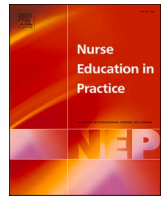




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Resilience as a mediator in the relationship between stress-associated with the Covid-19 pandemic, life satisfaction, and psychological well-being in student nurses: A cross-sectional study

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ABSTRACT

Aim: This study examined the direct and indirect effects of stress associated with the pandemic on student nurses' life satisfaction and psychological well-being through the intermediary role of resilience.

Background: The coronavirus disease 2019 (COVID-19) outbreak has brought additional stress to those in nursing programs, who were already under high pressure. This has resulted in increased mental and psychological issues in student nurses. The role of resilience as a mediator reducing the effects of pandemic-associated stress on student nurses' outcomes remains unexplored.

Design: Cross-sectional study.

Methods: This was an online survey that used four standardized scales and was completed by 301 student nurses in the Philippines. The data were collected from September 2020 to October 2020.

Results: Filipino student nurses experienced stress associated with the pandemic at a high level; however, their resilience, life satisfaction and psychological well-being were found to be moderate to high. Increased pandemic-associated stress was associated with reduced life satisfaction and poorer psychological well-being. Further, resilience was found to reduce the negative effects of pandemic-associated stress on the life satisfaction and psychological well-being of student nurses.

Conclusions: This study highlights the importance of building resilience in student nurses during the coronavirus pandemic to sustain their mental and psychological well-being and improve their life satisfaction.

1. Introduction

COVID-19, which emerged in Wuhan, China, in late 2019, continues to affect the economy of many nations worldwide, as well as the health of their residents. Like many countries in Asia, the Philippines was hit hard by COVID-19 (World Health Organization, 2021), despite its early implementation of measures to control the spread of SARS-CoV-2 infection. As early as January 2020, many countries, including the Philippines, implemented numerous strategies to halt the transmission of virus, including the mandatory use of masks in public, strict physical distancing, strict quarantine for those who had contact with infected patients, closure of non-essential establishments and stay-at-home orders to limit the mobility of the public (Amit et al., 2021; Vallejo and Ong, 2020). Additionally, schools and universities were subjected to indefinite closure, forcing these schools to shift to online learning. This

transition, along with the increased threats of COVID-19, has brought additional stress and mental health burden to many young people (Lee, 2020). Further, other infection control strategies, such as the physical distancing and stay-at-home mandates, prevent young people from interacting with their peers and friends, causing social and emotional isolation, anxiety, stress and emotional exhaustion (Power et al., 2020; Grande et al., 2021).

1.1. Background

Like other academic programs, the education and training of student nurses were heavily affected by the interruption caused by the pandemic (Agu et al., 2021). In the Philippines, the academic component of the nursing program was shifted from in-person to online and/or modular-type learning, while the clinical training aspect was completely

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terminated due to fear of exposing students to the virus. These changes, along with other pandemic-related concerns (e.g. fear of COVID-19, social distancing, stay-at-home order) have brought additional stress to the lives of student nurses, who were already under high pressure (Aslan and Pekince, 2021). Evidence has shown that healthcare students, including those from nursing programs, experienced moderate to severe stress during the height of the coronavirus outbreak (Kim et al., 2021; Ersin and Kartal, 2020), with higher stress levels reported by younger and female nursing students (Aslan & Pekince, 2021) and students who had their clinical training cross-sectional study during the pandemic (Casafont et al., 2021). International studies have demonstrated that, in addition to psychological distress, student nurses also suffered from other psychological problems during the pandemic, including emotional and social loneliness, post-traumatic stress disorder, emotional exhaustion, depression and fatigue (Grande et al., 2021; Savitsky et al., 2020; Labrague et al., 2021). Stress associated with distance learning and the abrupt shift to online learning were also seen to contribute to mental and psychological issues in student nurses (Wallace et al., 2021; Masha'al et al., 2020). In a broad review by Majrashi et al. (2021), stress that stemmed from distance learning was identified as the top stressor among student nurses during the coronavirus pandemic, followed by heavy workload and extreme fear of the virus.

While stress in minimal amounts is believed to promote students' learning and performance (Rudland et al., 2020), chronic exposure to higher stress levels could be detrimental to their health and may drive them to quit their nursing program (De los Santos et al., 2021). Evidence has suggested that persistent exposure to stress could be harmful to individuals' psychological well-being (Li and Hasson, 2020) and could negatively affect their satisfaction with their lives and overall quality of life (Kupcewicz et al., 2020; Rogowska et al., 2020). Such conditions, when not addressed, could have long-term deleterious effects, as they may exacerbate the current nursing workforce crisis due to the reduced number of students completing the program (Zhang et al., 2021). With the emergence of new coronavirus variants and the slow vaccine rollout in many countries, returning to normal life is not yet an option and student nurses will continue to be exposed to pandemic-related stress and suffer its consequences. Thus, nurse faculty should ensure that these students are well supported during the pandemic by equipping them with the resources necessary to effectively deal with and manage the different stressors during the pandemic.

Defined as an individual's ability to bounce back from stressful circumstances (Cooper et al., 2020), personal resilience is a vital resource that helps an individual manage and deal with numerous stressors. Various studies have confirmed the vital role of resilience in protecting one's mental and psychological health from the adverse consequences of any stressful and traumatic situations (Li and Hasson, 2020; Sanderson and Brewer, 2017). During the height of the coronavirus outbreak, a wide range of studies showed that when an individual is equipped with adequate resilience, they are less likely to suffer from stress, anxiety, loneliness, depression and post-traumatic stress (Labrague et al., 2021; Verdolini et al., 2021). Evidence from young people and healthcare workers demonstrated the importance of maintaining resilience during the pandemic to protect the mental, emotional and psychological health of an individual (Croghan et al., 2021; Grande et al., 2021). To our knowledge, no studies have yet examined the role of resilience in reducing the effects of pandemic-associated stress on student nurses' psychological well-being and life satisfaction, despite increasing evidence highlighting the role of resilience during the pandemic. Understanding the mechanism by which resilience exerts these effects will help nurse faculty formulate measures to effectively support the learning of the student nurses and support their mental, emotional and psychological health. Hence, this study examined the mediating effect of resilience on the relationships between pandemic-associated stress and psychological well-being and life satisfaction in student nurses during the COVID-19 pandemic.

1.2. Hypothesised model

Based on the reviewed literature, we hypothesised that: (a) stress associated with the pandemic has a negative influence on life satisfaction and psychological well-being in student nurses (Hypothesis 1); and that (b) stress associated with the pandemic influences student nurses' life satisfaction and psychological well-being via the mediating effect of resilience (Hypothesis 2).

2. Methods

2.1. Design, samples and settings

This study used a cross-sectional study research design, using an online survey to gather data from student nurses in select nursing schools in the Philippines. Students were qualified for inclusion in the study if they were currently registered in a nursing school, had no pre-existing psychiatric co-morbidities, had not experienced any losses or deaths in recent months and had access to the Internet to answer the survey questions. The sample size required was calculated using an online sample size calculator (Soper, 2020). With an 80% power, 0.02 effect size and alpha of 0.05, the sample size estimate was 242. The online survey was sent to 350 students to account for possible attrition and 301 students responded.

2.2. Instrumentation

Four standardized scales were used in this study: the 4-item Perceived Stress Scale (PSS; Cohen et al., 1988), the Psychological Well-Being Scale (PWBS; Diener et al., 2010), the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; Huebner et al., 2006) and the Brief Resilient Coping Scale (Smith et al., 2008).

Student nurses' perceptions of stress during the COVID-19 outbreak were assessed using the PSS. The scale consists of five items that assess student nurses' overall feelings during the previous weeks and are answered using a Likert-type scale (0 "never" to 4 "very often"). The composite score was categorized into three levels: low (0 – 1.33), moderate (1.34 – 2.66) and high (2.67 – 4.00) (Aslan and Pekince, 2021). The PSS has been widely used in student populations in both nursing and non-nursing disciplines (Aslan and Pekince, 2021) and was found to have good psychometric properties.

The PWBS was used to measure the psychological well-being of the student nurses during the pandemic. Consisting of 12 items that examine student nurses' appraisal of their overall psychological well-being, responses were given on a seven-point Likert-type scale (1 "strongly agree" to 7 "strongly disagree"). The composite score was categorized into three levels: low (1–28), moderate (29–56) and high (57–84) (Yüksel and Bahadır-Yilmaz, 2019). Previous research established the criterion validity and reliability of the scale with an internal consistency value of 0.91 (Diener et al., 2010). The PWBS has been used in many studies involving students from the different programs including those from the health profession programs (Yüksel and Bahadır-Yilmaz, 2019; Arslan et al., 2021).

Students' perceptions or judgment of their satisfaction with their lives was assessed using the BMSLSS. The scale consisted of five items that were answered on a Likert-type scale (1 "strongly disagree" to 7 "strongly agree"). The composite score was categorized into six levels: extremely low (5–9), low (10–14), slightly below average (15–19), moderate score (20–24), high score (25–29) and very high score (30–35) (Lucas and Donnellan, 2012). The excellent psychometric properties of the scale were established in an earlier research involving university students, with an internal consistency value of 0.91 (Lucas and Donnellan, 2012).

Psychological resilience in student nurses during the pandemic was examined using the BRCS. Students responded to each item using a Likert-type scale (0 "not at all" to 5 "true nearly all of the time"). The

mean scale score was categorized into three levels: low (1.00 – 2.99), moderate (3.00 – 4.30) and high (4.31 – 5.00) (Labrague and de los Santos, 2021). This 4-item scale had been used in student nurses during the early months of the pandemic and were found to be highly valid and reliable (Savitsky et al., 2020). The internal consistencies of the scales in the present study were 0.90 (PSS), 0.85 (PWBS), 0.87 (BMSLSS) and 0.92 (BRCS).

2.3. Ethical considerations and data gathering procedure

Permission to conduct the study was granted by the ethical committee of the (omitted for review purpose). Given the ongoing restrictions on in-person data gathering, the questionnaires were coded on the online survey platform Google Forms. The link to the survey was sent to the official social media accounts and/or email addresses of the students. The first page of the online survey included a short description of the research followed by a statement seeking the student's consent. Those who agreed to participate in the study clicked the "next" button and were redirected to the online questionnaire, while those who opted not to participate in the study were asked to click the "not interested" button. Anonymity of the participants was assured, as they were not asked for any personal information in the survey. Weekly reminders to complete the survey were automatically sent to the students who had not yet responded. The data were collected from September 2020 to October 2020.

3. Data analysis

The demographic profile of the study participants and their responses on the scales are presented using means, standard deviations and percentages. Bivariate analysis, using the Pearson's correlation coefficient (r), Student's t -test and analysis of variance, were used to assess correlations between key study variables. Multi-stage regression analyses were conducted to determine the mediating effect of resilience in the relationship between stress, psychological well-being and life satisfaction. Initially, the independent variable (IV) was regressed to the mediating variable (MV; Step 1). Next, the IV was regressed to the dependent variables (DVs). Finally, the MV was regressed to the DV while controlling for the IV. The Sobel test was used to test the significance of the mediation analysis.

4. Results

Three hundred one student nurses completed the online survey. Most of the participants were female (78.41%), in their first or second year of nursing school (65.45%) and enrolled in government-owned nursing schools (67.44%). Further, 58.14% of the participants reported that they felt unprepared to care for coronavirus patients, while less than 39.53% were willing to care for these patients. Stress due to COVID-19 was significantly negatively correlated with readiness ($r = -0.158$, $p = 0.011$) and willingness ($r = -0.219$, $p < 0.001$) to care for infected patients (Table 1).

The composite scores of the study variables were: stress = 3.01 (out of 5); psychological well-being = 64.52 (out of 84); life satisfaction = 26.31 (out of 35); and resilience = 3.94 (out of 5). Stress due to COVID-19 was significantly negatively correlated with psychological well-being ($r = -0.260$, $p < 0.001$), life satisfaction ($r = -0.135$, $p < 0.001$) and resilience ($r = -0.300$, $p < 0.001$). Meanwhile, resilience was significantly correlated with psychological well-being ($r = 0.588$, $p < 0.001$) and life satisfaction ($r = 0.500$, $p < 0.001$) (Table 2).

Multi-stage multiple regression analyses were conducted to assess the mediating role of resilience on the relationship between COVID-19-related stress and health outcomes in nursing students (Table 3, Fig. 1). Stress was found to have significant negative associations with psychological well-being ($\beta = -0.260$, $p < 0.001$) and life satisfaction ($\beta = -0.135$, $p = 0.029$). This result supported Hypothesis 1. The mediator

Table 1
Students' characteristics ($n = 301$).

| Characteristics | Categories | N | % |
|---|---------------------|-----|-------|
| Age (18 – 35) | | | |
| Gender | Male | 65 | 21.59 |
| | Female | 236 | 78.41 |
| Year Level | 1 | 75 | 24.92 |
| | 2 | 122 | 40.53 |
| | 3 | 73 | 24.25 |
| | 4 | 31 | 10.30 |
| Type of Nursing School | Private | 98 | 32.56 |
| | Public | 203 | 67.44 |
| Location of Nursing School | Urban | 204 | 67.77 |
| | Rural | 97 | 32.23 |
| Readiness to care for COVID-19 patients | Unprepared | 51 | 16.94 |
| | Somewhat unprepared | 124 | 41.20 |
| | Somewhat prepared | 102 | 33.89 |
| | Prepared | 24 | 7.97 |
| Willingness to care for COVID-19 patients | Absolutely not | 17 | 5.65 |
| | Probably not | 41 | 13.62 |
| | Unsure | 124 | 41.20 |
| | Probably yes | 87 | 28.90 |
| | Absolutely yes | 32 | 10.63 |

Table 2
Correlations between key study variables.

| Variables | Mean | SD | 1 | 2 | 3 | 4 |
|--------------------------|-------|-------|----------|---------|---------|---|
| Stress | 3.01 | 0.823 | 1 | | | |
| Psychological well-being | 64.52 | 10.01 | -0.260** | 1 | | |
| Life satisfaction | 22.81 | 5.67 | -0.135* | 0.588** | 1 | |
| Resilience | 3.94 | 0.722 | -0.300** | 0.500** | 0.286** | 1 |

** $p < 0.001$, * $p < 0.05$.

variable, resilience, was associated with psychological well-being ($\beta = 0.500$, $p < 0.001$) and life satisfaction ($\beta = 0.286$, $p < 0.001$). Finally, the effect of stress on psychological well-being ($\beta = -0.121$, $p = 0.031$) was reduced when resilience was added to the model, suggesting that resilience had a partial mediating effect. Meanwhile, the effect of stress on life satisfaction ($\beta = -0.055$, $p = 0.382$) vanished when resilience was added into the model, suggesting its full mediating effect for this variable as well. These results partially supported Hypothesis 2. The significance of the mediating effect of resilience on the relationships between stress and psychological well-being ($z = -3.256$, $p = 0.001$) and between stress and life satisfaction ($z = -2.883$, $p = 0.003$) was confirmed by the Sobel test. In other words, resilience reduces the impact of COVID-19-associated stress on students' life satisfaction and psychological well-being.

5. Discussion

The findings of this study showed that student nurses in the Philippines experienced high stress levels during the coronavirus outbreak. This result extended the findings of studies during the pandemic where student nurses reported experiencing moderate to severe forms of psychological distress (Ersin and Kartal, 2020; Aslan and Pekince, 2021). Higher stress levels are somewhat expected when confronted with new challenges, such as the ongoing coronavirus pandemic. Since the virus is relatively new, highly transmissible and potentially deadly and very few treatments are available, the stress levels and anxiety in student nurses are expected to be elevated. Further, the restrictions implemented by the government to control the spread of SARS-CoV-2, such as the strict physical distancing, stay-at-home orders and use of masks, could have an impact on the mental and psychological health of the public, resulting in higher stress and anxiety levels (Power

Table 3
Effect Estimates.

| Structural Paths | B | SE | β | <i>t</i> | <i>p</i> | 95% CI Lower Bound | 95% CI Upper Bound |
|--|--------|-------|---------|----------|----------|--------------------|--------------------|
| <i>Step 1</i> | | | | | | | |
| Stress → psychological well-being | -0.294 | 0.068 | -0.260 | -4.335 | 0.001 | -0.427 | -0.160 |
| Stress → life satisfaction | -0.180 | 0.082 | -0.135 | -2.200 | 0.029 | -0.342 | -0.019 |
| Stress → Resilience | -0.263 | 0.052 | -0.300 | -5.054 | 0.001 | -0.365 | -0.160 |
| <i>Step 2</i> | | | | | | | |
| Resilience → psychological well-being | 0.644 | 0.069 | 0.500 | 9.285 | 0.001 | 0.507 | 0.780 |
| Resilience → life satisfaction | 0.434 | 0.090 | 0.286 | 4.801 | 0.001 | 0.256 | 0.612 |
| <i>Step 3</i> | | | | | | | |
| Stress → Resilience → psychological well-being | -0.137 | 0.063 | -0.121 | -2.165 | 0.031 | -0.261 | -0.012 |
| Stress → Resilience → life satisfaction | -0.073 | 0.083 | -0.055 | -0.876 | 0.382 | -0.237 | 0.091 |

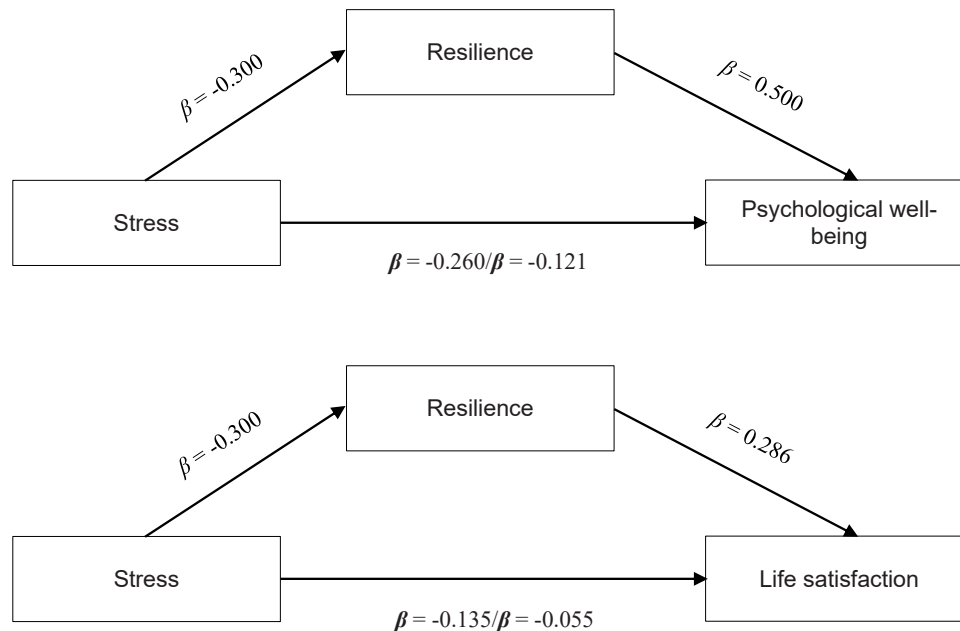


Fig. 1. Final model.

et al., 2020). While specific stressors were not identified in this study, earlier reports have attributed students' stress during the pandemic to fear of being infected by the virus, challenges with distance learning, heavy workloads and issues in the clinic (Majrashi et al., 2021). This finding underscores the need for nurse faculty to initiate measures or intervention to reduce stress in students and improve their coping skills. Due to various restrictions to limit the spread of the virus (e.g., social distancing and the stay-at-home orders), these stress reduction measures could be implemented through virtual platforms such as online workshops, webinars and on-demand videos (Labrague, 2021).

Despite the high levels of stress reported by student nurses, their level of resilience, psychological well-being and life satisfaction were found to be moderate to high. This result is in accordance with earlier reports (Celik, 2020; Kim, 2020) that suggested that student nurses are able to adapt to and effectively cope with the current pandemic situation, resulting in higher life satisfaction and psychological well-being. There are a few possible explanations for this. First, it may be attributed to the fact that, unlike the general population, student nurses are educated on and aware of the different ways to cope and the health-promoting behaviors that can help them effectively deal with various stressful and traumatic events (Ersin and Kartal, 2020). Second, the data were collected during the first few months of the pandemic, when individuals were most likely to have vast personal resources (e.g. resilience, coping, hardiness) to safeguard their mental health against the negative consequences of the pandemic (Cooper et al., 2020). However, with no end to the pandemic in sight, along with the emergence of new

COVID-19 variants and the increasing number of infected patients, sustaining resilience, psychological well-being and life satisfaction in student nurses is a major challenge. Hence, proactive measures or interventions to prevent the possible decline in students' personal resources and to sustain their psychological health and well-being and, hence, their life satisfaction should be tested.

Stress in minimal amounts is believed to be beneficial to an individual, as it facilitates higher concentration and focus, problem-solving and decision-making skills and effective learning (Rudland et al., 2020); however, stress levels that exceed an individual's threshold may negatively affect their physiological and psychological health (Bhurtun et al., 2019; McCarthy et al., 2018). In the present study, stress associated with COVID-19 had direct negative effects on life satisfaction and psychological well-being in student nurses. Specifically, increased stress may result in poorer psychological well-being and decreased life satisfaction. This finding is in accordance with the evidence collected during the pre-pandemic period that showed that student nurses who perceived more academic and clinical stress tended to score lower on the psychological well-being measure and were more dissatisfied with their lives than students who perceived less stress (Yildirim et al., 2013; Yüksel and Bahadır-Yilmaz, 2019). In a systematic review of the literature (Li and Hasson, 2020), high stress levels and low resilience levels among student nurses during their clinical training were found to be associated with poorer psychological well-being. Moreover, this result lent additional support to the findings of several studies showing the importance of managing stress levels in healthcare students, including

student nurses, during the pandemic to safeguard their mental and psychological well-being (Li and Hasson, 2020) and life satisfaction (Majrashi et al., 2021; Rogowska et al., 2020).

Given the negative repercussions of higher stress levels on student nurses' life satisfaction and psychological health, it is imperative that empirically driven interventions to combat and manage stress are provided to students. Due to movement restrictions in the community, nurse faculty may consider stress management interventions delivered in an online format, such as guided internet-based stress management interventions (Amanvermez et al., 2021), the 8-week web-based mindfulness program (El Morr et al., 2021) and a psycho-educational program (McCarthy et al., 2018).

The intermediary effect of resilience on the outcome variables in student nurses indicates that resilience may reduce the impact of coronavirus-associated stress on students' psychological well-being and life satisfaction. This finding increases our understanding of the potential role of resilience in safeguarding the psychological health and well-being of students during the coronavirus outbreak. Moreover, it emphasized the importance of resilience for an individual to effectively deal with and manage various stressors (Cooper et al., 2020). Studies during the pre-pandemic era showed that adequate resilience and frequent use of positive coping skills not only reduced stress levels in nursing students, but also enhanced their mental and psychological well-being (Li and Hasson, 2020; Sanderson and Brewer, 2017). Conversely, heightened mental problems and psychological issues were attributed to insufficient levels of resilience during stressful events (Croghan et al., 2021; Grande et al., 2021). During the pandemic, an adequate level of resilience and the use of positive coping methods, including the use of humor, were associated with significant reductions in psychological distress, anxiety, depression and emotional exhaustion (Hamadeh et al., 2021). Numerous studies involving non-nursing students have linked inadequate resilience during traumatic events to greater physiological, psychological and social health problems (Labrague et al., 2021; Verdolini et al., 2021). Moreover, lower resilience levels and inadequate social support were implicated in acute stress disorder in Chinese college students (Ye et al., 2020). Given these findings, the need to bolster resilience in student nurses is apparent and due to the current social distancing and lockdown measures, innovative methods such as online workshops and webinars are required.

This study has several limitations. Among these are the exclusion of student nurses from other cities, which could hamper the generalisability of the study findings. Moreover, given the nature of a cross-sectional study research design, causal relationships could not be established; therefore, a more rigorous design should be used in future studies. For example, a longitudinal research design is ideal when measuring dynamic constructs such as stress, coping, psychological well-being and life satisfaction, as it allows for the assessment of how these constructs change with time. The use of a self-reported scale to measure the study's construct is likewise an issue, as this renders the study susceptible to response bias. In addition, the partial mediating effect of psychological well-being suggests that other variables may have not been taken into consideration; hence, future research should consider other individual and organizational variables among nurses that could improve well-being and life satisfaction in students. Finally, future research should test interventions to improve coping skills and psychological well-being and to reduce stress.

6. Conclusions

In accordance with the results of international studies, student nurses in the Philippines during the height of the pandemic experienced moderate levels of stress; however, their resilience, psychological well-being and life satisfaction were found to be moderate to high. Higher stress levels contributed to deterioration in individuals' psychological well-being and life satisfaction, suggesting the importance of proactive interventions to help students deal with and manage their stress

effectively. Finally, this study identified the value of harnessing resilience in student nurses to reducing the negative effects of stress associated with the pandemic on their life satisfaction and psychological well-being. Nurse faculty play an important role in reinforcing and teaching resilience in student nurses to help them sustain their mental and psychological well-being during the pandemic.

Ethical considerations

Prior to data collection, the research protocol was submitted to the Visayas State University-College of Nursing Ethics Review Committee and has a code, RES-CON-01.

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CRedit authorship contribution statement

Leodoro J. Labrague: Conceptualization, Methodology, Data curation, Writing – original draft preparation, supervision, Writing – review & editing.

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Conflict of Interest

All authors declare no conflict of interest.

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