Journal of Nursing Science
Journal homepage: www.jns.vn

# Evaluation of the validity and reliability of the Vietnamese version of the perceived stress scale-10 among nursing students

*Do Minh Sinh[1], Do Thi Hoa[1], Vu Thi Hai Oanh[1], Nguyen Son Tung[1]*
*[1]Nam Dinh University of Nursing, Vietnam*

## ABSTRACT

***Objective**: This study evaluated the psychometric properties of the Vietnamese version of the Perceived Stress Scale (VN-PSS-10) among nursing students. **Methods**: A cross-sectional study was conducted with 350 nursing students from a university in Vietnam. Psychometric evaluation followed COSMIN guidelines, assessing content validity, structural validity, and reliability. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed, with internal consistency measured by Cronbach's alpha and test-retest reliability assessed via intraclass correlation coefficients (ICC). **Results**: The VN-PSS-10 demonstrated strong content validity (I-CVI: 0.80–1.00). EFA and CFA confirmed a two-factor structure (Perceived Helplessness and Perceived Self-Efficacy), explaining 54.2% of variance. The scale showed high internal consistency (Cronbach's alpha = 0.84) and excellent test-retest reliability (ICC = 0.87). Stress levels varied significantly across academic years, with advanced students reporting higher perceived stress. **Conclusions**: The Vietnamese Perceived Stress Scale (VN-PSS-10) is a valid and reliable tool for measuring perceived stress in Vietnamese nursing students. Its robust psychometric properties support its use in both research and educational settings. Future research should assess its responsiveness to stress-reduction interventions and its applicability to other student populations.*

***Keywords**: Perceived Stress, Psychometric Evaluation, Nursing Students, COSMIN, Vietnam*

## INTRODUCTION

Prolonged stress is a critical psychosocial factor profoundly impacting the mental health, academic performance, and clinical practice efficacy of nursing students [1]. Compared to students in other disciplines, nursing students often experience elevated stress levels due to the complex integration of academic pressures, clinical practice environments, and the demands of developing specialized skills under stringent supervision [1]. Recent systematic reviews have identified three primary stressor groups: (i) academic; (ii) clinical practice; and (iii) personal-social factors[2]. Accurate identification and assessment of stress levels in this population are vital for epidemiological research, designing effective interventions, and providing personalized academic support, thereby

Cor. author: Do Minh Sinh
Email: dmsinh@ndun.edu.vn
DOI: 10.54436/jns.2026.01.1193

Received: Nov 28, 2025
Accepted: Jan 19, 2026
Published: Jan 20, 2026

reducing the risk of early professional burnout and improving future patient care quality [3].

To assess stress in nursing students, several specialized tools have been developed, such as the Student Nurse Stress Index (SNSI), Student Nurse Stressor-15 (SNS-15), Stressors in Nursing Students Scale (SINS), and Clinical Stress Questionnaire (CSQ). These scales are valuable for classifying specific stress sources, facilitating targeted interventions within training settings. However, focusing solely on objective stressors may not fully or accurately reflect individual stress experiences. According to Lazarus and Folkman's transactional theory of stress [4], it is the individual's appraisal of a situation as uncontrollable, unpredictable, or beyond their adaptive capacity- rather than the mere objective presence of stressors-that determines psychological responses and long-term health outcomes. Consequently, measuring perceived stress - the central construct of Lazarus and Folkman's theory- is essential for a comprehensive and nuanced understanding of the stress experienced by nursing students.

The Perceived Stress Scale (PSS), developed by Cohen et al. [5], is a seminal instrument for measuring perceived stress. The PSS has been translated, validated, and applied across diverse populations, demonstrating Cronbach's alpha coefficients ranging from 0.67 to 0.91 and test-retest reliability with intraclass correlation coefficients (ICC) from 0.53 to 0.83 [6], [7]. Among its three versions (PSS-4, PSS-10, PSS-14), the PSS-10 is the most widely used due to its optimal balance of scale length, reliability, stable two-factor structure (perceived helplessness and perceived self-efficacy), and robust temporal reproducibility [6, 8]. Numerous studies have validated the psychometric properties of the PSS-10 in student populations [6, 9, 10], including its application in assessing stress among nursing students and students in other disciplines [11]. Unlike measures focusing on stressor exposure or physiological responses, the PSS-10 captures perceived stress appraisals over the preceding month. Moderate temporal stability has been observed in some studies, which may reflect consistency in appraisal across contexts, rather than enduring trait-like characteristics [12]. This observation underscores the theoretical significance of the "perceived stress" construct within Lazarus and Folkman's stress model [4].

The PSS-10 has been translated into Vietnamese and subjected to psychometric evaluation. Specifically, Dao-Tran et al.[13] validated the Vietnamese version of the PSS-10 (V-PSS-10) in a sample of 473 older women, concluding that the scale exhibited acceptable validity and reliability for this population. However, validating a psychological measurement tool extends beyond mere translation; it requires consideration of its appropriateness for specific target populations. Nursing students constitute a distinct group, confronting unique stressors-such as academic pressures, examinations, clinical practice demands, and concerns about future professional roles-that differ markedly from those experienced by older women [2]. Consequently, the psychometric properties of the PSS-10 established for older women may not necessarily generalize to nursing students. Therefore, this study aims to evaluate the validity and reliability of the VN-PSS-10 among nursing students. The findings are expected to provide a

scientifically robust tool to support research and educational practices in nursing within Vietnam.

## METHODS

**Study design:** The study was designed in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for cross-sectional studies. The evaluation of the psychometric properties of the Vietnamese Perceived Stress Scale (VN-PSS-10) followed the COSMIN (COnsensus-based Standards for the selection of health Measurement INstruments) guidelines [14, 15]. Validity assessment encompassed content validity, structural validity, and hypotheses testing for construct validity, while reliability assessment included internal consistency, measurement error, and reliability.

**Setting:** The study was conducted at a public medical university in northern Vietnam that delivers a four-year pre-licensure Bachelor of Nursing program combining theoretical coursework and clinical placements. Data collection was organized in sequential phases corresponding to different aspects of the instrument validation process. Face validity was assessed during the first phase (July 22-26, 2025), followed by evaluation of the content validity index (CVI) in the second phase (August 1-4, 2025). Structural validity assessment was conducted in the third phase (August 6-8, 2025), and measurement error and reliability analyses were performed in the final phase (August 20-23, 2025).

**Participants:** The study population consisted of full-time undergraduate nursing students who voluntarily agreed to participate. To minimize potential confounding in the assessment of psychological variables, students were asked to self-report whether they were currently receiving formal psychological or psychiatric treatment. No screening of medical records was conducted.

**Data sources/ measurement:** The VN-PSS-10 was previously translated and validated among Vietnamese older women (Dao-Tran et al., 2017), demonstrated satisfactory internal consistency and acceptable test–retest reliability. The present study evaluated convergent validity using Pearson's correlation with the Stress subscale of the DASS-21, which measures symptoms conceptually related to perceived stress and has been validated in the Vietnamese context. Discriminant validity was assessed using Pearson's correlation with the Rosenberg Self-Esteem Scale (RSES), representing a construct theoretically distinct from perceived stress; a low correlation was anticipated.

Data were collected through the direct administration of questionnaires in classroom settings. Participants were provided with detailed information about the study and provided written informed consent before completing the questionnaires on-site. All questionnaires were collected immediately upon completion to ensure data completeness and accuracy. The same questionnaire was re-administered to a subset of participants after a 14-day interval to evaluate temporal stability.

**Bias:**

Several procedures were implemented to minimize potential sources of bias. First, selection bias was reduced by cluster sampling at the class level stratified by academic year. Second, response and social desirability

biases were mitigated by anonymous data collection, strict confidentiality procedures, and standardized on-site instructions emphasizing voluntary participation and the absence of academic consequences. Third, recall-related inaccuracies were reduced by using the PSS-10, which assesses perceived stress over the preceding month, involving short-term recall rather than distant events.

### Study size:

In accordance with COSMIN recommendations and prior literature (Fabrigar et al., 1999; Kyriazos, 2018; Polit & Beck, 2006), the minimum sample size was set at ≥ 200 for internal consistency, ≥ 50 for measurement error and reliability, ≥ 150 for exploratory factor analysis (EFA), and ≥ 200 for confirmatory factor analysis (CFA). A stratified cluster sampling procedure was applied, in which two classes were randomly selected from each academic year (approximately 50 students per class). Of the 350 students who consented and completed the survey, participants were randomly allocated to EFA (n = 150) or CFA (n = 200), ensuring balanced representation across academic years. The CFA subsample was also used for hypothesis testing and internal consistency analyses. For the assessment of measurement error and test–retest reliability, 66 senior students were reassessed after two weeks due to their stable scheduling and feasibility of follow-up.

### Statistical methods:

Statistical analyses were conducted using R software. Content validity was evaluated using the content validity index (CVI), with thresholds of S-CVI/Ave ≥ 0.90, S-CVI/UA ≥ 0.80, and I-CVI ≥ 0.78. Construct validity was assessed in two stages: exploratory factor analysis (EFA), with criteria including KMO ≥ 0.80, Bartlett's test $p < 0.05$, eigenvalues ≥ 1, variance explained ≥ 50%, and factor loadings ≥ 0.40; followed by confirmatory factor analysis (CFA), with model fit indices of $\chi^2/df < 3$, CFI and TLI ≥ 0.90, RMSEA ≤ 0.08, average variance extracted (AVE) ≥ 0.50, and composite reliability (CR) ≥ 0.70. Pearson correlation coefficients were calculated to examine item–total, subscale–total, and factor–scale relationships, as well as criterion-related validity. Internal consistency was evaluated using Cronbach's alpha, with a threshold of ≥ 0.75, and test–retest reliability was assessed using intraclass correlation coefficients (ICC ≥ 0.70).

## RESULTS

Two focus group interviews were conducted to assess face validity, including eight nursing students (five female, three male) and seven experts (two psychology lecturers, two measurement specialists, and three nursing scholars; mean professional experience 12.4 ± 3.5 years). Both groups evaluated the VN-PSS-10 regarding relevance, comprehensiveness, and comprehensibility. Based on qualitative feedback and Likert-scale ratings (1–5), the VN-PSS-10 demonstrated high face validity, with a mean score of 4.4/5. Only minor suggestions were provided to guide subsequent stages of the validation process. Ten experts participated in evaluating the content validity of the VN-PSS-10. The analysis revealed item-level content validity index (I-CVI) values ranging from 0.80 to 1.00, with a scale-level content validity index for universal agreement (S-CVI/UA) of 0.90 and a scale-level content validity index for average agreement (S-CVI/Ave) of 0.98.

**Table 1. EFA Results (PCA with Varimax Rotation) and Item–total reliability statistics (n = 150), and model fit indices for CFA (n = 200)**

| Items | Perceived helplessness | Perceived self-efficacy |
|---|---|---|
| Item 1 | 0.661 | - |
| Item 2 | 0.644 | - |
| Item 3 | 0.632 | - |
| Item 6 | 0.688 | - |
| Item 9 | 0.662 | - |
| Item 10 | 0.690 | - |
| Item 4 | - | 0.533 |
| Item 5 | - | 0.722 |
| Item 7 | - | 0.640 |
| Item 8 | - | 0.633 |
| Eigenvalue | 3.4 | 2.0 |
| % of Variance | 34.24 | 20.0 |
| Cumulative % | 54.24 | |

$\chi^2/df = 1.4$; $p = 0.062$; CFI = 0.987; TLI = 0.983; SRMR = 0.045;
AVE Perceived helplessness = 0.636; AVE Perceived self-efficacy = 0.570

EFA conducted with principal axis factoring and oblimin rotation (KMO = 0.808, Bartlett's test $p < 0.001$), extracted two factors, explaining 54.2% of the variance. These factors corresponded to PH and PSE, with all item loadings exceeding 0.50 (Table 1). CFA confirmed the two-factor structure, demonstrating excellent model fit ($\chi^2/df = 1.4$, $p = 0.062$; CFI = 0.987; TLI = 0.983; RMSEA = 0.045; SRMR = 0.045; Table 1).

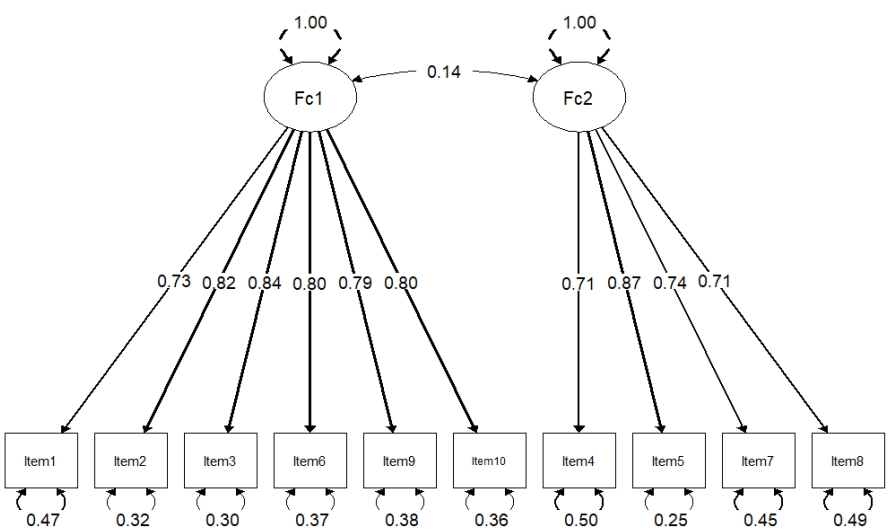


**Figure 1. CFA Model of the VN-PSS-10 Scale**

The two-factor model exhibited acceptable factor loadings, ranging from 0.25 to 0.87 across all items. Perceived Helplessness (Fc1) and Perceived Self-Efficacy (Fc2) were moderately correlated, supporting the proposed bidimensional structure of the scale (Figure 1).

**Table 2. Correlation matrix of the stress (DASS-21), rosenberg self-esteem, and VN-PSS-10 scales (n = 200)**

| Scale | Perceived helplessness | Perceived self-efficacy | VN- PSS -10 |
|---|---|---|---|
| Stress (DASS21) | 0.898 * | - 0.066 | 0.698* |
| Rosenberg self-esteem | 0.086 | -0.02 | 0.069 |

The VN-PSS-10 strongly correlated with the DASS-21 stress subscale, with the association primarily driven by PH. PSE showed minimal correlation with stress, and correlations with self-esteem were negligible (Table 2).

**Table 3. Comparison of mean VN- PSS -10 scores among student groups by academic year of study (n = 200)**

| Academic year | First-year (1) | Second-year (2) | Third-year (3) | Fourth-year (4) | p (One-way ANOVA) |
|---|---|---|---|---|---|
| Perceived helplessness | 15.7 (3.7) | 16.9 (3.6) | 17.6 (2.8) | 18.5 (3.6) | 0.001 *(1 vs 3; 1 vs 4) |
| Perceived self-efficacy | 7.2 (2.3) | 6.4 (1.9) | 7.6 (1.7) | 8.1 (1.9) | 0.001 **(2 vs 3; 2 vs 4) |
| VN-PSS-10 | 22.9 (4.6) | 23.3 (4.3) | 25.1 (2.9) | 26.6 (4.2) | 0.03 ***(1 vs 3; 1 vs 4; 2 vs 4) |

VN-PSS-10 scores increased with academic progression, reflecting a growing intensity in stress appraisal (Table 3).

**Table 4. Reliability analysis of the scale (n = 200) and test-retest reliability (n = 66) of the VN-PSS-10**

| Items | Item-scale correlation | Cronbach's Alpha if Item Deleted | ICC | 95% CI of ICC |
|---|---|---|---|---|
| Item 1 | 0.70 | 0.82 | 0.75 | 0.63 - 0.84 |
| Item 2 | 0.72 | 0.82 | 0.73 | 0.60 - 0.83 |
| Item 3 | 0.73 | 0.82 | 0.76 | 0.63 - 0.84 |
| Item 4 | 0.53 | 0.84 | 0.75 | 0.62 - 0.84 |
| Item 5 | 0.48 | 0.84 | 0.75 | 0.62 - 0.84 |
| Item 6 | 0.76 | 0.81 | 0.72 | 0.58 - 0.82 |

| Items | Item-scale correlation | Cronbach's Alpha if Item Deleted | ICC | 95% CI of ICC |
|---|---|---|---|---|
| Item 7 | 0.46 | 0.85 | 0.76 | 0.64 - 0.85 |
| Item 8 | 0.50 | 0.84 | 0.68 | 0.53 - 0.79 |
| Item 9 | 0.75 | 0.82 | 0.77 | 0.65 - 0.85 |
| Item 10 | 0.75 | 0.82 | 0.74 | 0.61 - 0.83 |
| VN - PSS -10 | Cronbach Alpha of VN- PSS-10: 0.84 | | 0.87 | 0.79 - 0.92 |

Item-total correlations varied between 0.46 and 0.76, and item-subscale correlations ranged from 0.79 to 0.90. Squared multiple correlations, indicating the proportion of variance explained by the latent constructs, ranged from 0.30 to 0.67. Cronbach's alpha if an item was deleted ranged from 0.81 to 0.85, with an overall Cronbach's alpha of 0.84 for the VN-PSS-10 (Table 4). Test-retest reliability showed item-level ICCs from 0.68 to 0.76, with an overall ICC of 0.87 (Table 4).

## DISCUSSION

The study confirmed that the VN-PSS-10 exhibits high face and content validity among nursing students. Minor linguistic and contextual adjustments enhanced the scale's relevance and comprehensibility. Both students and experts highly rated the appropriateness of the items in capturing the experiences of nursing students. The I-CVI, S-CVI/UA, and S-CVI/Ave indices met or exceeded recommended thresholds [16] indicating strong expert consensus on content validity. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) consistently validated the two-factor structure of the VN-PSS-10 in the nursing student sample, comprising Perceived Helplessness and Perceived Self-Efficacy. The CFA model fit indices met acceptable thresholds ($\chi^2/df = 1.4$; CFI = 0.987; RMSEA = 0.045), demonstrating alignment between the theoretical model and empirical data. The VN-PSS-10 exhibited high reliability in terms of both internal consistency and test-retest reliability. The overall Cronbach's alpha was 0.84, reflecting excellent internal consistency. For test-retest reliability, the overall ICC was 0.87. Measurement error indices (SEM, SDC, LoA) indicated the scale's ability to detect clinically meaningful changes at the group level, though caution is advised when interpreting results at the individual level.

The EFA and CFA results of this study confirmed the two-factor structure of the VN-PSS-10, consistent with the original model by Cohen et al [5]. This structure includes Perceived Helplessness (six items) and Perceived Self-Efficacy (four items), reflecting the core dimensions of perceived stress. This finding reinforces the theoretical stability of the PSS-10 structure within the Vietnamese cultural context, particularly among nursing students. The item distribution in this study aligns with similar studies among student populations in Hong Kong [17], Indonesia [10], and Ethiopia[18], which also identified a two-factor structure with six negative and four positive items. This consistency suggests that the two-factor model is a robust and widely applicable measurement framework across diverse student populations, irrespective of cultural and social contexts.

However, these results differ notably from those of Dao-Tran et al. [13], who validated the VN-PSS-10 among older women in Vietnam. Although that study also identified two factors, Perceived Helplessness comprised eight items, and Perceived Self-Efficacy included two items. This discrepancy is not merely statistical but reflects differences in stress perception and experiences across populations. Dao-Tran et al. [13] suggested that the shift of some items from "control capability" to "general stress" may stem from cultural and socioeconomic contexts, where older women may perceive less control over their lives. This observation underscores the critical need to revalidate the structural validity of psychological measurement tools when applied to populations with distinct demographic and contextual characteristics. Thus, the findings of this study provide compelling evidence that the VN-PSS-10, with its validated two-factor structure, is a suitable and reliable tool for assessing perceived stress among nursing students in Vietnam.

The study results demonstrated a strong, statistically significant positive correlation between the total VN-PSS-10 score and the Stress subscale of the DASS-21 ($r = 0.698$, $p < 0.001$), confirming that both instruments measure the same conceptual construct of perceived stress. These findings align with international evidence. A study in Hong Kong [17] reported correlations between the PSS-10 and Stress ($r = 0.60$), Anxiety ($r = 0.53$), and Depression ($r = 0.49$), while a study in Brazil [9] noted a correlation between the PSS-10 and the BSI-18 Global Severity Index ($r = 0.69$). In Turkey, Kaya et al. [19] found significant correlations between the PSS-10 and the BDI-II ($r = 0.54$) and BAI ($r = 0.52$). Some studies reported lower correlations, such as Manzar et al. [18] with the GAD-7 ($r = 0.34$) or Anwer et al. [20] with the PSQI ($r = 0.38$) and ESS ($r = 0.08$). Overall, the association between the PSS-10 and measures of psychological distress remains consistent across diverse cultural contexts. The similarity in correlation patterns between the PSS-10 and mental health instruments across countries strengthens the evidence for the convergent validity of the VN-PSS-10.

Conversely, the weak and non-significant correlations between the VN-PSS-10 and the Rosenberg Self-Esteem Scale ($r = 0.069$ for the total scale, $r = 0.086$ for Perceived Helplessness, and $r = -0.02$ for Perceived Self-Efficacy) demonstrate robust discriminant validity, indicating that the PSS-10 does not conflate with the concept of self-esteem. This aligns with theoretical expectations, as perceived stress is a state-like characteristic, whereas self-esteem is a more stable trait, although some studies report a slight negative correlation between the two [21]. Among nursing students, these results reinforce that higher self-esteem may facilitate better stress management, but the PSS-10 independently focuses on perceived stress, as reported in studies on self-esteem and stress among nursing students [22]. These findings further affirm that the VN-PSS-10 is a reliable tool for measuring perceived stress among Vietnamese nursing students. However, a limitation is that the lack of correlation with self-esteem may be influenced by the homogeneous sample (young students), necessitating further research in more diverse populations. Longitudinal studies are needed to explore how self-esteem influences perceived stress over time in nursing students.

The significantly higher total VN-PSS-10 scores among fourth-year students

reflect the cumulative impact of stressors during intensive clinical training. Nursing students experience varying levels of stress across academic stages, with clinical and academic factors being primary stressors [23]. Increased stress in advanced years: Studies indicate that third- and fourth-year nursing students report higher stress levels compared to their first- and second-year counterparts[24]. Common stressors include fear of making mistakes in clinical settings and academic performance pressure, which are more pronounced in later years [23]. In component analysis, Perceived Helplessness showed a strong and consistent increase from the first to the fourth year ($p = 0.001$), while Perceived Self-Efficacy also increased but to a lesser extent. This suggests that the rise in total stress scores across academic years is driven primarily by heightened feelings of helplessness rather than a lack of coping ability, consistent with existing evidence [25]. These results reinforce the structural and discriminant validity of the VN-PSS-10 while highlighting the need for intervention programs designed to enhance self-efficacy and mitigate feelings of helplessness during the pre-graduation phase, when psychological imbalances are most pronounced, as per the Job Demands–Resources theory.

Internal consistency reliability reflects the degree of correlation among items within the same scale, ensuring they measure the same latent construct [16]. In this study, the VN-PSS-10 achieved an overall Cronbach's alpha of 0.84 (0.912 for Perceived Helplessness and 0.84 for Perceived Self-Efficacy), indicating strong internal consistency across item groups. These results align with international studies using the PSS-10, with similar coefficients reported in Brazil (0.84) [9], Hong Kong (0.82) [17], Indonesia (0.784) [11], Saudi Arabia (0.77) [20], Ethiopia (McDonald's Omega for Factor-1: 0.80) [18] and Turkey (0.84) [19]. The high internal consistency of the VN-PSS-10 reinforces its broad applicability and stability within the local cultural context.

The test-retest reliability of the VN-PSS-10, assessed via the Intraclass Correlation Coefficient (ICC), reached 0.87 (95% confidence interval: 0.79–0.92), with item-level ICCs ranging from 0.68 to 0.76 ($p < 0.001$). This level of stability is higher than or comparable to international studies, such as those in Brazil (rho = 0.75) [9] and Turkey ($r = 0.77$) [19], demonstrating the instrument's robust reproducibility. However, compared to the Vietnamese version of the PSS-10 validated among older women [13], the test-retest reliability in nursing students was superior. This discrepancy may stem from the shorter retest interval (14 days versus one month), which reduces the influence of external factors, such as changes in personal circumstances or new stress events. Nursing students, with relatively stable academic and clinical schedules over short periods, likely maintain consistent levels of perceived stress, contributing to higher reliability. In contrast, older women, with greater variability in health and life circumstances (e.g., illness, family issues), may experience more significant stress fluctuations over a month, lowering correlation coefficients.

This study has several limitations that warrant acknowledgment. First, conducting the study at a single nursing university limits the generalizability of findings to the broader population of Vietnamese nursing students. Second, the scale's ability to detect changes over time was not assessed. Third, as a self-report measure, the VN-PSS-10 may be susceptible to reporting or social desirability biases, despite measures

to ensure confidentiality. Finally, the 14-day interval for assessing test-retest reliability may be insufficiently long, potentially affecting the scale's stability assessment.

## CONCLUSION

When applied to nursing students, the VN-PSS-10 demonstrated strong psychometric properties and high reliability. Qualitative and quantitative results confirmed high face and content validity, with the scale meeting relevance, comprehensiveness, and comprehensibility criteria. EFA and CFA validated the two-factor structure (PH and PSE), consistent with the original theoretical model and international studies. The VN-PSS-10 showed strong convergent validity with the Stress subscale of the DASS-21, good discriminant validity with the Rosenberg Self-Esteem Scale, and the ability to differentiate groups by academic year. The instrument achieved high reliability with a Cronbach's alpha of 0.84 and an ICC of 0.87. Future research should expand the sample to include more diverse populations and evaluate the tool's responsiveness following stress-reduction interventions.

## REFERENCES

1. Aloufi MA, Jarden RJ, Gerdtz MF, Kapp S. Reducing stress, anxiety and depression in undergraduate nursing students: Systematic review. Nurse Educ Today. 2021;102:104877. doi: 10.1016/j.nedt.2021.104877.

2. Mazalová L, Gurková E, Štureková L. Nursing students' perceived stress and clinical learning experience. Nurse Education in Practice. 2022;64:103457. doi: 10.1016/j.nepr.2022.103457.

3. Ji X, Guo X, Soh KL, Japar S, He L. Effectiveness of stress management interventions for nursing students: A systematic review and meta-analysis. Nurs Health Sci. 2024;26(2):e13113. doi: 10.1111/nhs.13113.

4. Lazarus R, Folkman S. Stress, Appraisal, and Coping. New York: Springer1984.

5. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385-96. https://doi.org/10.2307/2136404.

6. Lee E-H. Review of the Psychometric Evidence of the Perceived Stress Scale. Asian Nursing Research. 2012;6(4):121-7. doi: 10.1016/j.anr.2012.08.004.

7. Ng SM. Validation of the 10-item Chinese perceived stress scale in elderly service workers: one-factor versus two-factor structure. BMC Psychol. 2013;1(1):9. doi: 10.1186/2050-7283-1-9.

8. Yılmaz Koğar E, Koğar H. A systematic review and meta-analytic confirmatory factor analysis of the perceived stress scale (PSS-10 and PSS-14). Stress Health. 2024;40(1):e3285. doi: 10.1002/smi.3285.

9. Rosa ACA, Silva L, Azevedo JCC, Oliveira RTS, Ferreira RKA, Parra MT, et al. Validity of Perceived Stress Scale in Brazilian low-income college students. Rev Saude Publica. 2025;59:e4. doi: 10.11606/s1518-8787.2025059005974.

10. Zahra NS, Faturochman F, Putra MDK, Wirawan H. Beyond a Unidimensional Measure: Unveiling the Multidimensional Structure of the Perceived Stress Scale. Measurement: Interdisciplinary Research and Perspectives. 2025:1-11. https://doi.org/10.1080/15366367.2025.2474702.

11. Fitzgibbon K, Murphy KD. Coping strategies of healthcare professional

students for stress incurred during their studies: a literature review. J Ment Health. 2023;32(2):492-503. doi: 10.1080/09638237.2021.2022616.

12. Harris KM, Gaffey AE, Schwartz JE, Krantz DS, Burg MM. The Perceived Stress Scale as a Measure of Stress: Decomposing Score Variance in Longitudinal Behavioral Medicine Studies. Ann Behav Med. 2023;57(10):846-54. doi: 10.1093/abm/kaad015.

13. Dao-Tran TH, Anderson D, Seib C. The Vietnamese version of the Perceived Stress Scale (PSS-10): Translation equivalence and psychometric properties among older women. BMC Psychiatry. 2017;17(1):53. doi: 10.1186/s12888-017-1221-6.

14. Mokkink LB, Prinsen CAC, Patrick DL, Alonso J, Bouter LM, de Vet HCW, et al. COSMIN Study Design checklist for patient-reported outcome measurement instruments (Version July 2019). Amsterdam Public Health research institute, Amsterdam UMC; 2019.

15. Terwee CB, Prinsen CAC, Chiarotto A, Westerman MJ, Patrick DL, Alonso J, et al. COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. Qual Life Res. 2018;27(5):1159-70. doi: 10.1007/s11136-018-1829-0.

16. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. Res Nurs Health. 2006;29(5):489-97. doi: 10.1002/nur.20147.

17. Chen J, Chin W, Tiwari A, Wong J, Wong I, Worsley A, et al. Validation of the perceived stress scale (PSS-10) in medical and health sciences students in Hong Kong. The Asia Pacific Scholar. 2021;6:31-7. https://doi.org/10.29060/TAPS.2021-6-2/OA2328.

18. Manzar MD, Salahuddin M, Peter S, Alghadir A, Anwer S, Bahammam AS, et al. Psychometric properties of the perceived stress scale in Ethiopian university students. BMC Public Health. 2019;19(1):41. https://doi.org/10.1186/s12889-018-6310-z.

19. Kaya C, Tansey TN, Melekoglu M, Cakiroglu O, Chan F. Psychometric evaluation of Turkish version of the Perceived Stress Scale with Turkish college students. J Ment Health. 2019;28(2):161-7. doi: 10.1080/09638237.2017.1417566.

20. Anwer S, Manzar MD, Alghadir AH, Salahuddin M, Abdul Hameed U. Psychometric Analysis of the Perceived Stress Scale Among Healthy University Students. Neuropsychiatr Dis Treat. 2020;16:2389-96. doi: 10.2147/NDT.S268582.

21. Pacifico A, Gorrese L, Sorrentino C, Viciconte M, Andretta V, Iovino P, et al. The Impact of Psychological Well-Being on Learning Strategies: Analyzing Perceived Stress, Self-Esteem, and Study Approaches in Nursing and Obstetrics Students. Nurs Rep. 2025;15(3). DOI:10.3390/nursrep15030109

22. Ramakrishnan B, R D, B M, M M, M B, N SS, et al. Assessment of self-Esteem and academic stress among nursing students. Bioinformation. 2024;20(12):1886-9. doi: 10.6026/9732063002001886.

23. Mohamed NA, Ali SO, Ehrahim EEE, Ahmed AL, Wahba AM. Predictors of Academic and Clinical Stress Among Nursing Students. SAGE Open Nurs. 2024;10:23779608241290392. doi: 10.1177/23779608241290392.

24. Vo TN, Chiu HY, Chuang YH, Huang HC. Prevalence of Stress and Anxiety Among Nursing Students: A Systematic Review and Meta-analysis. Nurse Educ. 2023;48(3):E90-e5. doi: 10.1097/NNE.0000000000001343.

25. Soria-Reyes LM, Cerezo MV, Alarcón R, Blanca MJ. Psychometric properties of the perceived stress scale (pss-10) with breast cancer patients. Stress Health. 2023;39(1):115-24. doi: 10.1002/smi.3170.