



Stress and the development of depressive symptoms among Facebook users: A moderated mediation model of poor sleep quality and anxiety

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Abstract

There are positive correlations between stress, anxiety, depression and poor sleep quality. Recent studies have shown that Facebook users can experience stress, anxiety, depression, and poor sleep quality. However, there are very few studies investigating the moderated mediation model of the association between stress and depression symptoms among Facebook users. Using data collected on a sample of 354 Facebook users with the average age of 25.13 years old in Vietnam, our study examines a moderated mediation model to account for the progression from stress symptoms to depression symptoms among Facebook users. The DASS 21 and Pittsburgh Sleep Quality Index were used to measure indicators of stress, anxiety, depression, and sleep quality. After controlling gender and age of Facebook users, the results indicated that Facebook users who experienced stress symptoms tended to be depressed; furthermore, this association was mediated by Facebook users' anxiety symptoms, while the path between Facebook users' anxiety symptoms and depressive symptoms was moderated by poor sleep quality. Findings of this study have revealed that interventions and services that help prevent the development of stress and anxiety symptoms, and improve sleep quality are potentially important to decrease depressive symptoms among Facebook users.

Keywords Stress · Depressive symptoms · Poor sleep quality · Anxiety · Vietnamese

Introduction

Stress, anxiety and depression are symptoms of many mental disorders. The term “stress” is used to denote the effect of anything that seriously threatens to keep an individual's internal environment constant in the face of environmental change (Schneiderman et al., 2005). Anxiety is considered as a state of high alertness, associated with an increase in overall sensitivity due to conflict or uncertainty (Lukasik et al., 2019). Anxiety has characteristics such as limited control over anxious thoughts, a heavy focus on negative stimuli, and inattentive bias (Lukasik et al., 2019). Depression is also considered as a major risk factor with serious personal and social consequences (Zhao & Yiyue, 2018). Several previous studies have revealed that depressed individuals are more likely to be associated with suicidal behavior

or suicidal ideation (Wu et al., 2017; Kamali et al., 2019; Levy et al., 2020). In a meta-analysis, Salari et al. (2020) reported that the prevalence of stress, anxiety and depression among the general population were 29.6%, 31.9%, and 33.7%, respectively.

The Mediating Effect of Anxiety on Stress and Depression

Stress, anxiety, and depression are closely related. Firstly, numerous studies have reported that stress is positively related to depression (Rabadi et al., 2017; Saxena et al., 2019). The stress exposure model indicated that stress symptoms have the potential to increase an individual's risk of suffering from depression (Liu et al., 2017; Valikhani et al., 2020). In favor of this model, previous studies have shown that episodic or acute stress, chronic stress, and negative events increase an individual's risk of depression. Stress symptoms have an important role in the onset of depression, relapse and exacerbation of depressive symptoms (Liu & Alloy, 2010). There are many factors that can explain the relationship between stress and depression, including

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coping (Evans et al., 2015), sleep quality (Liu et al., 2017); anxiety (Ghorbani & Krauss, 2008), and social support (Talwar et al., 2017). Previous studies have proven that when an individual is stressed, they tend to experience anxiety (Ghorbani & Krauss, 2008), reduce social support (Talwar et al., 2017), have poor sleep quality (Liu et al., 2017), less use of healthy coping strategies (Evans et al., 2015), and thus develop depressive symptoms. Moreover, according to Valikhani et al. (2020), by exerting mental pressure, chronic stress can deplete an individual's energy and weaken the immune system, and this condition develops depressive symptoms. Secondly, stress is one of the risk factors that lead to the development of an individual's anxiety symptoms. Previous studies reported that stressed individuals tend to develop anxiety symptoms (Valikhani & Goodarzi, 2017). Valikhani et al. (2020) explained that the burden of stressful situations may lead to concern and as a result anxiety in the individual. Finally, anxiety and depression are often highly correlated with each other (Jacobson & Newman, 2014). Previous studies have identified anxiety as a risk factor for depression (Jacobson et al., 2017; Havnen et al., 2020; Li et al., 2018). Previous studies have explained that adolescents with high anxiety tend to experience insomnia, which in turn increases their experiences of depression (Li et al., 2018). Therefore, insomnia is considered a risk factors for depression. On the other hand, the association between anxiety and depression is mediated by perceived emotional social support (Jacobson et al., 2017), close and group relationships (Jacobson & Newman, 2016), and avoidance response (Jacobson & Newman, 2014).

The Moderating Effect of Poor Sleep Quality on Anxiety and Depression

Sleep quality refers to the satisfaction of an individual to experience sleep and its main components (Wang & Bíró, 2020). In the literature, there are evidences that sleep quality is linked to both anxiety (Oh et al., 2019; Richardson et al., 2019; Chueh et al., 2019) and depression symptoms (Liu et al., 2017; Richardson et al., 2019; Ho, 2021). Sleep problems (sleep disturbance, sleep disorders) are considered one of the prominent symptoms of depression (Fang et al., 2019). There is an evidence that depression can lead to sleep disorders (AbdulRahman et al., 2018). However, according to Paunio et al. (2015), poor sleep quality predicts depression. Previous studies have reported that individuals with poor sleep quality tend to experience higher levels of depression (Liu et al., 2017; Richardson et al., 2019; Ho, 2021). It has been explained that individuals with poor sleep quality tend to experience symptoms of depression through decreased ability to regulate emotions (O'Leary et al., 2017) and increase symptoms of stress (Zhang et al., 2018). Similarly, sleep quality are also related to individual anxiety

symptoms (Oh et al., 2019; Richardson et al., 2019). According to Chueh et al. (2019), anxiety is a major predictor of poor sleep quality. However, Zhang et al. (2018) demonstrated that students with poor sleep quality often experience high levels of perceived stress, which in turn develop anxiety symptoms. On the other hand, anxiety has been identified as an important predictor of depression symptoms (Li et al., 2018; Havnen et al., 2020). Hence, both sleep quality and anxiety level are important, in terms of both the effects on the health of the individual and quality of life (Tekere & Luleci, 2017). To our knowledge, no studies have reported the interactive effects of low sleep quality and anxiety on depression symptoms. However, there is research demonstrating the existence of the interaction between anxiety and poor sleep quality (Dong et al., 2020). From the above analyzes, we assume that to low sleep quality Facebook users, the positive effect of anxiety on depression becomes stronger and vice versa, to good sleep quality Facebook users, the positive effect of anxiety on depression becomes weaker. This study was built on prior work by considering whether poor sleep quality moderates the path from anxiety to depression symptoms.

Facebook is the most popular social networking site with a huge number of users worldwide (Tandoc et al., 2015). Besides its benefits, Facebook has been bringing risks to its users. Previous studies have shown that Facebook users can experience stress, anxiety, depression (Labrague, 2014; Nasser et al., 2019), and poor sleep quality (Bowler & Bourke, 2019). Facebook users were found to be anxiety, depression and other mental health outcomes (Kaye, 2019) and poor sleep quality (Bowler & Bourke, 2019). In Vietnam, there are a few prominent studies on stress, anxiety, poor sleep quality and depression (Tran et al., 2019; Nguyen et al., 2013; Pham et al., 2019; To & Nguyen, 2015). The estimated prevalence of stress, anxiety and depression in the Vietnamese population sample ranges from 3.4% to 18.5% (for stress), 7.0% to 39.8% (for anxiety) and 4.9% to 13.2% (for depression) (Tran et al., 2019; Le et al., 2020). Poor sleep quality has been reported in samples of Vietnamese patients (Le et al., 2019), pregnant women (Huong et al., 2019) and youths (Zhang et al., 2017), with prevalence ranging from 26.6% (Le et al., 2019) to 80.9% (Zhang et al., 2017). Similar to findings in other countries (Havnen et al., 2020; Richardson et al., 2019), in the Vietnamese sample, previous studies have found that there is a strong linear correlation between stress and anxiety and depression (Chitavong & Mai, 2018) and poor sleep quality increased the risk of depression in Facebook users (Ho, 2021). In the world as well as in Vietnam, there are very few studies investigating the moderated mediation model of the association between stress and depression symptoms. Therefore, it is important to explore the impact of stress, anxiety and poor sleep quality on depression in Facebook users as well as

to explore the mechanism of these relationships. This not only provides additional empirical evidence on the relationship between stress, anxiety, low sleep quality and depression among Facebook users, but also forms the basis for the development of depression prevention programs and improving mental health among Facebook users.

This Study

This study aims to examine a complex theoretical model in which anxiety was considered to be a mediator factor and poor sleep quality were hypothesized as a moderator factor in the path from stress to depression. Being guided by previous studies, this study proposes the following hypotheses:

- H1. Stress would be positively associated with the development of depressive symptoms among Facebook users in Vietnam.
- H2. Anxiety would mediate the relationship between stress and the development of depressive symptoms among Facebook users in Vietnam.
- H3. Poor sleep quality would moderate the mediated relationship between stress and the development of depressive symptoms among Facebook users in Vietnam.

The proposed research model is portrayed in Fig. 1.

Methods

Sample and Procedure

An online cross-sectional study was conducted in October 2020. All participants belong to an administrative body in central Vietnam. The Slovin’s Formula was used to calculate the sample size ($N = 3017$, $e = 5\%$ and $n \geq 352$ participants). To recruit participants, probability sampling method (stratified sampling technique) was used. The researcher contacted the participants (via Facebook) to ask for help. After receiving a request for help, 361 participants completed a

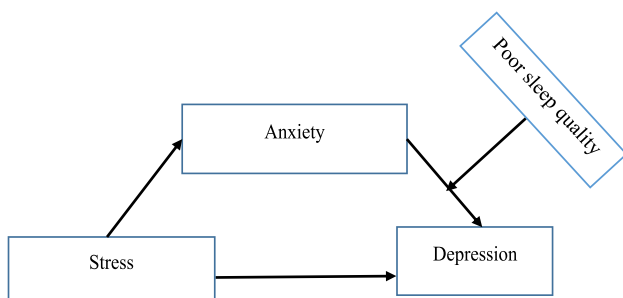


Fig. 1 Hypothetical model

questionnaire. All participants voluntarily answered the questionnaire. Seven invalid responses (responses which participants chose the same answer for nearly every question in the study) were deleted before processing data. As a result, 354 responses were considered valid, with an efficiency rate of 98.06%. This sample has a mean age of 25.13 (SD = 7.234), ranging from 15 to 49. Male respondents comprised 40.7% (n = 162) of the sample and the majority are urban residents (63.6%). Average time spent on Facebook equals to 1–3 h per day (see Table 1).

Measures

All measures taken are in Vietnamese and have been validated with Vietnamese samples.

Time Spent on Facebook Facebook users were asked how much time they spend on Facebook during a day with the following response options: 1 = <1 h a day, 2 = 1–3 h/day, 3 = 3–5 h/day, and 4 = 5–8 h/day.

The Depression Anxiety Stress Scale 21 (DASS 21) To measure the symptoms of anxiety, stress, and depression among Facebook users, we used the DASS 21. DASS 21 scale was developed by Lovibond and Lovibond (1995). The full version of DASS includes 42 items divided into three sub-scales to test an individual’s experience of anxiety, stress, and depression. DASS -21 is a simplified version of the DASS. DASS-21 is a simplified version of DASS with 3 sub-scales of depression, anxiety and stress, each consists of 7 items. Sample items include “I was worried about situations in which I might panic and make a fool of myself” (anxiety); “I found it hard to wind down” (stress) and “I was unable to become enthusiastic about anything” (depression). The

Table 1 Demographic of respondents

	n	%
<i>Gender</i>		
Male	162	45.8
Female	192	54.2
<i>Age, M ± SD</i>		
	25.13 ± 7.234	
<i>Permanent residence</i>		
Rural	129	36.4
Urban	225	63.6
<i>Online time</i>		
< 1 h / day	136	38.4
1–3 h/ day	125	35.3
3–5 h/ day	50	14.1
5–8 h/ day	43	12.1
College students	211	59.6
Non- college students	143	40.4

4-point Likert scale fluctuates from 0 (never) to 3 (almost always). Previous studies have reported the validity of DASS 21, while the Vietnamese version of DASS 21 indicates good reliability (Tran et al., 2013; Le et al., 2017). In this study, α values of the subscales of depression, anxiety and stress were 0.883, 0.779 and 0.858, respectively.

The Pittsburgh Sleep Quality Index (PSQI) PSQI is used to measure the sleep quality of Facebook users. The PSQI includes 18 items that assess the seven components of sleep over the past month such as sleep duration, use of sleeping medication, sleep disturbances, sleep latency, subjective sleep quality, habitual sleep activity and daytime dysfunction. Sample items include “When have you usually gone to bed?” (Open question) and “Wake up in the middle of the night or early morning” (Closed question, with answer options including 0 = Not during the past month, 1 = Less than once a week, 2 = Once or twice a week and 3 = Three or more times a week). The sleep quality score was calculated by adding up the 7-component score. Overall scores ranged from 0 to 21, higher scores indicate poorer sleep quality (PSQI >5 indicates poor sleep quality) (Buysse et al., 1989). The Vietnamese version of this scale has good reliability $\alpha = 0.789$ (To & Nguyen, 2015) and in this study, $\alpha = 0.713$.

Data Analysis

In this study, to calculate the mean score, standard deviation and correlation coefficient among the studied variables, we use SPSS software version 20.0. To explore the mediating role of anxiety in the path from stress to the development of depressive symptoms, Model 4 of Hayes’s (2013) process macro was applied. Model 14 was used to determine whether the mediational effect is moderated by poor sleep quality.

Results

Preliminary Analyses

Table 2 presents mean, SD and the correlations among the variables studied. On a scale of 0–42, the mean scores for

Table 2 Pearson correlations, mean, and standard deviations among study variables

	Mean	SD	Stress	Anxiety	Depression
Stress	14.85	9.093			
Anxiety	10.03	7.985	0.762**		
Depression	9.97	8.972	0.767**	0.724**	
Poor sleep quality	7.34	3.568	0.488**	0.471**	0.497**

** $p < 0.01$

stress, anxiety and depression were 14.85 (SD = 9.093), 10.03 (SD = 7.985) and 9.97 (SD = 8.972), respectively. According to Table 2, in this sample, Facebook users had mild stress, moderate anxiety and low depression. On a scale of 0–21, the mean scores for poor sleep quality was 7.34 (SD = 3.568), indicating that Facebook users have poor sleep quality.

Bivariate correlations indicated in Table 2 suggested that stress was positively related to anxiety and depression ($r = 0.762$, $p < 0.01$ and $r = 0.767$, $p < 0.01$); anxiety was positively correlated with depression ($r = 0.724$, $p < 0.01$). The correlation values above 0.70 indicated that there are strongly significant correlations among stress – anxiety – depression.

Table 2 indicated that poor sleep quality was positively related to stress ($r = 0.488$, $p < 0.01$) anxiety ($r = 0.471$, $p < 0.01$) and depression ($r = 0.497$, $p < 0.01$). The correlation coefficients of poor sleep quality with stress - anxiety - depression were greater than 0.40, indicating the moderate correlations between pairs of variables.

Mediation Analyses

Table 3 presents the results of the mediation analysis. Table 2 indicated that stress can positively predict depression; when treating stress and anxiety as predictors, their effects on depression were both significant. The indirect effect of stress on depression through anxiety was supported ($B = 0.254$, 95%CI = [0.156, 0.361]). Therefore, anxiety partially mediated the relationship between stress and depression (see Fig. 2).

Moderated Mediation Analyses

A model of moderated mediation was used to examine whether anxiety mediated the relationship between stress

Table 3 Bias-corrected bootstrap test on mediating effects

Paths	β	SE	95%CI	
			Low	High
Stress - depression	0.521***	0.050	0.424	0.619
Stress - anxiety	0.661***	0.032	0.599	0.723
Anxiety - depression	0.384***	0.056	0.274	0.494
Stress - anxiety -depression	0.254	0.052	0.156	0.361
The total effect	0.775***	0.035	0.706	0.845
Age - anxiety	-0.059	0.040	-0.137	0.019
Gender - anxiety	-0.762	0.556	-1.855	0.332
Age - depression	0.101*	0.042	0.019	0.183
Gender - depression	-0.019	0.584	-1.168	1.130

* $p < 0.05$, *** $p < 0.001$. Gender: 1 = male, 2 = female

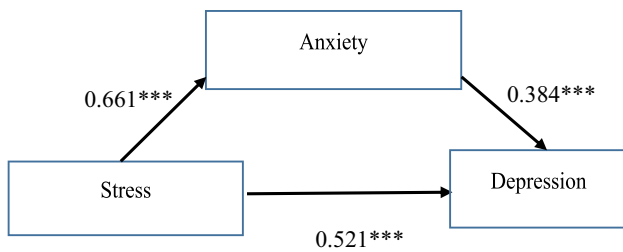


Fig. 2 Mediation model of the indirect effect of stress on the depression

Table 4 Moderated mediation analysis

Paths	β	SE	95%CI	
			Low	High
Stress – Anxiety	0.661***	0.032	0.599	0.723
Stress - Depression	0.498***	0.049	0.402	0.595
Anxiety - Depression	0.309***	0.056	0.200	0.419
Poor sleep quality - Depression	0.268**	0.091	0.088	0.447
Anxiety* Poor sleep quality	0.037***	0.009	0.020	0.054
Age - Anxiety	-0.059	0.040	-0.137	0.019
Gender - Anxiety	-0.762	0.556	-1.855	0.331
Age - Depression	0.092*	0.040	0.013	0.171
Gender - Depression	-0.121	0.564	-1.231	0.989
<i>Conditional effects of the focal predictor at values of the moderator</i>				
- 1 SD below mean Poor sleep quality	0.179**	0.068	0.044	0.313
+ 1 SD below mean Poor sleep quality	0.440***	0.059	0.324	0.556
<i>Conditional indirect effect at different values of poor sleep quality</i>				
- 1 SD below mean Poor sleep quality	0.118**	0.056	0.016	0.236
+ 1 SD below mean Poor sleep quality	0.291***	0.051	0.195	0.393
<i>Index of moderated mediation</i>				
	0.024	0.007	0.011	0.037

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$. Gender: 1 = male, 2 = female

and depressive symptoms, while simultaneously examining whether this mediation was moderated by poor sleep quality.

Table 4 presents the results of moderated mediation. Table 3 shows that both stress and anxiety significantly positively predict the development of depression symptoms ($B = 0.498$, $p < 0.001$, $SE = 0.049$, $95\%CI = [0.402, 0.595]$ and $B = 0.309$, $p < 0.001$, $SE = 0.056$, $95\%CI = [0.200, 0.419]$, respectively). Stress significantly positively predict anxiety ($B = 0.661$, $p < 0.001$, $SE = 0.032$, $95\%CI = [0.599, 0.723]$).

The interaction between anxiety*poor sleep quality was statistically significant ($B = 0.037$, $p < 0.001$, $SE = 0.009$, $95\% CI = [0.020, 0.054]$), suggesting poor sleep quality

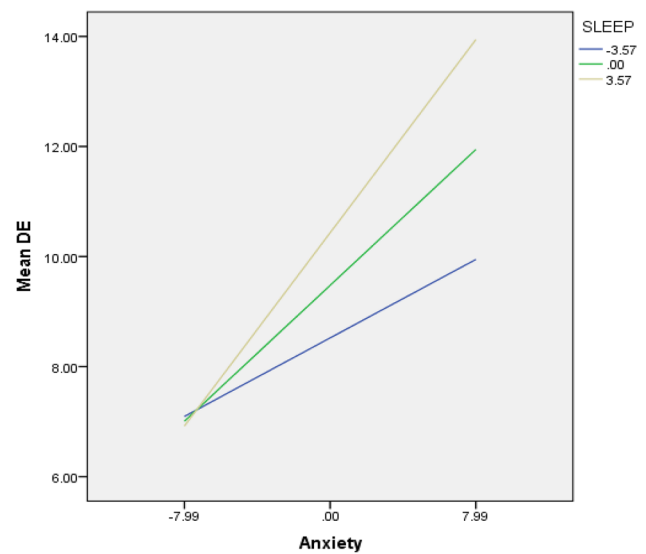


Fig. 3 Poor sleep quality as moderator of the relationship between anxiety and depression

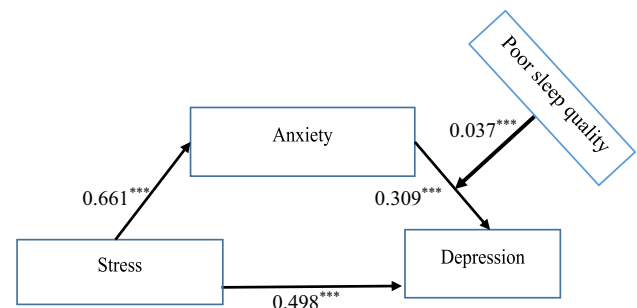


Fig. 4 The final moderated mediation model

moderated the effects of anxiety on depression. The simple slopes indicated that at -1 SD on poor sleep quality, the positive correlation between anxiety and depression is weaker ($B = 0.179$, $p < 0.01$, $SE = 0.068$, $95\%CI = [0.044, 0.313]$); meanwhile, at +1 SD on poor sleep quality, this relationship is stronger ($B = 0.440$, $p < 0.001$; $SE = 0.059$, $95\%CI = [0.324, 0.556]$) (Fig. 3).

The results of the conditional indirect effects exploration showed that the overall indirect effect was more remarkable for Facebook users who have poor sleep quality ($B = 0.291$, $0 < 0.001$, $SE = 0.051$, $95\%CI = [0.195, 0.393]$) than for those who have good sleep quality ($B = 0.118$, $p < 0.01$, $SE = 0.056$, $95\%CI = [0.016, 0.236]$). The index of moderated mediation was statistically significant ($B = 0.024$, $SE = 0.007$, $95\%CI = [0.011, 0.037]$), indicating that poor sleep quality significantly moderated the indirect effect of stress on depression. In other words, anxiety mediates the relationship between stress and symptoms of depression and this mediation is moderated by poor sleep quality (Fig. 4).

Discussion

In general, Facebook plays an important role in human life. Thanks to Facebook, people from all over the world can make friends and communicate with each other. People use Facebook to text, make calls, share photos, videos, exchange information, study and do business... Facebook can fulfill an individual's psychological and emotional needs, relieve loneliness, and establish new relationships with the opposite gender (Babacan, 2016). Facebook is also seen as a mean for individuals to overcome stress and depression (Revathy et al., 2018; Brailovskaia et al., 2018).

On the other hand, many other studies have reported that Facebook users tend to experience problems with stress, anxiety, poor sleep quality, and depression (Nasser et al., 2019; Bowler & Bourke, 2019). This study examines the role of anxiety and poor sleep quality as mediating and moderating mechanisms in the connection between stress and depression among Facebook users. Our findings provide a more nuanced understanding of how and when the stress is related to depressive symptoms among Facebook users.

Consistent with Hypothesis 1, we have found that stress was positively associated with depression symptoms among Facebook users; this finding concurs with that of previous studies (Liu et al., 2017; Valikhani et al., 2020; Saxena et al., 2019). Therefore, in this study, Facebook users with high stress levels tend to experience depression.

Consistent with Hypothesis 2, we found that anxiety symptoms mediated the relationship between stress and depression symptoms among Facebook users in Vietnam. The researched results demonstrated that stress can affect depression of Facebook users directly. In addition, it implied that stress affects depression of Facebook users indirectly through anxiety. Consistent with previous findings (Valikhani & Goodarzi, 2017; Valikhani et al., 2020), we have found that stress symptoms positively associated with anxiety. Like Valikhani et al. (2020), we believe that the burden of stressful situations may lead to concern, which in turn increases the risk of anxiety symptoms in Facebook users. In addition, we have found that anxiety symptoms was positively associated with depression among Facebook users, which supports previous findings (Li et al., 2018; Oh et al., 2019). In accordance with previous studies, individuals with high anxiety symptoms tend to experience sleep problems, lack emotional support, and use avoidance responses more frequently, thus contributing to an increase in depressive symptoms (Oh et al., 2019; Li et al., 2018). These findings suggest that symptoms of anxiety play an important role in the path from stress symptoms to depression. Thus, the reduction of anxiety symptoms will help Facebook users with symptoms of high stress from the risk of depression.

In line with Hypothesis 3, this study found that poor sleep quality moderated the indirect effect of stress symptoms on the development of depressive symptoms through anxiety symptoms of Facebook users. The simple slopes indicated that the impact leading from stress and anxiety to depression was increased in individuals with poor sleep quality and was decreased in individuals with better sleep quality. According to the Johnson-Neyman technique, we found that for Facebook users with poor sleep quality, the positive effects of anxiety on depression become stronger; meanwhile, for Facebook users with better sleep quality, the positive effects of anxiety on depression become weaker. These findings can be explained as follows: First, there is evidence that individuals with high levels of anxiety tend to experience depression (Oh et al., 2019; Li et al., 2018). Second, this study found that poor sleep quality was positively associated with an increase in depressive symptoms among Facebook users in Vietnam, which supports previous studies (Li et al., 2018; Liu et al., 2019; Richardson et al., 2019). Therefore, Facebook users with poor sleep quality and high anxiety had the highest levels of depression. In contrast, Facebook users with better sleep quality and low anxiety had the lowest levels of depression (see Fig. 3). This finding provides evidence that poor sleep quality is a risk factor for depression in Facebook users.

In the past, many studies have separately investigated the contribution of stress and anxiety symptoms to the development of depression. This study investigated both factors simultaneously (stress and anxiety) and demonstrated that symptoms of anxiety could be an important explanatory mechanism for the relationship between stress and depression among Facebook users. Furthermore, this study is the first one to investigate the joint contribution of anxiety symptoms and poor sleep quality on depression among Facebook users. This study revealed that Facebook users' anxiety symptoms mediated the pathway from stress symptoms to depression. In addition, this study indicated that poor sleep quality moderated indirect effects from stress to depression through anxiety. These findings can contribute to a better understanding of the paths and conditions as well as the effects of stress on the increase in depressive symptoms among Facebook users. Furthermore, these findings can provide constructive suggestions for reducing depression and improving the mental health of Facebook users. Therefore, early recognition of anxiety symptoms, taking anxiety reduction measures and improving sleep quality will be helpful in preventing depression in Facebook users. Some support measures that can improve sleep quality include music-assisted relaxation (Feng et al., 2018), exercise (Lederman et al., 2019) and bright light therapy (Endo et al., 2020). To reduce symptoms of stress and anxiety, we recommend Facebook users to take measures like yoga (Hofmann et al., 2016) and breathing practice (Ma et al., 2017).

Future studies need to overcome the limitations of this research. Firstly, the data collection is based on Facebook users' self-reporting method. Although self-reports can facilitate researchers by providing valuable diagnostic information, the information collected through self-report has many limitations. For example, participants may give socially acceptable answers rather than being honest; participants may not be able to evaluate themselves correctly and the information obtained depends on the participant's memory. All of these limitations may affect the reliability of the data and the findings of the study. Therefore, in addition to the self-reporting method, future studies need to use other methods. Secondly, our study only focused on the effects of general factors like stress, anxiety, poor sleep quality, and depression in Facebook users. Future studies need to examine more closely the association between Facebook use, specific stressors, and specific components of sleep quality and depression. Thirdly, this study has the full range of limitations of a cross-sectional study (e.g., it is difficult to find causal relationships between the variables; the information is susceptible to biases such as recall bias, respondent bias, and social acceptance bias; unable to measure incidence). Therefore, longitudinal studies of the relationship between the variables studied may address these limitations. Finally, this study investigated the number of hours that participants used Facebook per day, but did not analyze the relationship between time spent on Facebook and studied variables. Furthermore, most of the sample (general use of Facebook <1 h/day or 1–3 h/day) do not consist of severely users. This may affect the findings of this study. Therefore, future studies may investigate the effects of stress, anxiety, and poor sleep quality on depression in severe users.

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Data Availability Research data are not shared.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee.

Declaration of Conflicting Interests Author declares that there is no conflicts of interest.

Informed Consent Informed consent was obtained from all individual participants included in this study.

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