

Investigating Effects of COVID-19 Pandemic on the Mental Health of Nursing Students During Remote Learning: An Experience from Dong A University, Vietnam

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Abstract

Introduction: There was a radically changed in nursing education during the nationwide lockdown due to the COVID-19 outbreaks. The transition to remote learning stressed nursing students in many countries, particularly in Vietnam. However, there is still lacking a novel study to describe the mental characteristics of nursing students in detail.

Objectives: To assess the mental health of nursing students, including stress, anxiety, and depression, and to identify the related factors to their mental health during the online study period because of the COVID-19 pandemic.

Methods: A cross-sectional survey was conducted on 540 nursing students at Dong A university using a socio-demographic questionnaire, the Depression, Anxiety, and Stress Scale - 21 Items (DASS-21). Data were analyzed by descriptive statistics and tests, including Mann-Whitney, Kruskal-Wallis, and Spearman's correlation to identify the related factors.

Results: In total 540 participants, nursing students reported stress (N = 120, 22.2%), anxiety (n = 195, 36.1%), and depression symptoms (n = 135, 23.1%). There was a significant relationship between age, work status, married status, number of children, stress, anxiety, and depression ($P < 0.01$). In addition, our study showed a negative correlation between frequency of physical activity, perceived health and stress ($r = -0.117$; $p < 0.01$, $r = -0.127$, $p < 0.01$), anxiety ($r = -0.133$; $p < 0.01$, $r = -0.112$, $p < 0.01$), depression ($r = -0.134$; $p < 0.01$, $r = -0.135$, $p < 0.01$). A significant relationship was observed between e-learning space and Internet status with mental health ($p < 0.05$). Especially, there was no association between average online learning time, academic workload, stress, anxiety, and depression ($p > 0.05$). However, the authors found a positive association between perceived level of stress related to evaluative activities and stress, anxiety, depression ($r = 0.120$, $p < 0.01$; $r = 0.089$, $p < 0.05$; $r = 0.088$, $p < 0.05$).

Conclusion: Nursing students suffered stress, anxiety, and depression during online learning due to the COVID-19 pandemic in the presence of some related factors. Therefore, this study may increase more attention of universities, families, and governments to reduce the stress of nursing students during distance education.

Keywords

COVID-19, DASS-21, mental health, nursing students, remote learning

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Introduction

At the end of December 2019, society worldwide experienced devastating effects because of the spreading of coronavirus disease 2019 (COVID-19), which was first identified in Wuhan City, China (Wang et al., 2020a; Zhu et al., 2020). In early 2020, the Vietnam Ministry of Health reported the first case of the COVID-19 in Vietnam and the total reported cases had surpassed 1.2 million cases and 25,000 deaths, ranking 35/223 countries and territories in late October of 2021 (Ministry of Health, 2021).

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The COVID-19 pandemic has adverse effects on all sectors of society, including education. As the crises escalated, the Vietnamese government adopted several policies to control this pandemic, such as limiting community activities and requiring social distancing, postponing planned social and public events, mass transit, and travel restrictions (Ministry of Health, 2020). This approach entailed closing all schools, colleges, and universities in the whole nation, and obliged most education systems to adopt face-to-face teaching and learning alternatives. To ensure instruction continues, many schools around the country moved activities online and remote learning has been a crucial tool to sustain the skills development of students during school closures. The transformation caused by the sudden closure of campuses and the sudden switch to online education has disrupted the lives of students worldwide and resulted in students being severely impacted, increasing levels of anxiety and loneliness; suffering economic difficulties, connectivity difficulties, and mental breakdown (Chaabane et al., 2021; Kim et al., 2021; Salmi, 2021).

Review of Literature

A recent meta-analysis, including 18 psychological studies, showed high proportions of psychophysiological stress among the general population and health care workers during this pandemic (Sousa et al., 2021). Nursing students are not exempt from the resulting mental well-being issues. Evidence from around the world showed that during the COVID-19 lockdown, nursing students experienced significant problems such as fear, anxiety, and depression are common among nursing students (Alsolais et al., 2021; Gao et al., 2021; Jardon & Choi, 2022; Kim et al., 2021; Santangelo et al., 2021; Zhu et al., 2021). Moreover, when there were COVID-19 outbreaks in Vietnam, nursing students also became one of the frontline forces and aided healthcare staff in responding to prevent the COVID-19 pandemic under the calling of the Vietnamese government as well as the Vietnam Ministry of Health. Many demographic factors related to mental health have been considered in previous studies, such as age group (Ngoc Cong Duong et al., 2020; Reverté-Villarroya et al., 2021), sex (Kính, 2017; Tessema et al., 2019; Ngoc Cong Duong et al., 2020), place of residence (Gao et al., 2021), work status and marital status (Ngoc Cong Duong et al., 2020), number of children (Wang et al., 2020c), form of education (Linh et al., 2020). In addition, health conditions that are related to mental health such as whether you have COVID-19 or not, physical activity in university students, especially during COVID-19 lockdowns (Coakley et al., 2021), and level of perceived health (Hossain et al., 2020; Ngoc Cong Duong et al., 2020; C. Wang et al., 2020b), seeking social support (Harandi et al., 2017). Moreover, during the lockdowns stage of the COVID-19 pandemic, factors related to online learning such as academic workload

(Reverté-Villarroya et al., 2021), pressure related to evaluative activities, or the necessary conditions for effective online learning, including network connection, learning space, are considered to be related to creating excitement for students when participating in online learning (Hiên et al., 2020).

Dong A University (UDA), located in Da Nang city, is one of the largest private universities in the central part of Vietnam, with more than 200 nursing students enrolled each year. Similar situation to many other universities in Vietnam, nursing students of UDA have left school since June 2020 and have been quarantined at home because of the COVID-19 pandemic. Therefore, Dong A University has also adopted new strategies and introduced digital tools to support students in e-learning fully. Moreover, there were also disrupted clinical practice sessions for nursing students during distance learning time. Besides, these students also have to bear additional worries about their families, such as virus infections, economic conditions, and living situations during social distancing.

Although there were several studies to assess the psychological status caused by COVID-19 and associated risk factors in nursing students, it still lacking in Vietnam. In this study, researchers provided a detailed assessment of the impact of the COVID-19 pandemic on the mental health of nursing students at high risk of developing stress symptoms within the Dong A University environment. The current research had two main objectives:

1. To determine levels of mental health among nursing students at Dong A University, Da Nang, Vietnam during the COVID-19 pandemic
2. To find out the relationship between various factors and mental health among nursing students at Dong A University, Da Nang, Vietnam during the COVID-19 pandemic.

The results would contribute to developing appropriate psychological health interventions to help nursing students enhance their mental well-being.

Methods

Study Design and Participants

A cross-sectional survey via an online platform (Google forms) regarding the mental health of nursing students was conducted during the nationwide lockdown (from December 1st, 2021 to January 30th, 2022). This study was approved by the Committee Board of Dong A University, with Decision No. 36/QĐ-ĐHĐA-QLKH, which was signed by the director of Dong A University on January 14th of 2022.

Students who signed up for this school year and fully completed the surveys were allowed to participate in the study via email and social media. The purpose of the study and online informed consent was provided to all students before

proceeding with the survey. Dong A University had approximately 560 full-time and part-time nursing students in the first, second, third, and final years in 2021. Five hundred forty students completed the survey, for a 96.4% response rate, and 20 questionnaires (4.6%) were rejected because the students refused to answer or answered incompletely. The students who could not read and understand the Vietnamese language were excluded from the study, and the students who were previously diagnosed with major psychiatric illnesses were also excluded. Moreover, all participants met the health condition requirement of Circular No. 33/2021/TT-BYT, which was signed on December 31st, 2021 by the Vietnam Ministry of Health to pursue study in Vietnamese universities.

Measurements

A self-administered questionnaire consisting of the information form and the Depression, Anxiety, and Stress Scale - 21 Items (DASS-21) was applied to collect data in this study.

Information Form: A 17-question form was established to survey participants' demographic data, academic and health conditions related to COVID-19.

Depression, Anxiety, and Stress Scale – 21 Items: DASS-21 is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress which was abbreviated from the DASS-42 scale, developed from the research of Lovibond (Lovibond & Lovibond, 1995). The DASS-21 scale was translated to Vietnamese by Tran Duc Thach and coworkers in 2013 (Tran et al., 2013), proving its effectiveness. The authors have been permitted to use the translation of the questionnaire. There is evidence of the reliability and validity of the DASS –21 both in clinical and community settings in the Vietnam context previously (Ngoc Cong Duong et al., 2020; Le et al., 2017; Le et al., 2019).

Briefly, DASS-21 contains 21 items rated on a 4-point Likert-type scale to assess the frequency of depression, anxiety, and stress symptoms (which did not apply to me at all) to 3 (applied to me very much, or most of the time). The total DASS-21 scores are categorized as normal (0–9), mild (10–13), moderate (14–20), severe (21–27), and extremely severe (28+) for the depression subscale; normal (0–7), mild (8–9), moderate (10–14), severe (15–19), and extremely severe (20+) for the anxiety subscale; and normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and extremely severe (34+) for the stress subscale.

Statistical Analysis

The researchers used Microsoft Excel to clean and code the data, Statistical Package for the Social Sciences (SPSS) for analysis version 20.0 for Windows, and the normal distribution of the main variables was confirmed before analysis by the Kolmogorov–Smirnov test. Because of the non-normal distribution of data, Kruskal–Wallis test, Mann–Whitney U test, and Spearman's correlation test were used to analyze

the data. The significant level was taken as a P value <0.05 in the study.

Results

Socio-Demographic Characteristics of Participants

In this study, there were 53% full-time students and 47% part-time students. For the socio-demographic characteristics of participants (Table 1), 53.9% of participants were under 24 years old; moreover, most participants (94.4%) were female, and 60.9% were from rural areas. Regarding Marital status, above 50% of nursing students in this study were single (65.4%), followed by getting married (34.3%), with 67.6% having no children.

Health Characteristics of Participants

In this study, the researchers surveyed 540 students who either got or did not have COVID-19 infection. Among them, 0.6% of nursing students recovered from COVID-19, and 94.4% have not gotten COVID-19. Then, the current research evaluated some crucial factors related to the participants' health conditions (Table 2). The survey showed that 35.4% of nursing students performed regular physical

Table 1. Distribution of Socio-Demographic Characteristics of Nursing Students (N = 540).

| Sample Characteristics | Group | Size of sample (N) | Distribution (%) |
|-----------------------------|-------------------|--------------------|------------------|
| Age group | 18–24 | 291 | 53.9 |
| | 25–34 | 193 | 35.7 |
| | 35–45 | 55 | 10.2 |
| | >45 | 1 | 0.2 |
| Sex | Male | 30 | 5.6 |
| | Female | 510 | 94.4 |
| Place of Residence | Rural | 329 | 60.9 |
| | Urban | 211 | 39.1 |
| Work status | Medical work | 256 | 47.4 |
| | Non-medical work | 24 | 4.4 |
| | None | 260 | 48.1 |
| Marital status | Single | 353 | 65.4 |
| | Married | 185 | 34.3 |
| | Divorced | 2 | 0.4 |
| Number of children | <1 | 365 | 67.6 |
| | >=1 | 175 | 32.4 |
| Income affected by COVID-19 | High affected | 250 | 46.3 |
| | Medium affected | 226 | 41.9 |
| | Unaffected | 64 | 11.9 |
| Form of education | Full-time student | 286 | 53.0 |
| | Part-time student | 254 | 47.0 |

Table 2. Health Conditions of Nursing Students.

| Health characteristics | Group | N | % |
|--------------------------------|-------------------------|-----|------|
| COVID-19 status | Recovered from COVID-19 | 3 | 0.6 |
| | Not sick with COVID-19 | 537 | 99.4 |
| Frequency of Physical activity | Usually, exercise | 24 | 4.4 |
| | Often exercise | 191 | 35.4 |
| | Sometimes exercise | 301 | 55.7 |
| | Never exercise | 24 | 4.4 |
| Level of perceived health | Very good | 73 | 13.5 |
| | Good | 167 | 30.9 |
| | Fair | 298 | 55.2 |
| | Poor | 2 | 0.4 |
| Seeking Social Support | Yes | 471 | 87.2 |
| | No | 69 | 12.8 |

activity, and 55.7% were sometimes physical active. For the Level of perceived health, even though most of the nursing students in our study were seeking social support (87.2%), there was a meager percentage of participants who felt poor health (0.4%).

Online Study Characteristics of Participants

When we look at the characteristics of online study of nursing students (Table 3), 38.1% spent 10–15 h per week online studying. In terms of the amount of academic workload, more than 50% of students say that the amount of e-learning knowledge was normal. This study revealed that 10.9% of students had a private room soundproof, and 36.3% do not have a private room to learn online. 53.9% had a fast, and stable Internet connection when studying online and 44.4% of students said that the experience of online exams is less pressure.

Mental Health Conditions of Participants

In the analysis of the mental health of nursing students (Table 4), 22.2% of participants reported stress (N = 120), including 7.8% mild and 7.6% moderate. 4.8% severe, and 2.0% extremely severe; 36.1% anxiety (N = 195); and 23.1% depression (N = 135) symptoms.

The Relationship Between the Health status of Nursing Students and COVID-19

In the relationship between health status of nursing students to COVID-19 (Table 5), the results showed a negative correlation between frequency of physical activity, level of perceived health and stress ($r = -0.117$; $p < 0.01$, $r = -0.127$, $p < 0.01$), anxiety ($r = -0.133$; $p < 0.01$, $r = -0.112$, $p < 0.01$), depression ($r = -0.134$; $p < 0.01$, $r = -0.135$, $p < 0.01$) based on the DASS-21. There was a significant relationship

Table 3. Characteristic of Remote Learning of Nursing Students.

| Online study characteristics | Group | N | % |
|--|-----------------------------------|-------------------------------------|------|
| Average online learning time/ week | <10 h/week | 119 | 22.0 |
| | 10–15 h/week | 206 | 38.1 |
| | 15–20 h/week | 153 | 28.3 |
| | > 20 h/week | 62 | 11.5 |
| Academic workload | Overload | 27 | 5.0 |
| | Much | 159 | 29.4 |
| | Normal | 315 | 58.3 |
| | Few | 29 | 5.4 |
| | Very few | 10 | 1.9 |
| Perceived level of pressure related to evaluative activities | Very pressure | 40 | 7.4 |
| | Pressure | 206 | 38.1 |
| | Less pressure | 240 | 44.4 |
| | No pressure | 54 | 10.0 |
| Online learning space | Private room with soundproof | 59 | 10.9 |
| | A private room without soundproof | 285 | 52.8 |
| | No private room | 196 | 36.3 |
| | Internet connection status | Fast and stable Internet connection | 291 |
| | Unstable internet connection | 249 | 46.1 |

Table 4. Characteristics of Mental Health of Nursing Students.

| Level | Stress | | Anxiety | | Depression | |
|------------------|--------|------|---------|------|------------|------|
| | N | % | n | % | N | % |
| Normal | 420 | 77.8 | 345 | 63.9 | 415 | 76.9 |
| Mild | 42 | 7.8 | 43 | 8.0 | 47 | 8.7 |
| Moderate | 41 | 7.6 | 86 | 15.9 | 48 | 8.9 |
| Severe | 26 | 4.8 | 29 | 5.4 | 9 | 1.7 |
| Extremely severe | 11 | 2.0 | 37 | 6.9 | 21 | 3.9 |

between seeking social support and stress, anxiety, and depression ($P < 0.01$).

The Relationship Between the Academic status of Nursing Students and COVID-19

Furthermore, the relationship between academic status and COVID-19 was described based on the DASS-21 survey (Table 6). A significant relationship was observed between online learning space and internet connection status ($P < 0.05$). Especially in this research, there was no association between average online learning time per week and, academic workload, stress, anxiety, and depression ($p > 0.05$). However, the authors found a positive association between perceived level of stress related to evaluative activities and stress, anxiety, depression ($r = 0.120$, $p < 0.01$; $r = 0.089$, $p < 0.05$; $r = 0.088$, $p < 0.05$).

Table 5. Relationship Between Health Conditions and COVID-19.

| Health status related to COVID-19 | Mean Ranks | Stress | Mean Ranks | Anxiety | Mean Ranks | Depression | Statistical tests |
|-----------------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|------------------------|
| COVID-19 status | | | | | | | |
| Recovered from COVID-19 | 237.50 | U = 706.5 P = 0.712 | 282.00 | U = 771.0 P = 0.897 | 351.67 | U = 562.0 P = 0.355 | Mann – Whitney U |
| Not sick with COVID-19 | 270.68 | | 270.44 | | 270.05 | | |
| Frequency of Physical activity | r = - 0.117** P = 0.006 | | r = - 0.133** P = 0.002 | | r = - 0.134** P = 0.002 | | Spearman's correlation |
| Level of perceived health | r = - 0.127** P = 0.003 | | r = - 0.112** P = 0.009 | | r = - 0.135** P = 0.002 | | Spearman's correlation |
| Seeking Social support | | | | | | | |
| Yes | 260.49 | U = 11534.5 P = 0.000 | 261.27 | U = 11904.5 P = 0.000 | 260.38 | U = 11481.5 P = 0.000 | Mann – Whitney U |
| No | 338.83 | | 333.47 | | 339.60 | | |

Table 6. Relationship Between the Academic status of Nursing Students and COVID-19.

| Academic status related to COVID-19 | Mean Ranks | Stress | Mean Ranks | Anxiety | Mean Ranks | Depression | Statistical tests |
|--|--------------------------|-------------------------------|--------------------------|-------------------------------|--------------------------|--------------------------------|------------------------|
| Average online learning time/week | r = 0.081 P = 0.059 | | r = 0.013 P = 0.756 | | r = 0.077 P = 0.074 | | Spearman's correlation |
| Academic workload | r = - 0.029 P = 0.500 | | r = - 0.028 P = 0.512 | | r = - 0.047 P = 0.273 | | Spearman's correlation |
| Perceived level of stress related to evaluative activities | r = 0.120** P = 0.005 | | r = 0.089* P = 0.039 | | r = 0.088* P = 0.042 | | Spearman's correlation |
| Online learning space | | | | | | | |
| Private room with soundproof | 232.13 | $\chi^2 = 8.144$ P = 0.017 | 247.64 | $\chi^2 = 4.977$ P = 0.083 | 227.57 | $\chi^2 = 12.537$ P = 0.002 | Kruskal Wallis H |
| A private room without soundproof | 263.32 | | 262.41 | | 260.21 | | |
| No private room | 292.49 | | 289.14 | | 298.39 | | |
| Internet connection status | | | | | | | |
| Fast and stable Internet connection | 257.97 | U = 28449.5 P = 0.000 | 259.88 | U = 30119.0 P = 0.001 | 87585.00 | U = 28698.5 P = 0.000 | Mann – Whitney U |
| Unstable internet connection | 292.49 | | 289.14 | | 58485.00 | | |

Discussion

Because the COVID-19 pandemic was able to cause the development or worsening of mental disorders in nursing students (Cavalcante et al., 2022), this current research identified that 22.2% of nursing students had problems with stress, 36.1% with anxiety, and 23.1% with depression using DASS-21. This prevalence was higher than in some previous reports. Results of a study at Bach Mai medical college showed that the prevalence of stress, anxiety, and depression in nursing students was 4.5%, 10.1%, and 8.3%,

respectively (Điệp et al., 2021). In the case of nursing students at Tien Giang medical college, the prevalence of Stress, Anxiety, and Depression was 10.42%, 26.0%, and 20.8% (Kính, 2017). This result is also understandable when this research took place in the context of the ongoing COVID-19 pandemic in many provinces of Vietnam, and the authors applied the social distancing order according to the directive of the Prime Minister. Universities temporarily closed and switched to online teaching to adapt to the current epidemic context (Đại dịch COVID-19 tại Việt Nam, 2021).

WHO has recognized that imposing measures such as social distancing can increase anxiety, stress, and anger in individuals (WHO, 2020). Social isolation was found to be strongly associated with anxiety, depression, self-harm, and suicidal tendencies (Matthews et al., 2019). The pressure to study online for various reasons also aggravates the mental health problems of nursing students (Gao et al., 2021). In addition to the aforementioned general factors, clinical training disruption can also be a factor in mental health that deserves attention.

Furthermore, the problems of nursing students with stress, anxiety, and depression were different in different research in different countries. Dastan and colleagues performed research on the mental health of nursing students in Turkey in 2021 (38.2% with Stress, 58.8% with Anxiety, and 56.3% with Depression) (Dastan et al., 2021), Rasmussen and coworkers carried out research on the mental health of Australian nursing students in 2021 (55% with Stress, 52.7% with Anxiety, and 63.8% with Depression) (Rasmussen et al., 2021), which were higher ratio than in this current study. Otherwise, the prevalence of nursing students who had problems with stress, anxiety, and depression in this research was higher than that of Juan Gao report which was conducted from 12–13 April 2020 in China (Gao et al., 2021). Although these above studies all use the DASS – 21 scales, with studies in different countries, there will be differences in the situation of the COVID-19 epidemic, national culture, student lifestyle, characteristics of education programs, and so on, leading to disparities in mental health levels.

Nursing students negatively associated physical activity frequency with all measures of mental health problems (Stress, Anxiety, Depression). Similar relationships between Physical activity and mental health were reported in the U.S among 697 university students during COVID-19 lockdowns (Coakley et al., 2021). An online survey with 1154 participants also showed that individuals who had performed physical activities during the coronavirus outbreak presented lower Anxiety, Stress, and Depression levels. When considering both genders, those who did not perform physical activities had a 118% higher risk of presenting symptoms of anxiety, 152% more chance of having values of depression above normal, and a 75.1% higher risk of having symptoms of stress (Silva et al., 2020). According to Grasdalsmoen et al., self-reported depression was also negatively associated with physical exercise frequency in a dose-response manner; students with more infrequently physical exercise had a higher prevalence of depression (Grasdalsmoen et al., 2020). Because all face-to-face classes have moved online, making it inaccessible to sports facilities during school closures, university students may have been unable to maintain their physical activity routines and participate in exercise or sports regularly (Gallè et al., 2020; Rivera et al., 2021). Instead of spending time in physical activity, students with frequently sedentary behaviors such as online learning may request a large amount of time using electronic devices. A previous study

indicated that using smartphones, sitting time, and total sleep were significantly greater during- compared with the pre-COVID-19 lockdown phase in young adults (Sañudo et al., 2020). Most studies reported reduced physical activity, increased screen time, and longer sleep hours among children and adolescents (Kharel et al., 2022). These findings provide valuable information to medical professionals and universities to develop more feasible interventions focusing on physical activity, especially for university students.

Self-perceived health is a valid indicator of an individual's mental health and is independently associated with physical health and health-related behaviors in young adults (Craig et al., 2018; Mikolajczyk et al., 2008). In the current research, there was a negative correlation between Self-perceived health/ Self-rated health and all subscales of mental health. The results of previous studies support findings of this study. According to the report of Hossain et al. (2020), poor Self-perceived health was found to be significantly associated with a higher likelihood of depression and anxiety among students (Hossain et al., 2020b). A cross-sectional study conducted using two large cohorts of students in France and Japan by Ishida et al. (2020) showed that high depressive symptoms and poor self-rated health were strongly associated, independently of all other variables (Ishida et al., 2020). Similarly, result from an online survey during the COVID-19 pandemic among nursing and midwifery students suggested that those having poorer self-rated general health were all significantly associated with higher scores on at least one DASS-21 subscale (Wynter et al., 2021). These reports cannot be directly compared with each other in terms of populations, measurements, and methods of analysis; however, Self-perceived health status was relatively important concerning each of the mental health domains, and it also was the second most important explanatory variable for global quality of life (Sawatzky et al., 2010).

The present research suggests a significant relationship between seeking social support and stress, anxiety, and depression. Seeking social support is one of the fundamental responses to stress. When individuals face challenges or experience difficult emotions in their daily lives, they often seek out close others e.g., family members, friends, and coworkers, for comfort, support, advice, and problem-solving assistance (Vélez et al., 2016). Individuals with high-stress levels were more likely to seek social support than those with low-stress levels (Li, 2015). These observations propose that universities and schools of nursing should consider providing effective social networks e.g., psychological counseling websites or hotlines, for nursing students to cope with difficult situations and prevent mental health problems.

The perceived levels of stress related to evaluative activities were variable among nursing students. According to a web-based survey distributed to nursing students 2 months after the completion of the online learning during the first months of the COVID-19 pandemic in the U.S, the study found that the majority of respondents expressed concerns related to difficulty handling academic workload (62%) and difficulty taking exams

(64%) (Fitzgerald & Konrad, 2021). Online learning completely depends on electricity and internet connection; therefore, the unsecured and unstable internet connection speed will interrupt the learning process and make students feel bored (Hiên et al., 2020). Many students cannot follow the course because of poor internet connection (Hiên et al., 2020). Students even lose points when the teacher takes attendance or gives homework because of a network problem, especially students who face issues with internet connection during exams (Thanh & Thông, 2020). In the context of the pandemic, the high demands for online learning across the country, social distancing, and isolation caused the internet demand to increase, leading to frequent network congestion, which leads to mental stress in students. Our research also found the relationship between internet connection status and stress, anxiety, and depression. Poor internet connection was the main challenge in distance learning during the COVID-19 pandemic (Al-Balas et al., 2020). There were 65% of students getting difficulties during remote learning because of unstable internet connections (Dũng et al., 2021), especially students from rural areas. 60.9% of participants in the present research were from rural areas, and 46.1% had unstable internet connections. Similar to internet connection status, the online learning space was also an important factor affecting online learning activity. A quiet area is a necessary condition for students to study online; in contrast, a noisy environment makes students easily distracted and difficult to absorb knowledge (Dũng et al., 2021). In our study, only 10.9% of nursing students had a private room with soundproof for learning online, and there was a relationship between online learning space and stress, anxiety, and depression. However, there was no evidence to explain this relationship directly. Accordingly, further study is required to understand this relationship in more detail.

Strengths and Limitations of the Study

For this study, all participants were nursing students in university, who were suffering from different effects of the lockdown period as their online learning. Therefore, when the current study was carried out during the COVID-19 outbreak in Vietnam, the feedback and the description of participants about their mental conditions as well as related factors were more reliable. Moreover, from this research, the authors indicated the relationship between the health status and academic status of nursing students and the COVID-19 pandemic. Therefore, this current study provides valuable information to medical professionals and universities to improve the mental health of nursing students.

The present study was cross-sectional and used a one-time, online self-report survey. As such, the authors cannot verify these mental illnesses' impact over time. Findings may not necessarily be generalizable to all nursing students in Vietnam, and those without internet facilities as the timing and impact of the COVID-19 pandemic differ by geographic area. Therefore, in the future, researchers need to broaden participants from

different major studies and regions to have more general conclusions about the impact of COVID-19 on students' mental health.

Implications for Practice

It is important to consider the effects of the COVID-19 pandemic on the mental health of nursing students during remote learning. Furthermore, it is important to provide psychological support and counseling to improve mental health among nursing students so that they will be able to overcome difficulties because of pandemics.

Conclusion

Based on the results of this study regarding the factors related to the level of mental health in nursing students at Dong A University, Vietnam, there was a high rate of nursing students who had problems with stress (22.2%), anxiety (36.1%), and depression (23.1%). Moreover, nursing students had a relationship between health status and academic status during the COVID-19 pandemic and mental health (Stress, Anxiety, and Depression). The risk factors, including frequency of physical activity, level of perceived health, seeking social support ($P < 0.01$), online learning space, internet connection status, and perceived level of stress were identified to relate to evaluative activities ($p < 0.05$). This study provides evidence about mental health problems of nursing students as a consequence of the COVID-19 pandemic; therefore, universities, families, and society should consider this a necessary issue and pay attention to take specific measures to reduce stress, anxiety, and depression for nursing students, who play an important role in caring the health of the community. Especially, universities should consider targeted, accessible approaches to supporting student mental health, such as integrated student mental health services at campus health centers, information about campus mental health resources, accessibility issues (e.g., time offerings, insurance requirements, and telehealth options), and resilience-promoting programs. These observations propose that universities and schools of nursing should consider providing effective social networks, e.g., psychological counseling websites or hotlines, for nursing students to cope with difficult situations and prevent mental health problems.

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