7)	20 (47.6)	
Number of housemate, median (minimum-maximum)	4 (0-15)	4 (0-10)	4 (0-9)	4 (0-15)	0.654
Education					
High school	39 (17.7)	19 (48.7)	4 (10.3)	16 (41.0)	0.524
Beyond high school	181 (82.3)	81 (44.8)	32 (17.7)	68 (37.6)	
Occupation					
Unemployed	71 (32.3)	35 (49.3.9)	11 (15.5)	25 (35.2)	0.729
Employed	149 (67.7)	65 (43.6)	25 (16.8)	59 (39.6)	
Health-care personnel					
No	186 (84.5)	79 (42.5)	31 (16.7)	76 (40.9)	0.096
Yes	34 (15.5)	21 (61.8)	5 (14.7)	8 (23.5)	
Work					
Work from home	121 (55.0)	54 (44.6)	20 (16.5)	47 (38.8)	0.949
Work outside	37 (16.8)	19 (51.4)	5 (13.5)	13 (35.1)	
Alternate work outside and work from home	62 (28.2)	27 (43.5)	11 (17.7)	24 (38.7)	
Family member working as health-care personnel					
Yes	63 (28.6)	33 (52.4)	8 (12.7)	22 (34.9)	0.386
No	157 (71.4)	67 (42.7)	28 (17.8)	62 (39.5)	
Family member infected with SARS-CoV-2					
No	216 (98.2)	99 (45.8)	36 (16.7)	81 (37.5)	0.288
Yes	4 (1.8)	1 (25.0)	0 (0.0)	3 (75.0)	
Social media duration, median (minimum-maximum)	5 (1-15)	5 (1-15)	5.5 (1-15)	5 (1-15)	0.687

of severe-extremely severe depression compared to health-care personnel (48,9% vs. 32.4%,  $P = 162$ ). The duration of time dedicated to social media between groups of depression were not significant ( $P = 0.928$ ).

According to our study, anxiety mostly suffered by female compared to male (85.1% vs. 75.0%,  $P = 0.120$ ). Samples who were single more likely to suffer from anxiety compared to married samples (82.8% vs. 76.8%,  $P = 0.413$ ). All participants whose family members were infected with COVID-19 had anxiety compared to

those who did not had family members infected with SARS-CoV-2 (100% vs. 80.1%,  $P = 0.271$ ). The duration of time dedicated to social media between groups of anxiety were not significant ( $P = 0.062$ ).

Regarding variables associated with stress, male were more likely to suffer from severe-extremely severe stress compared to female (36.4% vs. 21.8%), and female tend to suffer lower stress (mild-moderate) compared to male (39.7% vs. 11.1%),  $P = 0.075$ ). Samples who were not healthcare personnel had higher frequency of stress



compared to health-care personnel (57.6% vs. 38.2%,  $P = 0.096$ ). Duration of time dedicated to social media between groups of stress were not significant ( $P = 0.687$ ).

In our study, only two variables in the bivariate analysis were statistically significant (age and gender) and thus taken into account in the multinomial logistic regression analysis with additional risk factors such as duration of social media exposure, occupation as healthcare personnel or nonhealth-care personnel, and family member working as healthcare personnel. Variables associated with mild-moderate and severe-extremely severe depression, anxiety, and stress compared to no depression, anxiety, and stress are shown in Table 3. Females were more likely to suffer from mild-moderate depression compared to male (odds ratio [OR]: 2.344; 95% CI: 1.105–4.972;  $P = 0.026$ ). While age was associated with less likelihood to suffer from severe-extremely severe depression to the extent that each 1-year increment decreases the likelihood by 0.044 (OR: 2.263; 95% CI: 1.134–4.517;  $P = 0.050$ ). Social media exposure was associated with less likelihood to suffer from severe-extremely severe depression as for each one-hour increment decreases the likelihood by 0.012 (OR: 0.989; 95% CI: 0.890–1.098;  $P = 0.989$ ). Females were also more likely to suffer from severe-extremely severe anxiety compared to male (OR: 2.066; 95% CI: 1.019–4.187;  $P = 0.044$ ).

Health-care personnel were less likely to suffer from severe-extremely severe anxiety compared to nonhealth-care personnel (OR: 0.484; 95% CI: 0.239–0.981;  $P = 0.044$ ). Social media exposure was associated with less likelihood to suffer from mild-moderate and severe-extremely severe anxiety as for each 1-h increment decreases the likelihood by 0.132 (OR: 0.876; 95% CI: 0.756–1.016;  $P = 0.081$ ) and 0.164 (OR: 0.849; 95% CI: 0.383–1.882;  $P = 0.849$ ) respectively. On the contrary of depression and anxiety, female were less likely to suffer from mild-moderate stress compared to male (OR: 0.705; 95% CI: 0.387–1.282;  $P = 0.251$ ). Social media exposure was associated with less likelihood to suffer from mild-moderate stress as for each 1-h increment decreases the likelihood by 0.014 (OR: 0.986; 95% CI: 0.900–1.081;  $P = 0.765$ ).

## Discussion

Studies have been conducted to assess factors associated with mental health problem during period of global health emergency in various countries. A study by Gao *et al.* in China founded that the prevalence of depression and anxiety were 48.3% and 22.6% consecutively.<sup>[15]</sup> In India, a study found that 25.1%, 28.0%, and 11.0% of the participants suffered from moderate-extremely severe depression, anxiety, and stress, respectively.<sup>[20]</sup>

Frequency of depression, anxiety, and stress in our study were 75.9%, 80.5%, and 54.5% respectively. Our study was conducted on the start of local lockdown policy by the local government in Tangerang, Banten, Indonesia. This would contribute to the high frequency of mental health problems of participants as population have to adapt to the new life style.

Based on our study, bivariate analyses on variables associated with depression, anxiety, and stress showed that sex is significantly associated with depression while age is associated with anxiety. On the multinomial logistic regression, female were more likely to suffer from mild-moderate depression and severe-extremely severe anxiety compared to male. On the contrary of depression and anxiety, female were less likely to suffer from mild-moderate stress compared to male. Our data correspond with a study in Turkey where depression was higher in female than male.<sup>[21]</sup> Another study by Ozamiz-Etxebarria *et al.* in Spain also showed female tends to suffer depression, anxiety and stress compared to male.<sup>[19]</sup> A study in India, found different result, i.e., male were more susceptible to anxiety than female. It was hypothesized that the anxiety was associated with lockdown and sharing household responsibilities between both male and female.<sup>[8]</sup>

Occupation as health-care personnel was associated with mental health problems during COVID-19 pandemic corresponding with data from prior study by Lu *et al.* that showed health-care personnel have higher level of depression and anxiety than nonhealth-care personnel.<sup>[22]</sup> In situation of rapidly increasing number of positive cases in Indonesia, our study showed that health-care population have lower percentage of mental health problems during COVID-19 pandemic, similar to previous studies in Egyptian population during COVID-19 pandemic, and in India during swine flu pandemic in 2015 where health-care personnel have lower psychological impact than nonhealth-care personnel. Authors from those studies suggested that raised of awareness would increase protective measure with favorable attitude during pandemic, therefore, resulting in lower level of depression and anxiety.<sup>[23,24]</sup>

Gao *et al.* showed the effect of social media exposure to mental health, that higher frequency of exposure was associated with depression although the association was not statistically significant, and significantly associated with anxiety.<sup>[15]</sup> Other studies in China also describe similar result that social media use time was associated with more depression, anxiety and stress.<sup>[25,26]</sup> The result of our study showed that social media exposure was associated with less likelihood to suffer from severe-extremely severe depression, mild-moderate and severe-extremely severe anxiety and mild-moderate stress. A possible explanation

**Table 3: Variables associated with mild-moderate and severe-extremely severe depression, anxiety, and stress compared to no depression, anxiety, and stress**

Variables	B	SE	Wald	df	P	OR	95% CI
<b>Depression</b>							
Mild-moderate							
Intercept	1.240	0.933	1.766	1	0.184		
Age	-0.016	0.023	0.520	1	0.471	0.984	0.941-1.029
Sex (female)	0.852	0.384	4.932	1	0.026	2.344	1.105-4.972
Health-care personnel (No)	0.322	0.501	0.414	1	0.520	0.724	0.271-1.934
Family as health-care personnel (Yes)	0.175	0.425	0.170	1	0.680	1.192	0.518-2.740
Social media exposure	0.007	0.058	0.014	1	0.906	1.007	0.899-1.128
Severe-extremely severe							
Intercept	1.906	0.905	4.438	1	0.035		
Age	-0.044	0.022	3.856	1	0.050	0.957	0.916-1.000
Sex (female)	0.817	0.353	5.361	1	0.021	2.263	1.134-4.517
Health-care personnel (no)	0.452	0.507	0.793	1	0.373	1.571	0.581-4.248
Family as health-care personnel (yes)	-0.065	0.403	0.026	1	0.872	0.937	0.425-2.064
Social media exposure	-0.012	0.054	0.046	1	0.831	0.989	0.890-1.098
<b>Anxiety</b>							
Mild-moderate							
Intercept	0.862	1.020	0.714	1	0.398	0.862	
Age	0.007	0.025	0.080	1	0.777	1.007	0.959-1.058
Sex (female)	0.541	0.445	1.474	1	0.225	1.717	0.717-4.109
Health-care personnel (no)	-0.742	0.573	1.676	1	0.195	0.476	0.155-1.464
Family as health-care personnel (yes)	-0.069	0.488	0.020	1	0.887	0.933	0.359-2.427
Social media exposure	-0.132	0.076	3.052	1	0.081	0.876	0.756-1.016
Severe-extremely severe							
Intercept	1.524	0.895	2.900	1	0.089	1.524	
Age	-0.034	0.023	2.128	1	0.145	0.967	0.924-1.012
Sex (female)	0.726	0.360	4.052	1	0.044	2.066	1.019-4.187
Health-care personnel (no)	-0.726	0.360	4.052	1	0.044	0.484	0.239-0.981
Family as health-care personnel (yes)	0.251	0.513	0.240	1	0.624	1.286	0.470-3.514
Social media exposure	-0.164	0.406	0.163	1	0.686	0.849	0.383-1.882
<b>Stress</b>							
Mild-moderate							
Intercept	0.067	0.774	0.007	1	0.931	0.067	
Age	-0.060	0.034	3.046	1	0.081	0.942	0.881-1.007
Sex (female)	-0.351	0.306	1.316	1	0.251	0.704	0.387-1.282
Health-care personnel (no)	0.295	0.571	0.267	1	0.606	1.343	0.439-4.112
Family as health-care personnel (yes)	-0.472	0.483	0.958	1	0.328	0.624	0.242-1.606
Social media exposure	0.013	0.059	0.045	1	0.832	1.013	0.901-1.138
Severe-extremely severe							
Intercept	-0.167	1.182	0.020	1	0.888	-0.167	
Age	-0.035	0.020	3.029	1	0.082	0.966	0.929-1.004
Sex (female)	0.575	0.428	1.799	1	0.180	1.776	0.767-4.113
Health-care personnel (no)	0.881	0.460	3.663	1	0.056	2.414	0.979-5.952
Family as health-care personnel (yes)	-0.175	0.346	0.255	1	0.614	0.840	0.426-1.655
Social media exposure	-0.014	0.047	0.089	1	0.765	0.986	0.900-1.081

OR=Odds ratio, CI=Confidence interval

for this contradictory result is that social media exposure could have positive and negative psychological effect. Positive effect was associated with viewing heroic act of ordinary people, and also knowledge on disease and its prevention. Negative effect was associated with viewing reports from hospitals about the shortage of medical supplies or hospital capacities, information about COVID-19 pandemic such as increasing number of cases

of infection and deaths.<sup>[25]</sup> Studies found that social media can be used by medical professionals and government officials to disseminate information, especially health knowledge management that would bring positive psychological effect.<sup>[27,28]</sup> In this study, we did not collect data on the content of social media exposure, thus we do not know which psychological effect the exposure had on the samples.

There are several of strengths of the our study, including the length of time of social media exposure, inclusion of independent variables of mental health problems during COVID-19 pandemic, and the timing of data collection in the large scale social restriction in Indonesia. However, there are also several limitation. First, we did not obtain data regarding family member support or family relationship during COVID-19 pandemic. As our data show no significant association other than sex and age from bivariate analysis, there is a possibility that family relationship during COVID-19 era act as a confounding resulting in insignificant impact between variables and mental health problems.<sup>[29]</sup> Another limitation would be the lack of data regarding history of mental health problems and medication history for treating mental health problems prior to COVID-19 pandemic. Finally, we did not have data on the content of social media exposure that would have negative or positive psychological effect.

## Conclusion

This study showed high frequency of depression, anxiety and stress in Indonesian population in the COVID-19 pandemic. Female were more likely to suffer from depression and anxiety, male were more likely to suffer from stress. Social media exposure was associated with less likelihood to suffer from mental health problems.

## Acknowledgment

The authors would like to thank all the individuals who volunteered to participate in this study.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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