INTRODUCTION
COVID-19 is an acute infection pneumonia disease of an unknown cause that was first discovered in December 2019 and it has been spreading rapidly from China to other parts of the world. In March 2020, the World Health Organization (WHO) announced the coronavirus disease, termed COVID-19 disease, before becoming an outbreak in all countries.

On the 25th of January 2020, the Malaysia Ministry Of Health reported the first case of COVID-19 case was reported and that COVID-19 outbreak has resulted in 1,061,476 confirmed cases in Malaysia and 8551 cases of confirmed deaths (COVID Live Update: 196,692,497 Cases and 4,203,599 Deaths from the Coronavirus - Worldometer, 2021).

The pandemic of COVID-19 has forced the Government of Malaysia to call for emergency plans and pose social and public restrictions. Movement Control Order (MCO) is a cordon sanitaire implemented as a preventive measure by the Federal Government of Malaysia in response to the COVID-19 pandemic in the country starting on 16th March 2020. Following that, the universities have been shut down across the world, globally, therefore changing the education systems and implementing new normality of online teaching. The COVID-19 pandemic has created changes in our daily lives. With changes to their environment, university students must take time to adapt to a new Norma in their life. Online learning can have a real impact on mental health among university students.

Stress is a normal response to the tasks people do the things that are wanted or needed to do is compromised by the pressure that underlies these feelings, this stress has become unhealthy and it can lead to mental disorder.

Do social and environmental factors affect level of stress during COVID-19 among nursing students? Results from single center cross-sectional study in Malaysia

Siti Fatimah Sa’at¹, Annabelle Dimple Kharisha Gill¹, Bernard Jordan Damianus¹, Jeremy Dominic Saibun¹, Lerrkey Ukim¹, Zulkhairul Naim bin Sidek Ahmad²,³*

INTRODUCTION
Stress in nursing students has been documented in many studies and this will lead to various health problems. However, there is scanty research assessing the level of stress among nursing students during Covid-19 in Malaysia. Hence, this study aimed to assess the level of stress and its association with social and environmental factors amongst nursing students in Universiti Malaysia Sabah, Malaysia.

METHODS: A cross-sectional study was conducted by random sampling among nursing students in Universiti Malaysia Sabah between March and May 2021. The primary outcome was stress symptoms, derived from the validated Perceived Stress Scale-10 (PSS) questionnaire. Socio-demographic, social, and environmental factors were also assessed. T-test was used to assess the associations between level of stress and social and environmental factors.

RESULTS: A total of 115 responses were received with the mean (SD) age of the students being 20.5 (1.3) years old. Of all the students, 84.9% were female, 54.6% received financial support from National Higher Education Fund Corporation and 46.2% were in nursing Year 2 followed by the nursing year 1 (28.6%) and nursing year 3 (25.2%). The students in this study reported a higher level of stress. The students who reported most or all the time being trapped in a hostel (p<0.01), challenges of online classes (p=0.03), and catching up with class projects (p=0.03) had a higher level of stress compared to those who reported none or little or some of the factors.

CONCLUSION: This study showed that social and environmental factors may play a role in determining the stress level among nursing students. Hence, authorities should foster supporting strategies to lower student stress and tackles the unwanted consequences.

Keywords: Nursing, stress, Covid-19.
and also for their own lives. Many studies support that COVID-19 has impacted people's mental health such as anxiety, depression, post-traumatic stress, and stress in populations including university students. 2,5

A previous study conducted at the Faculty of Medicine students at the National University of Malaysia, Kuala Lumpur showed that the prevalence of psychological distress during lockdown was 52.8%. The older and senior students were less likely to be anxious than their younger and junior counterparts, respectively. This study also showed that there was correlation between number of social support (three or more) and lower stress score. Moreover, the undergraduate students who received family support resulted lower depression scores and higher mental well-being compared to those without. Government support was independently associated with a lesser risk of depressive symptoms and a greater sense of mental wellbeing. 4 In addition, another study conducted among students in one university in Milan showed that increased prevalence of stress during COVID-19 lockdown was associated with quality of sleep. 5 A previous study conducted among 195 university students in the United States showed that 71% of the students experienced stress due to the COVID-19 pandemic. This condition induced many stressors, such as worry of their health and loved ones, disturbance in sleep patterns, the students may have problem in concentrating, decreased of social interactions due to physical distancing, and raised of concerns regarding to academic performance. 6 In addition, there are a few factors that may affect the stress level such as family problems, students' finances, inability to adapt to changes, and misleading information that led to confusion for the students. 7

According to the circumstances, it is important to analyze social and environmental factors that may be associated with stress among nursing students, specifically during the COVID-19 pandemic. This present study is important for the health care team to understand how the current pandemic is emotionally affecting the nursing students in UMS. In a nutshell, every student has a different level of stress, especially during this time of pandemic and lockdown in UMS. The results of this study also help in formulating and executing effective interventions and strategies to mitigate the mental health of people at large. Hence, this study aimed to assess the level of stress and association with social and environmental factors amongst nursing students in UMS, Malaysia.

METHODS

Study Design

The study adopted a cross-sectional descriptive design and was conducted among undergraduate students of the Nursing course at the Faculty of Medicine and Health Sciences (FMHS), University Malaysia Sabah (UMS), Malaysia. This university is a public higher education institute in Kota Kinabalu, Sabah State. The data collection was carried out between March and May 2021.

Data Collection

A single population proportion formula, $n = \left( \frac{Z_{\alpha/2}^2 P(1-P)}{d^2} \right)$, was used to calculate the sample size. 8 The 58.7% proportion was used and calculated to obtain the maximum sample size by considering a 95% confidence interval ($Z_{\alpha/2} = 1.96$), and a marginal error (d) of 5%. 9 According to these considerations, the calculated sample size was 115. This study was used random sampling technique to obtain the study subjects in population.

This study obtained a total population of 147 nursing students enrolled during the 2020-21 academic year. All 147 nursing students were relegated a number and after that a computerized random number generator was utilized to choose a random proportionate sample of 115 students across the three-year groups. Selected students were then contacted via WhatsApp to participate in the study. The participants meeting the inclusion criteria were (a) Nursing students from FPSK, and UMS, (b) those staying in a hostel, and (c) good internet connection. The exclusion criteria include: (a) Participants who were infected with COVID-19 and (b) did not sign informed consent A questionnaire was generated using the Google Form, and the link was shared through WhatsApp. Each participant received information about the background and the aim of this study. All the students already willing to participate in this study by filling the writing informed consent before the questionnaire was shared to them. Participants were allowed to withdraw from the study at any point.

A web-based self-administered structured questionnaire was used to collect the data. The first part covered the socio-demographic characteristics such as age, gender, year of study, and financial support. The second part of the questionnaire consisted of the validated Psychological Distress Scale (K10) which was to assess stress level and score. The 13-item were scored from 1 (none of the time) to 5 (all the time), and the total score ranged from 13 to 65. The third part of the questionnaire consisted of ten questions related to social and environmental factors that may be associated with stress among nursing students during COVID-19 lockdown. A pilot study was conducted before conducting the main study. The purpose of the pilot study is to test the understanding of the participants about the questionnaire that will be distributed to them and can make further improvements to our questionnaire.

Data Analysis

The collected data were cleaned, coded, and entered into SPSS Version 23. Categorical variables were expressed as absolute values and percentages. A T-test was used to assess associations between social and environmental factors and stress scores. Multivariable logistic regression was conducted to identify predictors for stress among nursing students. Accordingly, variables with a $p$-value ≤ 0.05 were entered into a logistic regression to control the confounder. Finally, a $p$-value of less than 0.05 was considered a statistically significant association, and the adjusted odds ratio with 95% CI was calculated to determine the strength of the association.

RESULTS

Table 1 shows the characteristics of the participants. A total of 115 students participated in the study. There were 53 (46.2%) students from Year 2, followed by 34 (28.6%) from year 1 and 28 (25.3%) from year 2. The majority were
between 18–20-year-old (58.26%) and female (87%). With regards to financial status, 54.8% of the participants were supported by National Higher Education Fund Corporation, while the rest were supported by family (40.0%) or Sabah State Gov Scholarship (5.2%).

Figure 1 shows the distribution of the level of stress among the participants. The mean value was 46.29 with an SD of 6.71. The minimum and maximum scores were 28 and 64, respectively.

Table 2 shows the association between social and environmental variables and stress scores. The students who reported most or all the time worried about families (p<0.01), trapped in the hostel (p<0.01), lack of motivation (p<0.01), irregular sleep patterns (p<0.01), challenges of online classes (p<0.01), inconsistent eating habit (p<0.01), reduced personal interactions (p<0.01), worried about impacts on future employment (p<0.01) and worried about catching up with class projects (p<0.01) had higher stress scores compared to those who reported none or little or some of the factors.

Table 3 shows the results of multivariable linear regression for significant predictors for stress scores. Out of nine potential predictors variables, three key predictors of stress were identified. Higher stress scores were associated with being trapped in a hostel (p<0.01), challenges of online classes (p=0.03) and catching up with class projects (p=0.03).

**DISCUSSION**

The Covid-19 era has ushered in a new norm of uncertainty, impact on mental health and the educational environment, affecting the stress and life quality of the university population. For nursing students, their future careers as a nurse will need a lot of clinical practice so that they can have first-hand experience as a future nurses but as the lockdown has been issued in UMS, they can't go for their clinical posting causing them to worry and concern about their future career. Based on these circumstances, the impact of Covid-19 on mental health including stress is an increasingly important topic to consider.

This present study showed that the mean stress scores were high among the study participants during the COVID-19 lockdown. This is in line with a few studies conducted around the world. One study conducted in Murcia Spain among 142 nursing students revealed that they experienced an increase in stress levels during the COVID-19 lockdown. They also experienced family and financial problems during this period.14 Similar results were found in one study conducted in Turkey and Nepal where stress was prevalent among many nursing students during the COVID-19 pandemic.14,15

In the current study, several factors were associated with increased stress level scores. The students who had been trapped in the hostel had higher stress scores. Being stuck inside UMS compound for a few months means they can't go or visit their families face-to-face at their home for quite a long time. Restrictions on movement and lockdown are two measures taken in many nations to prevent the impact of the COVID-19 pandemic and it is necessary as protective measures for physical health but prolonged impositions are often an unpleasant experience.16 A study conducted in Turkey also supports this statement where this study also found out that the most important stressors among nursing students included the imposed curfew.14

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**Table 1. Characteristics of the study participants (N=115).**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>34</td>
<td>29.6</td>
</tr>
<tr>
<td>Year 2</td>
<td>53</td>
<td>46.1</td>
</tr>
<tr>
<td>Year 3</td>
<td>28</td>
<td>24.3</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>100</td>
<td>87.0</td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>13.0</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-20</td>
<td>67</td>
<td>58.3</td>
</tr>
<tr>
<td>21-23</td>
<td>46</td>
<td>40.0</td>
</tr>
<tr>
<td>More than 23</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Financial support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>46</td>
<td>40.0</td>
</tr>
<tr>
<td>National Higher Education Fund Corporation</td>
<td>63</td>
<td>54.8</td>
</tr>
<tr>
<td>Sabah State Gov Scholarship</td>
<td>6</td>
<td>5.2</td>
</tr>
</tbody>
</table>
This study also suggests that the challenges of online classes were significantly associated with stress scores. Hence, nursing students are additionally burdened by online learning. During the lockdown, all the respondents must engage in online classes and practicals because their lectures must work from home. Due to this situation, they felt less motivated to study because of their surroundings and the distractions around them. This is consistent with a study conducted among 555 nursing students in a few universities in Jordan. The COVID-19 presents particularly stressful experiences for nursing students doing online distance learning.17 Similarly, a previous study with cross-sectional design was conducted among nursing students in Nepal showed the source of stress during online learning was due to electricity problems and internet access for their online classes.18 Another cross-sectional study conducted among 244 nursing students in Israel showed that the nursing students suffered significantly high levels of stress due to challenges presented by online distance learning.19

This study further revealed that catching up with class projects has created stress among nursing students during the COVID-19 pandemic. A cross-sectional study conducted in the United States among nursing students, showed that one in four of nursing students had stress and difficulty writing assignments.20 A previous study that analyzed nursing students’ problems during the pandemic found that most of them had difficulty keeping up with their class projects because they had difficulty in coping mechanism of their stress.

The strengths of the current study are determined by several points. This study used validated standardized tools for level of stress scores analysis. In addition, random sampling was used as a sampling method. Furthermore, the online survey format which allowed students to participate without violating the measures for social distancing. This subsequently, increases the response rate. To our knowledge, this is the first study to explore stress among nursing students during the COVID-19 outbreak in Borneo. Multiple modifiable were explored and showed significant associations with stress level.

This study also has several limitations, such as the cross-sectional design, which did not allow a causal relationship. Therefore, the longitudinal studies are required to addressing these issues more appropriately. In addition, a longitudinal study is required to fully explore the ongoing impacts of COVID-19 on stress. This study also might have a chance to obtain response bias, whereby individuals who were more stressed and perceived to be impacted by the pandemic may have been more likely to participate. The answers of those interviewed respondents cannot claim to be representative or generalise of all nursing students all over the world. This will potentially limit the generalizability of the findings. Hence, larger scale and long-term cohort studies in different educational institutions should be conducted to verify and generalize the findings.

Regarding implications for nursing management, it is recommended to people in the nursing profession to do more study on these issues. Many improvements can be planned and organised to reduce nursing students’ emotional stress and demotivation with their situation. Based on the result of this study, it also recommended the timely screening and appropriate interventions, such as online psychological counselling tailored for concerns specific to the students. In addition, developing a module to train nursing students in facing unexpected challenges of online classes were significantly associated with stress scores.
and disasters maybe can improve their mentally preparation to face the situation. As early as can try to introduce the difficulty environment that possibly occur within nursing profession.

CONCLUSION

This study explored the predictors of stress status of nursing students at UMS, Malaysia during the COVID-19 pandemic lockdown. In conclusion, nursing students had greater levels of stress during the COVID-19 pandemic lockdown. Being trapped in a hostel, challenges of online classes and catching up with class projects emerged as compelling stressors for the nursing students. Therefore, considering the negative impact of stress on daily life and health outcomes, it is important for universities to support their students. Hence, the authorities should foster supporting strategies including counselling, peer advocacy, and support to lowering student stress and tackles the unwanted consequences. Additionally, those who are feeling symptoms of stress should seek professional mental health care.

DISCLOSURE

Author Contribution
All authors have contributed to whole manuscript.

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Conflict of Interest
There is no conflict of interest for this manuscript.

Ethical Consideration
This research was approved by Research Ethics Committee, Faculty of Medicine and Health Sciences, University Malaysia Sabah (Ref. JKetika 1/21(24)).

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REFERENCES


ORIGINAL ARTICLE

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