

Does Self-Efficacy Mediate the Effect of Psychological Factors on Depression During COVID-19 Pandemic?

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ABSTRACT

Objectives : This study aimed to explore the association between depression and perceived stress, viral anxiety, reassurance-seeking behavior, and poor sleep quality among the general population in Bangladesh, with self-efficacy as a possible mediator.

Methods : Data on stress and anxiety during the pandemic in Bangladesh were collected through an online survey from September 16, 2021 to October 4, 2021. Viral anxiety and depression were measured using the Bangla version of Stress and Anxiety to Viral Epidemic-6 (SAVE-6) and Patient Health Questionnaire-9 (PHQ-9), respectively. Self-efficacy was measured by the General Self-efficacy (GSE) scale. Reassurance-seeking behavior related to the coronavirus disease 2019 infection was measured by the Coronavirus Reassurance-Seeking Behaviors Scale (CRBS).

Results : The CRBS showed a significant correlation with SAVE-6 ($r=0.281$, $p<0.001$) and PHQ-9 ($r=0.227$, $p<0.001$). People with higher anxiety, reassurance-seeking behavior, and poor sleep quality had lower self-efficacy, which led to depression. In contrast, perceived stress increased self-efficacy. The psychological factors impacted depression directly as well as indirectly, and self-efficacy mediated the association.

Conclusions : Viral anxiety, reassurance-seeking behavior, perceived stress, and poor sleep quality have a close correlation with depression both directly and indirectly. Self-efficacy can be a mediating factor in the association between psychological distress and depression. Viral anxiety, reassurance-seeking behavior, and poor sleep quality reduce self-efficacy. On the other hand, perceived stress can strengthen self-efficacy.

KEYWORDS : COVID-19; Depression; Anxiety; Perceived stress; Self-efficacy.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic caused worldwide distress due to the spread of successive new variants. The world, including Bangladesh, have facing a surge of Omicron variants worldwide. The first reported COVID-19-positive case was reported on March 8, 2020, and the first death on March 18, 2020.¹⁾ Since then, Bangladesh has faced three waves of the COVID-19 pandemic. Like other countries, the Bangladeshi government imposed several countrywide lockdowns. After controlling the mass spread of COVID-19, the government lifted the last lockdown from August 10, 2021²⁾ and re-

opened educational institutions since September 12, 2021.³⁾ As of December 23, 2021, a total of 1,582,368 people had tested positive and 28,054 people had died by COVID-19 disease.¹⁾

Life came to a standstill as governments across countries imposed different forms of lockdowns, night curfews, and closed borders. Due to these measures, especially the stay-at-home order, the daily routine of life was drastically disrupted. For example, many people's sleep schedules changed during the lockdown.⁴⁾ People went to bed late and woke up late, and sleep quality was affected as well.⁴⁻⁸⁾ Marelli's study among Italians found elevated rates of insomnia and poor sleep quality.⁹⁾ Besides the threat to physical health, the pandemic increased psy-

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chological problems like anxiety and depression.^{10,11)} Among the various first-line emergency measures, quarantine is associated with cognitive functions, sleep disturbance, and psychological problems like depression.^{12,13)} Many studies have shown the association between COVID-19 and widespread fear of contagion, perceived stress, anxiety, and depression symptoms.¹⁴⁻¹⁸⁾ Kowal found higher levels of stress among young people and females during the pandemic.¹⁹⁾

People tended to feel anxious about getting infected during the COVID-19 pandemic. Based on the Illness Anxiety Disorder model,²⁰⁾ a person in fear engages in reassurance-seeking behavior for relief from that fear. However, transient relief often leads to frequent and repetitive reassurance-seeking, which can counterproductively lead to greater anxiety and preoccupation with the virus.²⁰⁾ In a study on medical students during the COVID-19 pandemic, the mediation analysis showed that depression could affect people's obsessive thoughts about viral infection, and reassurance-seeking behavior could be a mediating factor between depression and obsession.²¹⁾ As psychological stress and severity of depression caused by the pandemic increased, repetitive reassurance-seeking behavior such as checking signs of infection or washing hands also increased. Rather than reducing obsessive thoughts and fear, reassurance-seeking behavior aggravated them. To measure an individual's coronavirus-related reassurance-seeking behavior, the Coronavirus Reassurance-Seeking Behaviors Scale (CRBS) was developed. However, it has not yet been validated in the Bangla language.

Self-efficacy means a person's belief about their ability to perform well and achieve specific outcomes.²²⁾ Self-efficacy affects people's decisions about their behavior in various social contexts and the activities they choose to engage in. Self-efficacy determines how long a person can endure and persist in an activity.²²⁾ One's perception of one's own self-efficacy affects health-related behavior such as pain experience and adherence to preventive health programs. In other words, perceived self-efficacy has a major impact on health.²³⁾ Regarding the mediation effect of self-efficacy on general well-being, a study involving surgical residents at Stanford Health Care showed that high self-efficacy has a positive correlation with general psychological well-being and a negative correlation with emotional and psychological distress.²⁴⁾

In this study, we first test the reliability and validity of the Bangla version of the CRBS among the general Bangladeshi population. Second, we explore the association of depression with four factors of psychological distress—viral anxiety, reassurance-seeking behavior, perceived stress, and poor quality of sleep—among the general population in Bangladesh during the COVID-19 pandemic. Also, we explore whether self-efficacy

mediates the association. This study presents five hypotheses.

H1: Viral anxiety is positively correlated with depression.

H2: Coronavirus reassurance-seeking behavior is positively correlated with depression.

H3: Perceived stress is positively correlated with depression.

H4: Poor sleep quality is positively correlated with depression.

H5: Self-efficacy mediates the association between psychological distress and depression.

METHODS

1. Participants and procedure

In this study, we utilized the data from the project "Assessing stress and anxiety to the viral pandemic during COVID-19 pandemic in Bangladesh: effect on people's self-efficacy and quality of life." The data were collected online from September 16, 2021, to October 4, 2021. Google forms® (Google LLC, Mountain View, CA) was used for the online survey form, which was distributed via social media (e.g., Messenger and WhatsApp) and e-mail. Our study used the snowball sampling method to recruit subject. After e-mails were sent to acquaintances with whom we had contact, each individual referred an additional potential subject, who can suggest another. E-mails were also sent via a university group email to reach a wider audience. The survey link was also posted on Facebook and shared with our Facebook friends, and distributed to our Messenger and WhatsApp contacts. The survey form was developed according to the Checklist for Reporting Results of Internet e-Surveys (CHERRIES) guidelines,²⁵⁾ and the usability and technical functionality of the e-survey form was tested by an investigator (Oli Ahmed) before its implementation.

The necessary sample size was calculated to be 384 for a 95% confidence level and a confidence interval of 5. All 399 individuals voluntarily participated in our survey, and no reward was provided for participation. Four individuals refused consent to use their information for research purposes and were excluded from the study. Thus, 66 respondents who didn't complete any item of self rating scales in the survey were also excluded from the study. Finally, 329 of 399 respondents were enrolled in this study. This study was approved by the Institutional Review Board of the University of Ulsan (2001R0043). Written informed consent for the participation was waived.

2. Measures

1) Stress and Anxiety to Viral Epidemics-6 Items (SAVE-6)

The SAVE-6 is a self-rating scale developed for measuring

one's anxiety response to the viral epidemic.²⁶⁾ It was derived from the SAVE-9 designed to assess healthcare workers' stress and viral anxiety.²⁷⁾ All 6 items can be rated from 0 (never) to 4 (always), and the total score may range from 0 to 24. High scores mean high levels of anxiety in response to viral epidemics. In this sample, we applied the Bangla version of the SAVE-6,²⁸⁾ and Cronbach's alpha in this sample was 0.835.

2) Patient Health Questionnaire-9 Items (PHQ-9)

The PHQ-9 scale is a self-rating scale for measuring the severity of depression.²⁹⁾ All 9 items can be scored from 0 (not at all) to 3 (nearly every day). The cut-off points for depression are 0–4 (minimal), 5–9 (mild), 10–14 (moderate), 15–19 (moderately severe), and 20–27 (severe). In this study, we defined 10 points as clinical depression. We applied the Bangla version of PHQ-9,³⁰⁾ and Cronbach's alpha was 0.896 in this sample.

3) General Self-efficacy Scale (GSES)

The GSE is a self-rating scale to assess one's optimistic self-beliefs that help cope with stressful events.³¹⁾ Each of the 10 items can be rated from 1 (Not at all true) to 4 (Exactly true), and a high total score reflects higher perceived general self-efficacy. In this study, we applied the Bangla version of GSES³²⁾ and Cronbach's alpha was 0.919 in this sample.

4) Coronavirus Reassurance-Seeking Behaviors Scale

The CRBS is a self-rating scale developed for measuring reassurance-seeking behaviors that people use to alleviate their worry about coronavirus infection.¹⁷⁾ The items measure the frequency of engaging in coronavirus-related reassurance-seeking behavior. Each of the 5 items is rated from 0 (not at all) to 4 (nearly every day) over the past 2 weeks, and total scores range from 0 to 20. Since the CRBS was not validated in Bangla, we tested the validity and reliability of the Bangla version of the CRBS in this sample. With the permission of the original developer, Dr. Sherman Lee, we translated the Bangla version of the CRBS through translation and back-translation methods. After the questionnaire was translated from English into Bangla by two bilingual experts, one Bangla version was synthesized from the two translated versions. Next, two bilingual experts back-translated the synthesized version into English. To identify any discrepancies in meaning, both back translations were synthesized into one and compared with the original English text. After confirming the lack of discrepancy, the Bangla translation was used in the final study.

5) Single Item Sleep Quality

Insomnia severity was assessed using a single question "How

would you rate your sleep quality overall in the last one month?". The answer options were: very good, fairly good, fairly bad, and very bad. Although other common questionnaires such as PSQI (Pittsburgh sleep quality index) are also available, our study considered lengthy format of PSQI which comprises of 19 items can be burdensome to respondents. Single Item Sleep Quality was revealed to be valid and reliable for screening sleep problems in various countries.⁴⁵⁾

3. Statistical analysis

First, the reliability and validity of the Bangla version of the CRBS were assessed. Confirmatory factor analysis (CFA) was used to check the factor structure of the Bangla version of the CRBS. Data suitability and sampling adequacy were checked using Kaiser–Meyer–Olkin (KMO) test and Bartlett's test of sphericity. Good fit for the model was defined as Comparative Fit index (CFI) ≥ 0.9 , Tucker-Lewis index (TLI) ≥ 0.9 , Root-Mean-Square-Error of Approximation (RMSEA) ≤ 0.9 , and Standardized Root-Mean-square Residual (SRMR) ≤ 0.08 . Reliability of internal consistency was examined using Cronbach's alpha and McDonald's omega. Convergent validity of the Bangla version of the CRBS with the SAVE-6 and PHQ-9 scales was checked using Pearson's correlation coefficients.

Second, the association of depressive symptoms with psychological status was analyzed. Descriptive statistics (percentages, mean, and standard deviation) were run to examine the distribution of responses. Pearson's correlation analysis was done to explore the association between depression and psychological status. To explore variables related to participants' depressive symptoms, linear regression analysis with the enter method was performed. Furthermore, to examine whether self-efficacy mediates the relationship between depression and psychological status, the bootstrap method was implemented with 2,000 resamples. Statistical analysis was performed using SPSS version 21.0 and AMOS version 27 for Windows (IBM Corp., Armonk, NY, USA), as well as JASP (Jasp teams, Amsterdam, Netherlands).

RESULTS

Through the analysis of the demographic distribution of participants, the results showed that among people with depression (PHQ-9 ≥ 10), the percentage of females was slightly higher (53.8%) than males ($p=0.003$) (Table 1). About 68.1% of the people without depression (PHQ-9 < 10) were vaccinated ($p < 0.001$). About 53.3% of people with depression reported a past psychiatric treatment history. In addition, 62.5% of people with depression reported that they were depressed or anxious or

Table 1. Clinical characteristics of participants with depression (PHQ-9 ≥ 10) and without depression (PHQ-9 < 10) (n=329)

Variables	With depression (n=169)	No depression (n=160)	p-value
Sex (female)	91 (53.8)	61 (38.1)	0.003
Age, years old	35.9 \pm 16.8	38.6 \pm 15.0	0.135
Marital status			0.258
Single	83 (49.4)	62 (38.8)	
Married, without children	16 (9.5)	17 (10.6)	
Married, with children	68 (40.5)	79 (49.4)	
Living area			0.105
City	113 (66.9)	120 (75.0)	
Village area	56 (33.1)	40 (25.0)	
Questions on COVID-19			
Were you kept in quarantine due to being tested positive for COVID-19? (yes)	60 (35.5)	54 (33.8)	0.738
Did you experience being infected with COVID-19? (yes)	25 (14.9)	39 (24.5)	0.028
Did you get vaccinated? (yes)	79 (46.7)	109 (68.1)	<0.001
(Among participants who didn't get vaccinated. n=141)	85 (94.4)	43 (84.3)	0.046
Do you want to get vaccinated, if it is available? (yes)			
Psychiatric history			
Have you ever experienced depression, anxiety, or insomnia or received treatment for any of those conditions? (yes)	90 (53.3)	30 (18.9)	<0.001
At present, do you think you are depressed or anxious, or do you need help for regulating and improving your mood? (yes)	105 (62.5)	28 (17.5)	<0.001
Rating scales			
Patient Health Questionnaire-9 items	16.0 \pm 4.8	4.8 \pm 3.1	<0.001
Stress and Anxiety to Viral Epidemics-6 items	11.3 \pm 5.2	7.9 \pm 4.8	<0.001
General Self-Efficacy	25.7 \pm 6.4	30.1 \pm 5.6	<0.001
Coronavirus Reassurance-Seeking Behaviors Scale	3.3 \pm 4.5	1.6 \pm 2.5	<0.001
Perceived Stress Scale	9.0 \pm 2.1	7.0 \pm 2.8	<0.001
Single Item Sleep Quality	1.5 \pm 0.8	0.9 \pm 0.7	<0.001

Table 2. Correlation coefficients of each variable in all participants

Variables	Age	PHQ-9	SAVE-6	PSS	GSE	CRBS
PHQ-9	-0.16**					
SAVE-6	0.06	0.32**				
PSS	0.04	0.40**	0.31**			
GSE	0.16**	-0.45**	-0.14**	0.04		
CRBS	-0.01	0.23**	0.29**	0.10	-0.16**	
Poor sleep quality	-0.06	0.48**	0.10	0.20**	-0.22**	0.03

**p < 0.01.

PHQ-9, Patient Health Questionnaire-9; SAVE-6, Stress and Anxiety to Viral Epidemics-6 items; PSS, Perceived Stress Scale; GSE, General Self-Efficacy; CRBS, Coronavirus Reassurance-Seeking Behaviors Scale

needed help with mood regulation ($p < 0.001$). People with depression reported higher scores on all six self-rating scales: Patient Health Questionnaire-9 items, Stress and Anxiety to Viral Epidemics-6 items, General Self-Efficacy, Coronavirus Reassurance-Seeking Behaviors Scale, Perceived Stress Scale, and Single-item Sleep Quality ($p < 0.001$). Thus, hypotheses 1, 2, 3, and 4 are supported.

1. Reliability and validity of bangla version of the CRBS

KMO value of 0.796 and Bartlett's sphericity ($p < 0.001$) showed that the data was suitable, and the sample was adequate for conducting CFA. CFA results showed that the single-factor model (Supplementary Table 1 in the online-only Data Supplement) of the Bangla version of the CRBS had a good model fit (CFI=1.00, TLI=1.03, RMSEA=0.00, SRMR=0.04). The factor loadings in CFA ranged between 0.60 and 0.80 (Table 2).

This scale has good internal consistency and reliability (Cronbach's alpha=0.86, McDonald's omega=0.87). The CRBS has significant correlation with SAVE-6 ($r=0.281, p<0.001$) and PHQ-9 ($r=0.227, p<0.001$).

2. Depression and psychological factors among the general population

The PHQ-9 score demonstrated a positive correlation with the scores for all psychological factors, SAVE-6, PSS, CRBS, and poor sleep quality. This suggests that people with higher levels of depression tend to exhibit higher viral anxiety, perceived stress, and reassurance-seeking behavior (Table 2). Furthermore, PHQ-9 and SAVE-6 showed a significantly negative correlation with the GSE score, indicating that people with more severe depression and viral anxiety have lower general

self-efficacy. People with higher general self-efficacy reported a lower CRBS score and tended to have better sleep quality (Table 2).

Linear regression analysis was performed to examine whether viral anxiety, reassurance-seeking behavior, perceived stress, and poor sleep quality can predict depression (Table 3). Depression was predicted by the SAVE-6 ($\beta=0.12, p=0.005$), CRBS ($\beta=0.10, p=0.019$), PSS ($\beta=0.30, p<0.001$), and poor sleep quality ($\beta=0.32, p<0.001$) scales. As age increased, the PHQ-9 score reduced ($\beta=-0.11, p=0.007$). Also, the GSE score showed a negative correlation with the PHQ-9 score ($\beta=-0.34, p<0.001$), implying that lower general self-efficacy can exacerbate depression. Viral anxiety, reassurance-seeking behavior, perceived stress, poor sleep quality, and general self-efficacy can explain 49% of depression among the general population (adjusted

Table 3. Linear regression analysis predicting high depression in the general population during the COVID-19 pandemic

Dependent variables	Included parameters	Beta	p-value	Adjusted R ²	F, p-value
PHQ-9	Age	-0.11	0.007	0.49	F=54.2 p<0.001
	SAVE-6	0.12	0.005		
	CRBS	0.10	0.019		
	PSS	0.30	<0.001		
	GSE	-0.34	<0.001		
	Poor sleep quality	0.32	<0.001		

PHQ-9, Patient Health Questionnaire-9 items; SAVE-6, Stress and Anxiety to Viral Epidemics - 6 items; CRBS, Coronavirus Reassurance-seeking Behavior Scale; PSS, Perceived Stress Scale; GSE, General Self-Efficacy

Table 4. Direct, indirect, and total effects observed in mediation analysis

Effect	Standardized estimator	S.E.	Z-value	p	95% CI
Direct effect					
SAVE-6 → PHQ-9	0.11	0.06	2.61	0.009	0.04 to 0.26
CRBS → PHQ-9	0.10	0.08	2.37	0.018	0.03 to 0.33
PSS → PHQ-9	0.30	0.11	7.02	<0.001	0.55 to 0.98
Poor sleep quality → PHQ-9	0.33	0.36	7.88	<0.001	2.12 to 3.53
Indirect effect					
SAVE-6 → GSE → PHQ-9	0.04	0.03	2.12	0.034	0.003 to 0.11
CRBS → GSE → PHQ-9	0.04	0.04	2.21	0.027	0.01 to 0.16
PSS → GSE → PHQ-9	-0.05	0.05	-2.27	0.023	-0.23 to -0.03
Poor sleep quality → GSE → PHQ-9	0.08	0.19	3.79	<0.001	0.34 to 1.07
Component					
SAVE-6 → GSE	-0.13	0.07	-2.19	0.029	-0.29 to -0.02
GSE → PHQ-9	-0.36	0.04	-8.64	<0.001	-0.47 to -0.30
CRBS → GSE	-0.13	0.09	-2.29	0.022	-0.40 to -0.03
PSS → GSE	0.13	0.13	2.35	0.019	0.05 to 0.57
Poor sleep quality → GSE	-0.23	0.43	-4.22	<0.001	-2.66 to -0.97
Total effect					
SAVE-6 → PHQ-9	0.16	0.06	3.31	<0.001	0.08 to 0.33
CRBS → PHQ-9	0.14	0.08	3.14	0.002	0.10 to 0.43
PSS → PHQ-9	0.25	0.12	5.37	<0.001	0.41 to 0.88
Poor sleep quality → PHQ-9	0.41	0.39	9.10	<0.001	2.77 to 4.29

S.E., standard error; CI, confidence interval; SAVE-6, Stress and Anxiety to Viral Epidemics-6 items; PHQ-9, Patient Health Questionnaire-9 items; CRBS, Coronavirus Reassurance-seeking Behavior Scale; PSS, Perceived Stress Scale; GSE, General Self-Efficacy

$R^2=0.49$, $F=54.2$, $p<0.001$)

Table 4 shows the results of the direct, indirect, and total effects of each psychological factor on depression by mediation analysis. It indicates that general self-efficacy mediates the effect of viral anxiety, reassurance-seeking behavior, perceived stress, and poor sleep quality on depression. The total effect of 0.16 for SAVE-6 comprises a direct effect of 0.11 ($p=0.009$, 95% CI=0.04–0.26) and an indirect effect of 0.04 ($p=0.034$, 95% CI=0.003–0.11). For CRBS, the total effect of 0.14 comprises a direct effect of 0.10 ($p=0.018$, 95% CI=0.03–0.33) and an indirect effect of 0.04 ($p=0.027$, 95% CI=0.01–0.16). For perceived stress, the total effect of 0.25 comprises a direct effect of 0.30 ($p<0.001$, 95% CI=0.55–0.98) and an indirect effect of -0.05 ($p=0.023$, 95% CI=-0.23–0.03). Finally, the total effect of poor sleep quality on depression (0.41) comprises a direct effect of 0.33 ($p<0.001$, 95% CI=2.12–3.53) and an indirect effect of 0.08 ($p<0.001$, 95% CI=0.34–1.07).

The mediation model in Fig. 1 indicates that viral anxiety, perceived stress, reassurance behavior, and poor sleep directly influenced depression. These relationships were partially mediated by general self-efficacy. Viral anxiety, reassurance-seeking behavior, and poor sleep quality reduced self-efficacy, leading to greater depression (Table 4). In contrast, perceived stress increased self-efficacy and decreased the severity of depression. Thus, hypothesis 5 is partially supported.

DISCUSSION

In this study, we concluded that the single-factor model of

the Bangla version of the CRBS has sufficient validity and reliability. Mediation analysis showed that in Bangladesh, people's viral anxiety, reassurance-seeking behavior, perceived stress, and poor sleep quality directly affected their severity of depression. Perceived stress increased self-efficacy and decreased the severity of depression, contrary to viral anxiety, reassurance-seeking behavior, and poor sleep quality which reduced self-efficacy and aggravated depression. The COVID-19 pandemic has affected not only physical health but also psychological health worldwide. Like other countries, Bangladeshis also experienced several nationwide lockdowns. Such conditions may have caused psychological distress, leading to an increase in viral anxiety, perceived stress, and poor sleep quality. A study on the relationship between perceived stress and depression showed that stress among Slovak university students increased due to the pandemic and that stress was positively correlated with the severity of depression.³³ Furthermore, anxiety and perceived stress showed a significantly positive relationship with depression in quarantined populations in China during the COVID-19 pandemic with the Omicron variant.³⁴ Based on the illness anxiety disorder model, the fear of COVID-19 infection increases one's anxiety sensitivity.²⁰ There is a close relationship between anxiety and depression, and one study showed that the risk and severity of depressive symptoms were increased by general anxiety and work-related stress in response to viral infection during the pandemic.³⁵ Regarding the relationship between poor sleep quality, depression, and anxiety, young American adults experienced high rates of sleep problems during the COVID-19 pandemic.³⁶ The study also il-

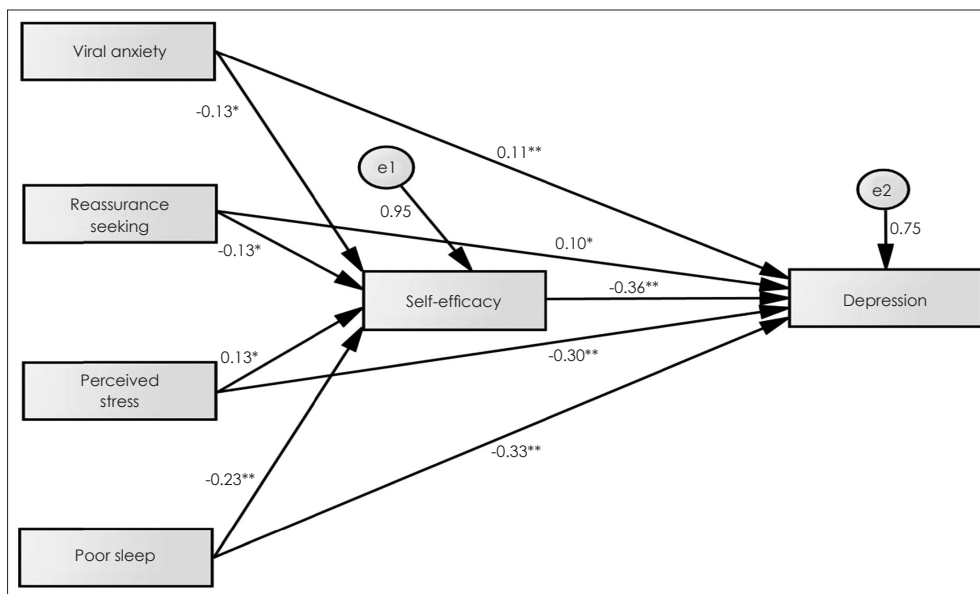


Fig. 1. Mediation model showing that the effect of viral anxiety, reassurance-seeking behavior, perceived stress, and poor sleep quality (independent variables) on depression (outcome) is mediated by self-efficacy (mediator).

illustrated that depression and anxiety predict sleep quality, and viral anxiety is associated with poor sleep quality.³⁶⁾

The fear of COVID-19 infection provoked viral anxiety and increased the incidence of obsessive-compulsive disorder-related symptoms.³⁷⁾ The fear of infection led to an increase in excessive self-diagnosis for infection-related symptoms, compulsive and repetitive checking, and reassurance-seeking behavior.³⁸⁾ Even though recurrent reassurance-seeking behaviors can provide temporary relief, they ultimately exacerbate anxiety.²⁰⁾ Immoderate reassurance-seeking behavior can be a risk factor for depressive symptoms and can predict depressive reactions to stress in the future.³⁹⁾ Also, reassurance-seeking behavior can partially mediate the effect of depression on obsession with COVID-19 infection.²¹⁾

Previous research has shown that self-efficacy is negatively correlated with various psychological factors such as perceived stress, depression, and anxiety.⁴⁰⁾ One study suggested that higher self-efficacy can prevent psychological distress during the COVID-19 pandemic period.⁴¹⁾ Another study about patients with radical prostatectomy demonstrated that self-efficacy works as a mediator between social support and depression.⁴²⁾ Moreover, higher self-efficacy and sufficient social support can improve depressive symptoms.⁴²⁾ There was an evident negative relationship between self-efficacy and depression among people who were isolated due to social distancing during the COVID-19 pandemic in China.³⁴⁾ Therefore, it is quite reasonable to surmise that improving self-efficacy is key to reducing depression.

The results of the mediation analysis showed that viral anxiety, poor sleep quality, and reassurance-seeking behavior aggravated depression by decreasing self-efficacy. In contrast, perceived stress increased self-efficacy and resultantly decreased depression severity. This result conflicts with most previous studies on the relationship between perceived stress and self-efficacy. Many previous studies link higher perceived stress with lower self-efficacy.⁴³⁾ In contrast, a study on the relationship between perceived stress and self-efficacy in Chinese teachers reported differences in the relationship in participants from different types of institutions.⁴⁴⁾ In that study, the multi-group analysis showed a positive relationship between perceived stress and self-efficacy in teachers from research-oriented universities when the stress was caused by intrinsic factors related to teaching such as striving to achieve higher quality of teaching.⁴⁴⁾ Likewise, the result of our study shows that sometimes perceived stress can increase self-efficacy depending on the context and the individual's mindset. Some people may regard perceived stress as an opportunity for growth and believe in their own self-efficacy to manage stressful events. Viewing the results of our study comprehensively, various psychological factors

could have aggravated depression in the COVID-19 pandemic period. While viral anxiety, reassurance-seeking behavior, and poor sleep quality lowered self-efficacy and exacerbated depression, perceived stress strengthened self-efficacy. Based on our results, we can predict that strengthening self-efficacy can help alleviate the severity of depression caused by several psychological burdens.

1. Limitations

There are some limitations to this study. First, as the study is cross-sectional, there is ambiguity in the causal relationships between the variables. Moreover, as the study was conducted at a single point in time, changes in variables over longer periods could not be considered. Longitudinal studies which may make up for this limitation are in need in the future. Second, as the study was conducted approximately two years after the onset of the first wave of COVID-19 infections, some people in the sample might have adapted to the pandemic conditions. Getting used to the pandemic may have caused changes in their level of viral anxiety, perceived stress, and self-efficacy, as well as the relationship between those factors. Third, demographic focus is narrow. The mean age of both groups, that is, people with and without depression, is in their thirties, and relatively young people participated more in the study than elderly people. As this study was conducted during COVID-19 pandemic era, we implemented an online survey as face-to face interview can aggravate the spread of virus. We suppose that this study can have a limitation with regard to representing people of all ages, as elderly people are not familiar with digital devices and social media than younger people.

2. Conclusion

In conclusion, we observed that viral anxiety, reassurance-seeking behavior, poor sleep quality, and perceived stress are positively correlated with the severity of depression in both direct and indirect ways. All four psychological factors directly aggravate depression. Regarding indirect correlation, general self-efficacy works as a mediator. Viral anxiety, reassurance-seeking behavior, and poor sleep quality aggravate self-efficacy, thereby worsening depression. On the other hand, perceived stress strengthens self-efficacy. As depression during the pandemic period is correlated with diverse psychological factors, it is crucial to develop coping strategies to reinforce self-efficacy and to deal with anxiety, poor sleep quality, and perceived stress.

Supplementary Materials

The online-only Data Supplement is available with this article at <https://doi.org/10.22722/KJPM.2024.32.1.34>.

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Conflicts of Interest

The authors have no financial conflicts of interest.

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