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# Resilience, Social Support, Loneliness and Quality of Life during COVID-19 Pandemic: A Structural Equation Model

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ABSTRACT

*Aim:* To determine the parsimonious model of the interrelationships of personal resilience, social support, loneliness and quality of life (QoL) and to identify the mediating effect of loneliness among nursing students amidst the pandemic.

*Background:* The coronavirus 2019 (COVID-19) pandemic led to control measures which increased loneliness among students due to disrupted social connections and sudden shift to virtual learning. During these changes, resilience and social support can significantly influence how learners deal with pandemic-related stresses thus, minimizing loneliness and enhancing QoL. Although studies posited the influence of resilience and social support with loneliness and QoL, these were conducted prior the COVID-19 pandemic wherein loneliness and feelings of isolation play a crucial part.

*Design:* Correlational, theory testing using covariance-based structural equation modeling

*Methods:* A total of 550 nursing students from a comprehensive university in Manila, Philippines were recruited from September to October 2021 and answered four standardized, validated scales.

*Results:* A good and parsimonious model ($x^2$/df = 2.84, RMSEA = 0.058, GFI = 0.999, CFI = 0.999, PNFI = 0.048) highlighted the mediating effect of loneliness between social support, personal resilience and QoL. While personal resilience positively influenced the physical and psychological domains of QoL, social support positively affected the social relationships and environmental domains. Loneliness was a strong, negative predictor of the psychological and social domains of QoL and had a moderate, negative effect on the physical domain. Personal resilience also mediated the influence of social support on loneliness and QoL.

*Conclusion:* Social support and personal resilience positively affected QoL, while loneliness had a negative effect. Through the mediation of loneliness, the effects of social support on QoL decreases. However, the mediation of resilience further decreases loneliness and improves QoL. The presented model assists nurse educators and administrators in developing strategies to enhance social support, resilience and QoL among students while mitigating the negative effects loneliness during the pandemic.

*Tweetable abstract:* Loneliness and Resilience are mediators of student nurses' quality of life during COVID-19 pandemic. Social support is the common predictor.

## 1. Introduction

Since the onset of the COVID-19 pandemic, several countries implemented pandemic control measures and isolating protocols, including the sudden shift to virtual learning of students (Viner et al., 2020; Commission on Higher Education, 2020). Notably, the need to adapt suddenly to virtual learning caused college students to experience increased levels of loneliness and social isolation due to disrupted social connections and home confinement measures (Schiff et al., 2020; Labrague et al., 2021). Specifically, considering the challenging academic

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nature of the nursing education curriculum, loneliness puts the quality of life of nursing students at risk during the pandemic (Rauschenberg et al., 2021; Loades et al., 2020). As such, there is an increasing demand to develop policies and evidence-based programs geared in improving the overall quality of life of nursing students during the COVID-19 pandemic. Strengthening one's personal resilience and social support were reported as vital traits that effectively influence how one deals during such adversities and in times of loneliness (Labrague et al., 2021). However, there is a gap in literature that tackles the interrelationships of these variables to quality of life. A comprehensive study on the interplay of these variables will exemplify the development of new strategies in nursing education amidst the pandemic.

## 2. Background

This study addressed the concept of loneliness as a mediator between personal resilience, social support and quality of life. Personal resilience and social support can effectively influence how one deals with such adversity (Labrague et al., 2021). Resilience is defined as the ability of adjusting to external and internal demands to successfully adapt to challenging life experiences (American Psychological Association, 2020). This definition is also consistent with the Resilience theory where resilience centers on the mediating factors which allow positive outcomes during adverse events (Van Breda, 2018). High resilience levels have been reported of their protective role in mental health problems and stress as it enhances coping and flexibility, thereby allowing better adaptability in changing conditions (Pakdaman et al., 2016; Ali et al., 2018; Guillasper et al., 2021). Moreover, it protects against adversities such as emergencies, disaster events and disease outbreaks such as the COVID-19 pandemic (Labrague et al., 2021). The ability of high resilience to reduce the impact of the COVID-19 pandemic could improve its positive correlation to the quality of life of nursing students (Guillasper et al., 2021). However, low levels of personal resilience may even predispose one to increased levels of loneliness (Pakdaman et al., 2016; Labrague et al., 2021).

On the other hand, social support is the level of support an individual perceives to receive from his social network (Lin et al., 2019; Ren and Ji, 2019; Labrague et al., 2021). As schools remained closed during the pandemic, the social resources of college students in universities were restricted (Alsubaie et al., 2019; Saltzman et al., 2020; Sun et al., 2020) and led to feelings of disconnectedness (Lisitsa et al., 2020). Based on the theoretical framework of the stress buffering model, the lack of social support consequently affects how one buffers pandemic-related stresses which also negatively influences one's physical and mental health as part of one's quality of life (Cohen and Wills, 1985; Wilcox, 1981). Moreover, evidence presents that the lack of social support – especially during crises, such as the pandemic – increases the risk of developing loneliness (Peplau and Perlman, 1982; Labrague et al., 2021).

Loneliness is a highly subjective emotional response when there is insufficient social interaction and connection with others (Peplau and Perlman, 1982). Loneliness has a severe impacts on mental health as it increases the prevalence of anxiety, mood disorders, suicide and it potentially exacerbates pre-existing mental health conditions (Hawkley and Cacioppo, 2010; Lim et al., 2020). Loneliness is also reported as a negative predictor of quality of life (Lardone et al., 2020). Quality of life is defined as the "individuals' perceptions of their position in life, in the context of the culture and value systems where they live and concerning their goals, standards and concerns" (World Health Organization Quality of Life Group, 1998). It encompasses four domains: physical health, psychological, social relationships and environmental, which are viewed as a general and constant state of an individual's wellbeing. This supports the theoretical framework of health related quality of life that views health as physical, psychological and social functioning and well-being (Ekwall et al., 2005). Nursing students who also use coping strategies and recovery resilience (Chang and Jang, 2019) showed more satisfaction in their quality of life (Felicilda-Reynaldo et al., 2019). Torres and Paragas (2019) posit that positive social connections of nursing students sustain their support networks under the social domain quality of life. As there are studies linking the influence of resilience and social support to loneliness and quality of life, as well as loneliness to quality of life, the relation between resilience, social support and quality of life could be mediated by loneliness.

However, a gap in research exists that explains the interrelationships of personal resilience, social support, loneliness and quality of life among nursing students during the COVID-19 pandemic. This study determined how these variables interrelate with one another, which can serve as a basis in developing evidence-based programs and policies in improving the overall quality of life of nursing students in the context of the new normal.

## 3. Aims

This study determined the interrelationships of personal resilience, social support, loneliness and quality of life of nursing students during the COVID-19 pandemic and was underpinned on the following research questions: *what is the relationship of personal resilience, social support and loneliness to the dimensions of quality of life; what is the mediating effect of loneliness in the relationship of social support and personal resilience with the dimensions of quality of life; and what is the final parsimonious model illustrating the interrelationship between and among personal resilience, social support, loneliness and the dimensions of quality of life?* As presented in the theoretical model (Fig. 1), the following are the research hypotheses of this study:

**H1a**. Higher personal resilience and social support show lower loneliness scores among nursing college students.

**H1b**. Higher personal resilience and social support show higher QoL scores among nursing college students.

**H1c**. Higher loneliness scores show lower QoL scores among nursing college students.

**H2**. Higher personal resilience and social support are associated with lower loneliness scores, thereby higher QoL scores among nursing college students.

**H3**. Personal resilience mediates the effect of the relationship of social support and loneliness to the dimensions of quality of life.

## 4. Methods

### 4.1. Design

This study used correlational, theory testing design using structural equation modeling to determine the interrelationships between and among personal resilience, social support, loneliness and quality of life of nursing college students during the COVID-19 pandemic. Cross-sectional data collection occurred during September to October 2021. The proposed theoretical model tested in this study is presented in Fig. 1.

### 4.2. Sample/participants

The study was conducted in a comprehensive university in Manila offering a Bachelor of Science in Nursing program. A total of 550 students who were at least 18 years old and a *bona fide*, full-time nursing student in the academic year 2021–2022 were recruited through cluster random sampling. Year levels were the considered clusters of the study. Random selection of the clusters was done through draw lots of the different sections from year levels 1–4 after having requested permission to obtain the full list of potential study participants from the university's administration office. All participants are fluent in speaking and reading English. However, students clinically diagnosed with mental health disorders were excluded from the study. Since the data were

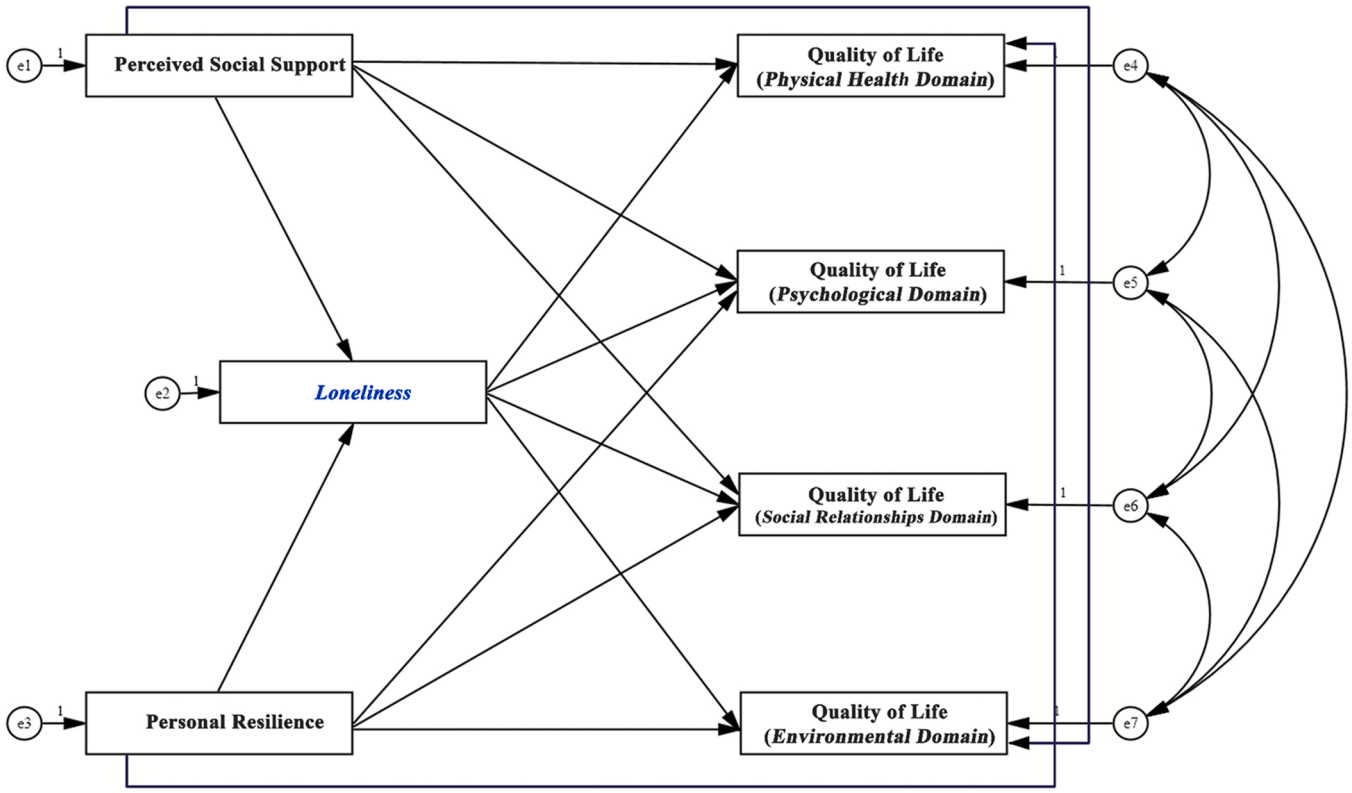


**Fig. 1.** Hypothesized Model of the Interrelationship of Social Support, Personal Resilience, Loneliness, and Quality of Life (N = 550).

anonymized, no mental health screening was done prior to answering the online questionnaire nor the study did not obtain any medical records. Therefore, self-reported declarations by the participants were observed as they were discouraged from participating if they have mental health disorders as indicated in the consent form.

### 4.3. Research instruments

Four standardized instruments were used to measure the constructs in this study. The Brief Resilience Scale is a 6-item, 5-point Likert questionnaire that has well-established measures in assessing resilience (Fung, 2020). Average scores were interpreted as low resilience (scores 1.00–2.99), normal resilience (scores 3.00–4.30) and high resilience (scores 4.31–5.00) (Smith et al., 2008). Pre-testing Cronbach's alpha reliability was 0.73.

The Perceived Social Support Questionnaire is a 6-item, 5-point Likert questionnaire that is widely accepted and has cross-culturally demonstrated good psychometric properties in assessing general perceived social support (Lin et al., 2019). Average scores were classified into "low" (scores 1.00–2.99), "moderate" (scores 3.00–4.30) and "high" (scores 4.31–5.00) levels of perceived social support (Kliem et al., 2015). Pre-testing reliability showed Cronbach's alpha score of 0.82.

The 6-item version of the De Jong Gierveld Loneliness Scale is a well-established instrument used to assess loneliness. Total loneliness scores were categorized as "not lonely" (scores 0–1), "moderately lonely" (scores 2–4) and "severely lonely" (scores 5–6). The scale was reported to have predictive validity, as evidenced by its strong association with mental illnesses and physical health (De Jong Gierveld and Tilburg, 2006). The scale showed a good reliability score in the pre-testing results with a Cronbach's alpha of 0.73.

The 26-item WHOQOL-BREF developed by the World Health Organization is an alternative assessment tool that adequately assesses the four domains (physical health; psychological; social relationships; and environmental) relevant to quality of life in several cultures worldwide (World Health Organization Quality of Life Group, 1998). Raw scores from this 5-point Likert questionnaire were linearly transformed using the 0–100 scale (Aboshaiqah and Cruz, 2019). Transmuted scores on each domain and the overall score ranged from "0" being the least favorable quality of life and "100″ being the most favorable quality of life. Considering the context and setting of the study, the WHOQOL-BREF adapted to a local university setting modified by Torres and Paragas in 2019 was used. The modified questionnaire contains similar items from the original tool, only removing an item about sexual relations. Pre-testing results demonstrated high scale reliability with a Cronbach's alpha of 0.83.

### 4.4. Validity and reliability

All tools were written in English and have undergone face validation and pre-testing. Four experts certified the face validation of the tools before proceeding to pre-testing. The online survey questionnaires were initially pre-tested among 10 respondents to assess reliability. Reliability analysis showed acceptable to good internal consistency coefficients for all tools.

### 4.5. Data collection

Ethical approval (Protocol Code XXX-XXX 2021-SR04) was obtained before any data gathering commenced. Data and electronic consent were collected online using Google Forms. On accessing the forms by the participants, the informed consent was presented that included the description of the study, risks and discomforts, benefits, confidentiality, pertinent contact information of the researcher, voluntary participation and the right to withdraw anytime from the process. An electronic consent stating that they fully understood and wish to participate in the study was ticked before they can proceed in answering the questionnaires. Consent was assumed through completion of the online questionnaire. The online questionnaire was divided into five parts: (a)

Demographic Profile (age, sex and year level), (b) Brief Resilience Scale, (c) Perceived Social Support Questionnaire, (d) Loneliness Scale and (e) WHOQOL-BREF. Items were marked as required to ensure the completeness of the questionnaire before submission. The settings of the Google Forms were modified to limit only one response from a single email address to prevent duplication. The data were anonymized, wherein no identifiers that may link the respondents to their responses were obtained. Data were retrieved weekly from the online database and stored in a single Excel file before being permanently deleted from the online database. The account, files and computer used during the data collection were encrypted with a strong password and only the principal investigator had access for process monitoring and data retrieval purposes.

### 4.6. Data analysis

Descriptive and inferential statistics using IBM® SPSS® Statistics version 26.0 (Armonk, N.Y.) were used to analyze the data. Descriptive statistics included mean, standard deviation, frequency and percentage to describe and summarize the respondents' demographic profile, personal resilience scores, social support scores, loneliness scores and quality of life scores. On the other hand, inferential statistics involved Covariance-Based Structural Equation Modeling, using maximum likelihood estimation and path analysis to determine the underlying relationship between the variables as hypothesized in Fig. 1 (Byrne, 2010). Path analysis was also used to determine the direct, indirect and total effects of the variables (Byrne, 2010). The following model fit indices were employed to assess the emerging model: Chi-Square/Degrees-of-Freedom ratio (CMIN/df) $\leq 3.00$, Root Mean-Square Error of Approximation (RMSEA) $\leq 0.08$, Goodness-of-Fit Index (GFI) $\geq 90\%$, Comparative-Fit-Index (CFI) $\geq 90\%$, a higher Parsimonious Normal Fit Index (PNFI) (Byrne, 2010). Furthermore, standardized scale scores were used in testing the hypothesized and emerging models.

### 4.7. Ethical considerations

The study obtained ethical approval from the university's Ethical Review Committee and adhered to the National Ethical Guidelines for Health and Health-related Research (2017) on good ethical practice, by upholding principles of Belmont Report, informed consent, privacy and confidentiality, standards of appropriate risk-benefits and safety ratio; as well as by promoting justice, social value and transparency to the respondents.

## 5. Results

### 5.1. Demographic characteristics of the respondents

Table 1 illustrates the demographic profile of the respondents. The total response rate of the study is 91.67%, from the cluster response rates of year levels 1 (86.92%), 2 (93.21%), 3 (91.91%) and 4 (93.04%). Some of the reasons for noncompliance include non-completion and lack of time due to academic workload. It can be noted that most of the respondents were female (74.20%) and were third-year students (28.90%). Results also showed that the mean age of the respondents was 19.92 years old (SD = 1.18).

**Table 1**
Demographic profile of the respondents (N = 550).

| Characteristics | Frequency (*f*) | Percentage (%) | Mean (SD) |
|---|---|---|---|
| **Age (Year)** | | | 19.92 (1.18) |
| **Sex** | | | |
| *Female* | 408 | 74.20% | |
| *Male* | 142 | 25.80% | |
| **Year Level** | | | |
| *First Year* | 93 | 16.90% | |
| *Second Year* | 151 | 27.50% | |
| *Third Year* | 159 | 28.90% | |
| *Fourth Year* | 147 | 26.70% | |

### 5.2. Descriptive statistics and correlation matrix of social support, personal resilience, loneliness and quality of life

The descriptive statistics and correlation matrix of social support, personal resilience, loneliness and quality of life are presented in Table 2. It can be noted that the mean social support, personal resilience and loneliness were 3.92 (SD = 0.72), 3.07 (SD = 0.70) and 1.93 (SD = 0.40), respectively. These results denote that most respondents had moderate social support, normal resilience and moderate loneliness. It can also be noted in Table 2 that the mean quality of life in the physical health domain, psychological domain, social relationships domain and environmental domain were 64.24 (SD = 11.52), 58.84 (SD = 13.41), 71.27 (SD = 14.59) and 71.34 (SD = 12.02), respectively. Among these domains of quality of life, results indicate that the psychological domain had the lowest score, while the environmental domain of quality of life had the highest score.

### 5.3. Hypothesized model of the interrelationship of social support, personal resilience, loneliness and quality of life

The hypothesized model of the study is illustrated in Fig. 1. Initial model analysis indicated poor model fit parameters (Table 3). Moreover, initial results showed that loneliness was not statistically significant in influencing the environmental domain of quality of life ($\beta = -0.09$, $p = 0.065$) and should be omitted from the model. Analysis of the modification indices also suggested a path between social support to personal resilience (MI = 31.30, Par. Change = 0.22). These results denote that the hypothesized model should be trimmed and re-specified.

### 5.4. Emerging model of the interrelationship of social support, personal resilience, loneliness and quality of life

After model trimming and re-specification, the emerging model depicted in Fig. 2 showed acceptable model fit indices (x2 = 2.84, df = 1, x2/df = 2.84, $p = 0.092$; RMSEA =;0.058 [0.001–0.142, $p = 0.306$]; GFI = 0.999; CFI = 0.999; PNFI=0.048). Results showed that social support directly influenced personal resilience ($\beta = 0.26$, $p = 0.003$); loneliness ($\beta = -0.48$, $p = 0.003$); and, the physical health domain ($\beta = 0.10$, $p = 0.022$), psychological domain ($\beta = 0.13$, $p = 0.003$), social relationships domain ($\beta = 0.35$, $p = 0.003$) and environmental domain ($\beta = 0.36$, $p = 0.003$) of quality of life. Likewise, it can be gleaned from the emerging model that personal resilience directly affected loneliness ($\beta = -0.29$, $p = 0.003$) and the four domains of quality of life – physical health ($\beta = 0.39$, $p = 0.003$), psychological ($\beta = 0.33$, $p = 0.003$), social relationships ($\beta = 0.12$, $p = 0.003$) and environmental ($\beta = 0.28$, $p = 0.003$). The analysis also showed that loneliness had a direct, negative effect on the physical health domain ($\beta = -0.14$, $p = 0.003$), psychological domain ($\beta = -0.35$, $p = 0.003$) and social relationships domain ($\beta = -0.33$, $p = 0.003$) of quality of life.

### 5.5. Mediating roles of personal resilience and loneliness on the emerging model

It is also interesting to note that the results of the path analysis (Table 4) showed the mediating roles of personal resilience and loneliness. In particular, social support had indirect effects on loneliness ($\beta = -0.07$, $p < 0.01$) and the four domains of quality of life (physical: $\beta = 0.18$, $p < 0.01$; psychological: $\beta = 0.27$, $p < 0.01$; social relationship: $\beta = 0.21$, $p < 0.01$; environment: $\beta = 0.07$, $p < 0.01$) through the mediation of personal resilience. In addition, loneliness mediated the indirect effects of social support towards the physical health domain

**Table 2**
Descriptive statistics and correlation matrix of social support, personal resilience, loneliness, and quality of life (N = 550).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Social Support | – | – | – | – | – | – | – |
| 2. Personal Resilience | 0.26 | – | – | – | – | – | – |
| 3. Loneliness | –0.56 | –0.41 | – | – | – | – | – |
| 4. Quality of Life (Physical Health Domain) | 0.28 | 0.47 | –0.37 | – | – | – | – |
| 5. Quality of Life (Psychological Domain) | 0.40 | 0.50 | –0.56 | 0.61 | – | – | – |
| 6. Quality of Life (Social Relationships Domain) | 0.56 | 0.34 | –0.58 | 0.40 | 0.53 | – | – |
| 7. Quality of Life (Environmental Domain) | 0.43 | 0.37 | –0.36 | 0.49 | 0.53 | 0.43 | – |
| **Mean** | 3.92 | 3.07 | 1.93 | 64.24 | 58.84 | 71.27 | 71.34 |
| **Standard Deviation** | 0.72 | 0.70 | 0.40 | 11.52 | 13.41 | 14.59 | 12.02 |
| **Cronbach's Alpha** | 0.79 | 0.85 | 0.70 | 0.71 | 0.81 | 0.75 | 0.81 |

*Significant at 0.05 level
†Significant at 0.01 level

**Table 3**
Model Fit Parameters of the Hypothesized and Emerging Models (N = 550).

| Model | CMIN | | | RMSEA 90% CI | | | CFI | GFI | PNFI |
|---|---|---|---|---|---|---|---|---|---|
| | $\chi^2$ | df | $\chi^2$/df (*p*-value) | RMSEA (*p*-value) | Lower Bound | Upper Bound | | | |
| **Acceptable Threshold** | – | – | ≤ 3.00 (>0.05) | ≤ 0.08 (>0.05) | – | – | ≥ 0.90 | ≥ 0.90 | EM>HM |
| **Hypothesized Model** | 32.23 | 1 | 32.23 (0.001) | 0.238 (0.001) | 0.172 | 0.312 | 0.978 | 0.984 | 0.047 |
| **Emerging Model** | 2.84 | 1 | 2.84 (0.092) | 0.058 (0.306) | 0.001 | 0.142 | 0.999 | 0.999 | 0.048 |

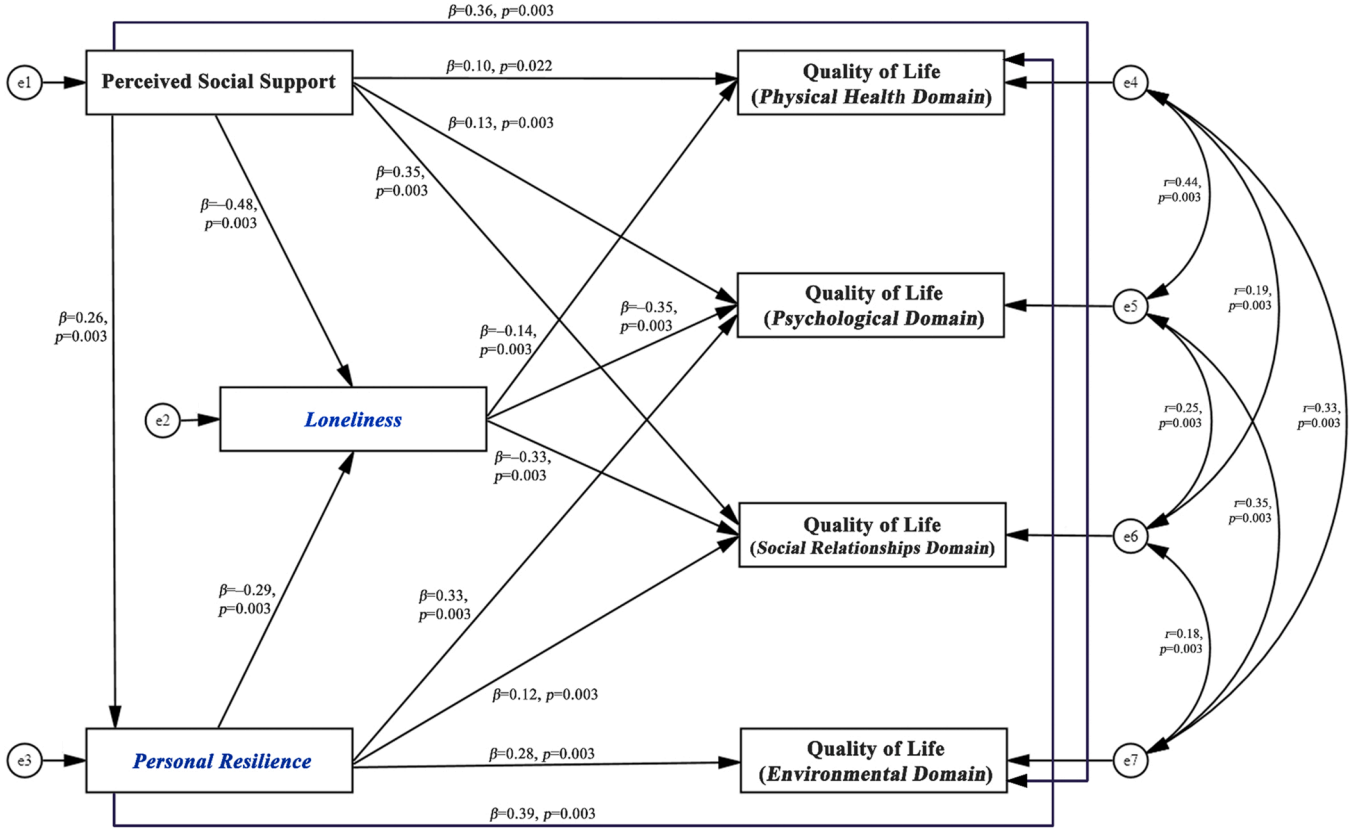


**Fig. 2.** Emerging model of the interrelationship of social support, personal resilience, loneliness, and quality of life (N = 550).

(β = 0.07, p < 0.01), psychological domain (β = 0.17, p < 0.01) and social relationships domain (β = 0.16, p < 0.01) of quality of life. Results also showed that personal resilience had an indirect effect on the four domains of quality of life through the mediation of loneliness (Table 4).

## 6. Discussion

This study determined the interrelationship of social support, personal resilience, loneliness and quality of life of nursing students during the COVID-19 pandemic. In general, results showed the positive influence of social support and personal resilience to quality of life, their negative influence on loneliness and the negative effect of loneliness to quality of life. Furthermore, the mediating role of loneliness and

**Table 4**
Path analysis of the interrelationships of social support, personal resilience, loneliness, and quality of life (N = 550).

| Predictors | Personal resilience | | | Loneliness | | | Quality of life (Physical health domain) | | | Quality of Life (Psychological domain) | | | Quality of Life (Social relationships domain) | | | Quality of life (Environmental domain) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Indirect | Direct | Total | Indirect | Direct | Total | Indirect | Direct | Total | Indirect | Direct | Total | Indirect | Direct | Total | Indirect | Direct | Total |
| Social Support | – | 0.26[†] | 0.26[†] | –0.07[†] | –0.48[†] | –0.56[†] | 0.18[†] | 0.10[*] | 0.28[†] | 0.27[†] | 0.13[†] | 0.40[†] | 0.21[†] | 0.35[†] | 0.56[†] | 0.07[†] | 0.36[†] | 0.43[†] |
| Personal Resilience | – | – | – | – | –0.29[†] | –0.29[†] | 0.04[†] | 0.39[†] | 0.43[†] | 0.10[†] | 0.33[†] | 0.43[†] | 0.09[†] | 0.12[†] | 0.21[†] | – | 0.28[†] | 0.28[†] |
| Loneliness | – | – | – | – | – | – | – | –0.14[†] | –0.14[†] | – | –0.35[†] | –0.35[†] | – | –0.33[†] | –0.33[†] | – | – | – |

[*] Significant at 0.05 level
[†] Significant at 0.01 level

personal resilience were identified.

The results showed that social support positively influences quality of life, particularly on the environmental and social relationship domains. This may be attributed to how having more social resources provides students more opportunities to seek financial aid and obtain new information and skills, which contributes to increased feelings of physical safety in their environmental quality of life. Supporting studies also state that the increased level of support one perceives to receive from his social network consequently improves their perceptions on their quality of life (Zhang et al., 2018; Drach-Zahavy et al., 2021; Labrague et al., 2021). With the closure of universities during the pandemic, reduced social interaction and connectedness significantly impaired social relationships among nursing students especially with their peers who are their crucial sources of social support (Elmer et al., 2020). The lack of peer interaction affects the fulfillment of the fundamental psychological need for belongingness and their perceptions on social relationships quality of life. Sun et al. (2020) also stated that the lack of support lessens the buffering factor against feelings of social isolation, which also affects their perceptions on their social relationships during the pandemic.

Personal resilience also has a positive influence on quality of life, particularly on the physical and psychological domains. The protective factor of resilience to readily adapt to stress contributes to better physical and psychological health of nursing students. A plethora of literature posits that personal resilience reduces pandemic-related stress by enhancing coping and flexibility in adapting to changing situations (Labrague, 2021; Keener et al., 2021; Spurr et al., 2021). Students with low personal resilience are more likely to manifest fatigue, poor sleep quality, headache, muscle pain and develop various diseases such as stroke and hypertension, which affects their physical health quality of life (Croghan et al., 2021; Labrague and De Los Santos, 2020). Furthermore, personal resilience crucially manages emotional responses amidst sudden disturbances, thereby promoting positive feelings and self-esteem that improves one's psychological quality of life. The pivotal role of personal resilience protects individuals against stress, anxiety, emotional exhaustion and negative thoughts by minimizing vulnerability in developing mental health problems associated with crisis (Walsh et al., 2020; Oducado et al., 2021). Nursing students develop their personal resilience by using opportunities that strengthen coping strategies and by remaining steadfast to combat various stressors and challenges during the pandemic. Moreover, nurses are expected to be flexible and gritty to differing situations. The nursing curriculum teaches these traits and other health-promoting behaviors to students, which aids in building their resilience to deal with various stressors, including the pandemic.

Even a year after the pandemic, the respondents still reported moderate levels of loneliness, which may be attributed to the prolonged implementation of home confinement and disease control measures. Loneliness negatively influences all domains of quality of life except the environmental domain, while having the highest effect on the psychological domain. Lonely individuals are more prone to perceive stress, lack of motivation and mental health issues such as anxiety, depression and substance use. Jakobsen et al. (2020) explains that loneliness reinforces negative feelings and maladaptive behaviors which consequently affect their psychological quality of life. Moreover, since this is the first pandemic experienced by students, the disrupted social interactions easily facilitate feelings of isolation and aloneness as they are not used to restricted support-seeking opportunities, which then affects their social relationship quality of life. Beridze et al. (2020) also reported that increased loneliness after the shift to virtual learning promoted feelings of yearning among students. Due to this, the emotional exhaustion brought by loneliness affects one's physical quality of life. Malcolm et al. (2019) states that lonely individuals have poor sleep quality and less favorable lifestyles due to emotional fatigue.

It is also interesting that despite garnering the highest mean score among the four domains, the environmental domain was not influenced

by loneliness. This is similar to the findings of Rumas et al. (2021) where the relationship of loneliness to the environmental domain remained statistically insignificant. This could indicate that student nurses in this study have a good and consistent environment conducive to their current situation, where they are likely comfortable and able to manipulate their surroundings based on their preference during the pandemic. Furthermore, the respondents are non-working full-time nursing students; therefore, financial matters are not one of their most pressing concerns. Strutt et al. (2021) also stated that loneliness is a predictor of quality of life except for the environmental domain because most of the respondents' concerns are related to the other aspects of quality of life.

The emerging model also showed that loneliness mediated the effects of social support and resilience towards quality of life. As increased social support reduces loneliness, it further improves the quality of life of nursing students. Social support is a protective resource against loneliness by buffering the negative impacts of stress especially on physical and mental health (Paykani et al., 2020), thereby aiding in higher quality of life. Thus, with limited social interactions due to tighter movement control, rates of loneliness during the pandemic can further affect one's quality of life. On the other hand, personal resilience has a stronger indirect effect on quality of life through the mediation of loneliness, especially on the psychological and social relationship domains. Other studies also reported how increased personal resilience lowers loneliness of students (Labrague et al., 2020), thereby further increasing their quality of life. Personal resilience also serves as a protective factor against loneliness by helping the individual to recover quickly from the chronic and enduring stress represented by the pandemic. Low resilience increases loneliness as it facilitates negative feelings, low self-esteem and easy burnout among students, which has a detrimental effect on their psychological quality of life. Furthermore, being unable to readily adapt to pandemic restrictions increases feelings of social isolation and loss of connection. This further lower support-seeking behaviors and poorer perceptions on social relationships quality of life (Lisitsa et al., 2020).

It is notable that aside from loneliness, an incidental finding on the mediating role of personal resilience was also identified. Personal resilience mediates social support and quality of life, which is similar to other studies that reported how high social support increases personal resilience, thereby further improving quality of life (Wu et al., 2018; Wang et al., 2019). Social support positively influences personal resilience because the amount of support received from social relationships helps one to be more grounded in recovering quickly from stress. This is supported by the Protective Resilience Model, which also suggests that having social support results in a more favorable quality of life through the mediation of personal resilience (Lee, 2019). Furthermore, personal resilience also mediates social support and loneliness. Social support and resilience are considered vital predictors in coping and managing stressful situations during the pandemic, which enable individuals to become more or less adaptive to loneliness (Jakobsen et al., 2020). College students with interpersonal relationships become more resilient, which enables them to adapt well from factors that cause loneliness such as feelings of isolation during the pandemic (Zhang et al., 2021). In this case, nursing students with good social support must develop resilience to further reduce loneliness and improve quality of life. Nursing schools play an essential role in developing students' resilience by providing a learning culture of trustworthiness in education (Amsrud et al., 2019).

The emerging model specifies the interrelationship of the variables that greatly contribute to the body of knowledge relevant to nursing education, policy development and nursing research. Thus, adopting activities and programs that capitalize on both the predictors and mediators is vital to improving the overall quality of life of nursing students during the pandemic. Polizzi et al. (2020) emphasized the practice of loving-kindness meditation (LKM) as a valuable tool during the COVID-19 pandemic to reinforce social interactions and boost resilience because it fosters positive emotions, social connection and prosocial behaviors, which also negate feelings of loneliness in times of adversities. Mindfulness practice (MP) and stress management are also evidence-based approaches that promote resilience by facilitating self-awareness to make coping strategies more flexible in managing negative emotions and crises during the pandemic (Heath et al., 2020). Cassidy (2015) also suggested that online peer mentoring and peer-assisted learning are some alternative classroom activities that can enhance social support and resilience building.

Furthermore, this study also serves as a basis for policy development and policy readjustments of institutions during the pandemic. Heijde et al. (2018) stated that it is vital to first determine the prevalence of loneliness among the students to employ appropriate interventions with loneliness. Institutions may adapt scheduled assessments conducted by guidance counselors to assess their students, obtain a basis for planning activities and provide health teachings on self-care methods and positive coping strategies. Concrete programs, such as staff training and an active student affairs organization, can strengthen knowledge and proper execution of planned strategies to their students. Furthermore, since loneliness and personal resilience were identified as mediators, interventions must improve their common predictor, which is social support, to further improve the quality of life of nursing students. Universities can engage in digital interactions and projects such as online student week, virtual team building, online open forums, leadership trainings and interactive webinars for students to foster digital relationships, promote student interaction and improve their psychological and social well-being during the pandemic.

## 7. Limitations

Despite the notable results, this study has some limitations, including the number of study locale; the instruments used; and, the data gathering that was done purely online and can have potential biases. As the study was only conducted in one comprehensive university, interpreting the generalizability of the results must be taken with caution. There was also no available pre-pandemic data on the study group that can be used to compare how their social support, personal resilience, loneliness and quality of life were before the COVID-19 pandemic. Though measures were taken to ensure data integrity, the participants' self-reported data may also limit the results due to possible over- or under- reporting. Moreover, though all questionnaires used are valid and reliable, the Brief Resilience Scale, Perceived Social Support Questionnaire and the Loneliness Scale were very short and only measured the specified domains or factors, which may have missed out some items relevant to the concepts of interest. However, the use of covariance-based structural equation modeling with a large sample size contributed to better rigor of the study since such statistical approach accounted for measurement errors introduced during the data collection process.

## 8. Conclusions

The direct and indirect relationships among personal resilience, social support, loneliness and quality of life of nursing students during the COVID-19 pandemic were determined. Social support directly improves quality of life, having the strongest influence on the environmental and social relationships domains. The psychological need for belongingness is fulfilled by having adequate social support, thereby promoting their positive perception of their environment and interpersonal relationships. Similarly, personal resilience also improves quality of life, having the strongest influence on the physical health and psychological domains. Increased personal resilience allows one to adapt well to adversities, thereby promoting better physical and psychological health outcomes. On the other hand, loneliness is a negative predictor of quality of life, particularly in the psychological and social relationships domain. The pandemic has facilitated feelings of isolation and aloneness which eventually affected perceptions on interpersonal relationships. However, loneliness did not directly affect the environmental domain of quality of life.

Loneliness is an important mediating role between social support and personal resilience to quality of life. Enhanced predictors promote an individual's protective resources, which reduces loneliness, thereby further improving their quality of life. Personal resilience was also discovered to have a mediating role between social support to quality of life and loneliness. Good social support improves adapting to adversities, thereby enhancing one's coping with loneliness and improvement in their quality of life. Emphasizing and understanding both predictors and mediators can help nursing students gauge the different factors that significantly affect their quality of life and develop coping mechanisms from these. Nursing educators could also develop strategies, approaches and interventions capitalizing on these variables that can help the students adapt well during the pandemic.

## CRediT authorship contribution statement

**Chelsea Nicole Padilla Pineda:** Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Moira Pauline Ibasco Naz**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Annedel Quirao Ortiz**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Ella Louisse Baldelomar Ouano**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Nathaniel Pierce Doinog Padua**: Conceptualization, Methodology, Writing - Original Draft. **Jaime Jr De Guzman Paronable**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Janella Mae Gregorio Pelayo**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Minette Coleen Calderon Regalado**: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing. **Gian Carlo Sy Torres**: Conceptualization, Methodology, Validation, Writing - Original Draft, Writing - Review & Editing, Supervision.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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### *Author contributions*

All the authors mentioned above have critically contributed to this study and are qualified for authorship and contributed in the (1) conception and design of the work including acquisition of data; (2) drafting and critical revision of the paper; and (3) final approval of the study; (4) accountability on all aspects of the work. Moira Pauline Naz, Annedel Ortiz, Ella Louisse Ouano, Nathaniel Pierce Padua, Jaime Jr Paronable, Janella Mae Pelayo, Chelsea Nicole Pineda, and Minette Coleen Regalado made equal contributions to this manuscript. Gian Carlo Torres served as the faculty senior author.

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