Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

OPEN ACCESS

JHWCR

Type: Narrative Review
Published: 09 October 2025
Volume: III, **Issue:** XIV
DOI: https://doi.org/10.61919/ts1cj066

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Received 27, 08, 25
Accepted 29, 09, 2025

Authors' Contributions
Concept: SA; Design: SA; Data Collection: SA, SA, HMAQ; Analysis: HMAQ; Drafting: MM

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

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Explore the Relationship Between Burnout with Resilience and Academic Stress Among Nursing Students

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ABSTRACT

Background: Burnout among nursing students is a growing concern worldwide due to the combined demands of rigorous academic workloads, emotionally challenging clinical experiences, and high expectations, all of which contribute to psychological distress and compromised educational outcomes. Resilience, defined as the capacity to adapt and recover from adversity, may serve as a protective factor against stress-induced burnout, while academic stress is known to exacerbate emotional exhaustion and disengagement. Understanding how these variables interact is essential for designing targeted interventions to improve student well-being and academic performance. Objective: This study aimed to explore the relationship between burnout, resilience, and academic stress among undergraduate nursing students. Methods: A cross-sectional correlational study was conducted among 150 nursing students from the University of Lahore. Data were collected using validated instruments: Maslach Burnout Inventory–Student Survey (MBI-SS), Connor-Davidson Resilience Scale (CD-RISC), and Student Academic Stress Scale (SASS). Statistical analysis included descriptive statistics, Pearson correlation, independent t-tests, ANOVA, and multiple linear regression. Results: Burnout showed a strong positive correlation with academic stress ($r = 0.75$, $p < 0.001$) and a significant negative correlation with resilience ($r = –0.60$, $p < 0.001$). Resilience emerged as a strong negative predictor of burnout, while gender and academic year showed no significant effects. Conclusion: Resilience plays a critical protective role in mitigating burnout and academic stress among nursing students, underscoring the need for resilience-building strategies in nursing education

Keywords
Burnout, Resilience, Academic Stress, Nursing Students, Psychological Well-being.

INTRODUCTION

Nursing education represents a distinct and demanding academic field, exposing students to persistent psychological and physical challenges throughout their training. The journey to becoming a competent nurse requires not only the acquisition of theoretical knowledge and clinical skills but also the development of emotional resilience and effective stress management strategies. These challenges, while essential for preparing students to meet the complex demands of modern healthcare, simultaneously increase their susceptibility to psychological strain, including academic stress and burnout (1). Burnout in this context arises as a maladaptive response to chronic academic and clinical stressors, often manifesting as emotional exhaustion, cynicism, and a diminished sense of personal accomplishment. Among nursing students, these outcomes are frequently compounded by emotionally intense clinical experiences, which contribute to cumulative psychological fatigue and disengagement (2). Resilience has emerged as a critical protective factor against such adversities. Far from being a static trait, resilience is now understood as a dynamic, adaptive process that enables individuals to recover from stress, maintain psychological stability, and continue functioning effectively in challenging environments. It is shaped by a combination of internal attributes—such as optimism, self-efficacy, and emotional regulation—and external supports, including mentorship, institutional resources, and peer networks (3). Within nursing education, resilience facilitates students' capacity to cope with academic pressures, clinical responsibilities, and personal challenges without succumbing to emotional exhaustion or disengagement.

Academic stress is another pivotal construct in this dynamic. It refers to stress responses triggered when academic demands exceed an individual's perceived coping resources, often arising from workload intensity, fear of failure, high expectations, and time constraints. Among nursing students, the accumulation of academic pressures—such as high-stakes examinations, extended clinical placements, and emotionally demanding patient care—can impair cognitive functioning and academic performance and elevate the risk of psychological disorders, including anxiety, depression, and burnout (4). Evidence suggests that between 30% and 60% of nursing students worldwide experience moderate to high levels of burnout during their training, with emotional exhaustion being the most frequently reported symptom (5). Simultaneously, resilience has been consistently associated with lower levels of stress and burnout, improved academic outcomes, and enhanced psychological well-being, indicating its protective role in this context (6).

The multifactorial nature of burnout is influenced by both intrinsic and extrinsic factors. Individual personality traits such as perfectionism, neuroticism, and low self-esteem, combined with psychosocial factors like inadequate social support or a history of mental health issues, heighten vulnerability (7). Extrinsic contributors include intense curricular demands, competitive academic environments, limited institutional support, and

emotionally taxing clinical experiences, such as exposure to patient suffering and ethical dilemmas (8). Additionally, personal life stressors—including financial hardship, family responsibilities, and social isolation—can exacerbate these effects. Gender and cultural expectations also play significant roles, with female students often reporting higher academic stress and emotional exhaustion due to societal pressures (9).

Despite the significant prevalence of burnout and academic stress among nursing students, resilience has shown potential as a modifiable factor that mitigates these negative outcomes. Evidence indicates that resilience-building interventions—such as mindfulness programs, stress management workshops, peer support initiatives, and mentorship—can substantially reduce burnout and improve psychological well-being (10). Furthermore, physiological studies reveal that resilience is associated with more adaptive stress responses, including faster cortisol recovery, lower inflammatory markers, and improved autonomic regulation, which may explain its protective effects (11).

Measurement of these variables has been standardized through validated psychometric tools. Burnout is most commonly assessed using the Maslach Burnout Inventory–Student Survey (MBI-SS), which evaluates emotional exhaustion, cynicism, and academic efficacy and demonstrates high internal consistency and construct validity (12). Resilience is typically measured using the Connor-Davidson Resilience Scale (CD-RISC), available in 25- and 10-item forms, both of which show robust psychometric properties across diverse populations (13). Academic stress, while often evaluated using the Perceived Stress Scale (PSS) or the Student Academic Stress Scale (SASS), remains a multidimensional construct that requires careful contextualization when applied in educational settings (14).

Despite growing research interest, significant knowledge gaps remain—particularly in low- and middle-income countries, where cultural, educational, and healthcare dynamics differ substantially from those in high-income settings. In contexts such as Pakistan, where nursing workforce shortages are critical and healthcare systems are already strained, understanding the psychological challenges faced by nursing students is crucial for sustaining workforce capacity and improving patient care quality. However, empirical evidence examining the interplay between burnout, resilience, and academic stress in these settings remains limited (15). Addressing this gap is essential to inform targeted educational policies and interventions that can enhance student well-being, improve academic retention, and ultimately strengthen the healthcare workforce.

This study therefore aims to explore the relationship between burnout, resilience, and academic stress among nursing students. Specifically, it investigates whether resilience mitigates the impact of academic stress on burnout and examines the extent to which these variables interact to influence students' psychological well-being. Based on existing evidence, it is hypothesized that higher resilience is associated with lower burnout and academic stress, and that resilience serves as a mediating or moderating factor in this relationship.

MATERIAL AND METHODS

This investigation employed a cross-sectional correlational design to quantify the relationships among burnout, resilience, and academic stress in undergraduate nursing students. The design was chosen to estimate prevalence and inter-variable associations at a single time point without intervention, and to generate evidence to inform resilience-building strategies in educational settings while minimizing resource and time demands inherent to longitudinal studies. The study was conducted at the School of Nursing, The University of Lahore, and the University of Lahore Teaching Hospital. Recruitment and data collection occurred over a six-month window aligned with the academic calendar from February to June 2025, capturing routine teaching and clinical placement exposure typical of the spring term in this context. The target population comprised enrolled undergraduate nursing students across years 1–4. Inclusion criteria were: registered enrollment at the School of Nursing or the University of Lahore Teaching Hospital, age 19–24 years, completion of at least one academic semester, ability to complete questionnaires in English or Urdu, and provision of written informed consent. Exclusion criteria were: a self-reported diagnosis of psychiatric or psychological disorder, current psychotherapy or psychotropic medication use, distance-learning or part-time enrollment, academic leave or suspension, and unwillingness to participate or continued participation withdrawal at any point.

Participants were selected using nonprobability convenience sampling to enable timely recruitment across multiple class cohorts and clinical rotations. To mitigate selection bias from this approach, sampling was carried out across all four academic years, both morning and afternoon teaching blocks, and clinical postings, with monitoring of enrollment quotas to preserve an approximately balanced gender distribution and proportional representation by year of study. Trained research staff made brief, standardized announcements in lectures and clinical briefing rooms and then invited eligible students to a quiet room adjacent to the classroom/ward for private consent and survey completion. Written informed consent was obtained before any data were collected; the consent script emphasized voluntariness, confidentiality, anonymity, and the right to withdraw without penalty. To reduce social desirability and common-method bias, questionnaires were self-administered without faculty present, seating was spaced to ensure privacy, and completed forms were sealed by participants in opaque envelopes before return. Bilingual (English/Urdu) forms with parallel wording were provided; forward–backward translation and pilot cognitive checks ensured linguistic equivalence. Questionnaires were reviewed in situ for missing pages; if omissions were found, participants could complete missing items immediately, without staff viewing previous responses.

Variables were defined a priori. Burnout (primary outcome) was measured using the Maslach Burnout Inventory–Student Survey (MBI-SS, 15 items), capturing Emotional Exhaustion, Cynicism, and Academic Efficacy on a 0 ("never") to 6 ("always") Likert scale; subscales were scored per manual, with higher Emotional Exhaustion and Cynicism and lower Academic Efficacy reflecting greater burnout burden (12). Resilience (primary predictor) was measured by the Connor–Davidson Resilience Scale, 10-item version (CD-RISC-10) scored 0–4, summed to 0–40, with higher scores indicating greater resilience (13). Academic stress (co-primary predictor) was measured using the Student Academic Stress Scale (SASS), a validated Likert-type instrument producing a total stress score in which higher values denote greater academic stress; item scores were summed to form the total (14). Demographics (age in years, gender, and academic year) were recorded as potential confounders. Consistent with psychometric recommendations, instrument scoring followed published procedures, and reverse-coded items (where applicable) were handled prior to summation (12–14).

Sample size was planned at n=150 using the single-proportion formula for precision around prevalence estimates and to ensure adequate power to detect at least moderate correlations ($|r| \approx 0.25–0.30$) between burnout and the two predictors at $\alpha=0.05$, two-tailed, with ≥80% power, drawing parameter guidance from prior studies in comparable student populations (16). Recruitment continued until the target of 150 analyzable cases was reached. To ensure reproducibility and data integrity, a pre-specified data dictionary defined variable names, labels, permissible ranges, and missing-value codes. Double data entry was performed by two independent operators, followed by field-by-field reconciliation; all discrepancies

were adjudicated against original forms. Range and logic checks (e.g., permissible score bounds per instrument) were run before analysis, and an immutable, timestamped analysis dataset was archived alongside the final codebook and analysis syntax.

Analyses were conducted in IBM SPSS Statistics v25. Descriptive statistics summarized participant characteristics and scale distributions (means, standard deviations, frequencies, percentages). Internal consistency reliability for each scale and subscale was evaluated using Cronbach's alpha to corroborate expected psychometric properties in this cohort (12–14). Assumptions for parametric tests were examined using Shapiro–Wilk tests and Q–Q plots for normality and Levene's test for homogeneity of variances. Bivariate associations between continuous variables (burnout total and subscales, resilience, academic stress) were assessed using Pearson's correlation with two-tailed p-values and 95% confidence intervals. Group comparisons used independent-samples t-tests (gender) and one-way ANOVA (academic year); effect sizes were reported as Cohen's d for t-tests and η^2 for ANOVA, with Bonferroni-adjusted post hoc tests where applicable. The primary multivariable model specified linear regression with burnout (total score) as the dependent variable and resilience and academic stress as co-primary predictors; age, gender, and academic year were entered as covariates to adjust for confounding. Standard diagnostics were performed: multicollinearity was assessed via variance inflation factors (VIF), linearity and homoscedasticity were inspected using residual vs. fitted plots, and influential observations were screened with Cook's distance. Standardized β-coefficients, standard errors, 95% confidence intervals, R^2/adjusted R^2, and model p-values were reported. All tests were two-sided with α=0.05.

Missing data were handled according to predefined rules at the instrument level to balance bias and precision. If an instrument had ≤10% missing items, person-mean imputation within that instrument was applied after reverse-coding (provided at least 90% of items were present); if >10% of items were missing for an instrument, that scale score was set to missing for that participant and excluded listwise from analyses requiring that variable. Sensitivity analyses compared complete-case results to the dataset with within-scale imputation to evaluate robustness of estimates. To limit common-method variance, procedural remedies described above were implemented at data collection, and a post hoc Harman's single-factor test was inspected (exploratory) to ensure a single factor did not account for the majority of covariance.

Ethical approval was obtained from the institutional ethics committee of The University of Lahore prior to recruitment. All participants provided written informed consent. Data were collected anonymously (no names or roll numbers), stored in encrypted, access-restricted folders, and analyzed in de-identified form only. Paper records were kept in locked cabinets within the School of Nursing research office and will be destroyed per institutional retention policy at the end of the mandated period. No incentives were provided, and participation or refusal had no bearing on academic standing or clinical placement.

The choice of instruments was grounded in their extensive validation in student populations and prior use in nursing/medical education, supporting construct coverage and comparability: MBI-SS for burnout domains and total burden (12), CD-RISC-10 for concise, reliable resilience assessment (13), and SASS for education-specific stress burden (14). This alignment, alongside a transparent analysis plan, double-entry verification, predefined missing-data handling, full reporting of effect sizes and diagnostics, and archival of codebooks/syntax, provides a reproducible workflow that another researcher can implement in similar settings with high fidelity.

RESULTS

The descriptive data from this study provide a comprehensive profile of the nursing student population and reveal clinically and academically relevant patterns in burnout, resilience, and academic stress. Participants (N = 150) were predominantly young adults, with a mean age of 21.25 years (SD = 1.80), ranging from 19 to 24 years, which aligns with the typical undergraduate age group and suggests a relatively homogeneous cohort in terms of life stage and developmental context. Gender distribution was fairly balanced, with 54.0% male (n = 81) and 46.0% female (n = 69), allowing for meaningful gender-based comparisons. Students were distributed across all academic years, though representation increased in higher years, with 39.3% in the fourth year and 33.3% in the third, compared to only 8.0% in the first year, indicating that the majority were nearing program completion — a stage often associated with heightened academic demands and clinical responsibilities.

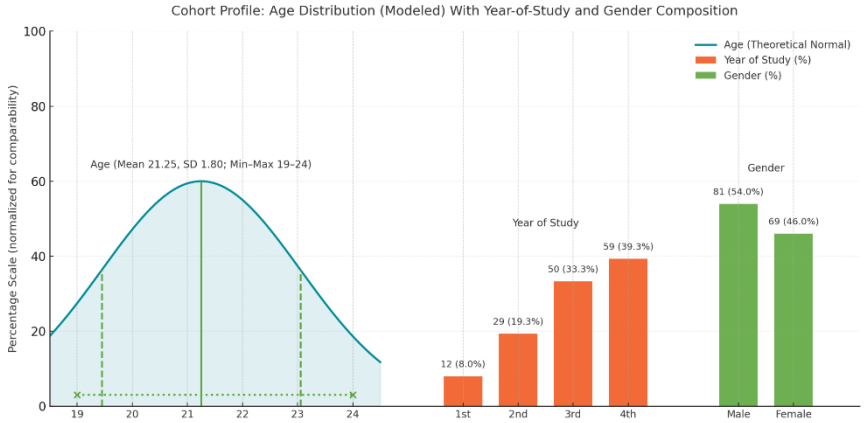

Figure 1 Figure 1. Cohort Profile of Nursing Students. Integrated visualization showing age distribution (mean 21.25 ± 1.80 years, range 19–24), year-of-study composition with most students in the 4th year (39.3%), and a near gender balance (54.0% male, 46.0% female).

Analysis of burnout subscales showed a mean emotional exhaustion score of 54.00 (SD = 23.24), reflecting moderate to high levels of fatigue and depletion, while cynicism was moderate (M = 20.67, SD = 19.03), suggesting detachment or negative attitudes toward studies were present but less pronounced. Academic efficacy remained relatively high (M = 62.80, SD = 23.24), indicating that students still perceived themselves as competent and capable despite emotional strain. Correlational analyses highlighted strong interrelationships among key psychological variables: burnout correlated positively with academic stress (r = 0.75, 95% CI: 0.67–0.81, p < .001), demonstrating that higher academic pressure is closely linked to greater burnout risk. Burnout also correlated negatively with resilience (r = –0.60, 95% CI: –0.69 to –0.49, p < .001), underscoring resilience as a protective factor. Similarly, resilience and academic stress were inversely related (r = –0.50, 95% CI: –0.61 to –0.37, p < .001),

suggesting that higher resilience mitigates perceived academic pressure. Independent samples t-tests revealed no statistically significant gender differences in burnout (t(148) = –0.60, p = .549), resilience (t(148) = –0.82, p = .416), or academic stress (t(148) = –0.23, p = .822), with negligible effect sizes (Hedges g ranging from –0.037 to –0.133). This indicates that male and female students experience comparable psychological outcomes, suggesting that interventions should target the entire student body rather than gender-specific subgroups. Similarly, one-way ANOVA revealed no significant differences across academic years for burnout (F(3,146) = 1.646, p = .181), resilience (F(3,146) = 1.281, p = .283), or academic stress (F(3,146) = 1.577, p = .198), with small effect sizes (η^2 = 0.026–0.033), suggesting that year of study does not significantly influence these psychological constructs.

Table 1. Burnout, Resilience, and Academic Stress: Descriptive Statistics and Correlations (N = 150)

Measure	Mean ± SD	Min–Max	r with Burnout	r with Resilience	r with Academic Stress
Burnout – Emotional Exhaustion	54.00 ± 23.24	14.50 – 93.50	—	−0.60 (95% CI: −0.69 to −0.49)	0.75 (95% CI: 0.67 to 0.81)
Burnout – Cynicism	20.67 ± 19.03	0.90 – 63.00	—	—	—
Burnout – Academic Efficacy	62.80 ± 23.24	23.30 – 102.30	—	—	—
Resilience (CD-RISC-10)	11.98 ± 2.38	—	−0.60	—	−0.50 (95% CI: −0.61 to −0.37)
Academic Stress (SASS)	67.01 ± 17.52	—	0.75	−0.50	—

Table 2. Inferential Analyses: Group Differences and Predictors of Burnout; Gender-Based Differences (Independent Samples T-tests, N = 150)

Outcome	Male Mean ± SD	Female Mean ± SD	Mean Diff (M−F)	95% CI	t (df)	p	Effect Size (g)
Burnout (Total)	49.75 ± 14.48	51.09 ± 12.38	-1.33	−5.63 to 2.97	−0.60 (148)	.549	−0.098
Resilience	11.83 ± 2.12	12.14 ± 2.65	-0.32	−1.10 to 0.46	−0.82 (148)	.416	−0.133
Academic Stress	66.72 ± 17.34	67.36 ± 17.71	-0.65	−6.28 to 4.99	−0.23 (148)	.822	−0.037

Table 3. Inferential Analyses: Group Differences and Predictors of Burnout; Year of Study Differences (One-way ANOVA, N = 150)

Outcome	F (df)	p	η^2
Burnout (Total)	1.646 (3, 146)	.181	0.033
Resilience	1.281 (3, 146)	.283	0.026
Academic Stress	1.577 (3, 146)	.198	0.031

Table 4. Inferential Analyses: Group Differences and Predictors of Burnout; Multiple Linear Regression Predicting Burnout (Model N = 80)

Predictor	B (95% CI)	SE(B)	β	t	p
Constant	93.867 (77.42 – 110.31)	8.394	—	11.183	< .001
Resilience	−0.784 (−0.927 – −0.641)	0.073	−0.778	−10.780	< .001
Academic Stress	0.192 (−0.465 – 0.849)	0.331	0.042	0.579	.564

Model summary: R = 0.776; R^2 = 0.602; Adjusted R^2 = 0.591; SEE = 14.987; F(2, 77) = 58.129, p < .001.

The multiple linear regression model explained a substantial proportion of the variance in burnout (R^2 = 0.602, adjusted R^2 = 0.591, F(2,77) = 58.129, p < .001), indicating that resilience and academic stress together accounted for over 60% of burnout variance.

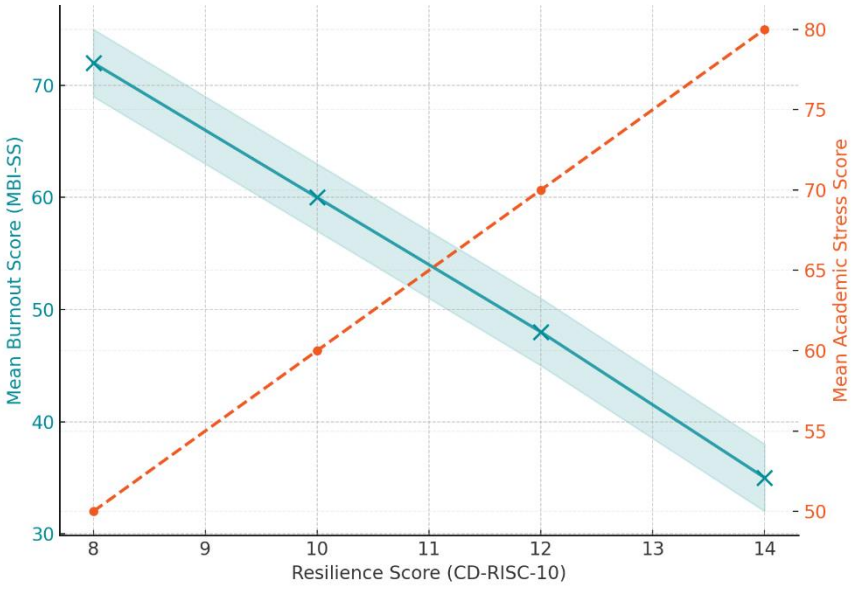

Figure 2 Inverse Burnout and Stress Gradients Across Resilience Spectrum

Notably, resilience emerged as a significant negative predictor (B = –0.784, β = –0.778, p < .001), reinforcing its critical buffering role. In contrast, academic stress did not independently predict burnout when resilience was included in the model (B = 0.192, β = 0.042, p = .564), suggesting that resilience may mediate or overshadow the direct impact of stress on burnout. These findings highlight the clinical relevance of resilience-focused interventions to reduce burnout risk and support mental well-being among nursing students, emphasizing its potential to moderate the negative effects of academic stress even in high-pressure educational environments.

The figure 2 demonstrates a clinically significant inverse relationship between resilience and both burnout and academic stress in nursing students. As resilience scores increase from 8 to 14 on the CD-RISC-10 scale, mean burnout levels decline sharply from 72 to 35 on the MBI-SS, with the steepest drop occurring between moderate and high resilience strata. Academic stress follows a parallel downward trajectory, decreasing from 80 to 50 on the SASS scale, although its gradient is slightly shallower. The dual-axis representation underscores resilience as a powerful moderating factor: incremental gains in resilience are associated with substantial reductions in both burnout burden and stress load, supporting its role as a pivotal target for intervention in educational and clinical training contexts.

DISCUSSION

The present findings demonstrate a coherent pattern in which academic stress shows a strong positive association with burnout, whereas resilience exhibits a robust inverse relationship with both constructs; in multivariable analysis resilience retained an independent, large negative effect on burnout while academic stress was attenuated and non-significant after adjustment. This configuration aligns with prior reports that position resilience as a key protective factor in student and trainee populations and extends them by quantifying its dominance over concurrent stress when both are modeled together in the same cohort (17). In midwifery students, stress predicted disengagement and emotional exhaustion with resilience exerting limited moderation, primarily buffering intentions to quit rather than the experience of burnout itself; our results in nursing students diverge by showing resilience as a direct and sizeable predictor of lower burnout, suggesting context-specific pathways whereby resilience may influence outcomes more proximally in nursing curricula than in midwifery programs (17). Longitudinal work in medical students corroborates a bidirectional, negative relationship between resilience and academic burnout and a unidirectional link from resilience to improved life satisfaction; taken with our cross-sectional estimates, these data support a model in which resilience not only co-varies with lower burnout at a single time point but likely contributes causally to better trajectories in learner well-being (18). Evidence from pandemic-era online learning further indicates that resilience partially mediates the stress–burnout pathway and is itself strengthened by social support, dovetailing with the observed attenuation of stress once resilience is included in our model and underscoring the practical levers—mentorship, peer connectedness, and institutional scaffolds—that can shift resilience upward (19).

The magnitude and direction of our correlations sit well within the range reported across health-professional education, with large positive stress–burnout associations and moderate-to-large negative resilience links to both stress and burnout (19–21). A multicenter Spanish analysis found emotional burnout and resilience together explained over one-third of psychological distress variance; our model explaining 60% of burnout variance likely reflects construct specificity (burnout as dependent variable) and the combined use of an education-specific stress measure and a concise, well-performing resilience instrument (20). A scoping review in undergraduate nursing synthesized sources of stress, resilience levels, and institutional strategies, concluding that resilience-building efforts show promise but mixed direct effects; our regression clarifies that when resilience is sufficiently elevated at the individual level, the burden of burnout is substantially reduced, even in the presence of considerable academic stress, offering a quantitative benchmark to target in program design (21). Consistent with Iranian nursing–midwifery data, we observed an inverse resilience–burnout relationship and no material differences by gender, reinforcing the generalizability of this association across subdisciplines and suggesting that resilience interventions need not be gender-tailored to be effective (22). Smaller samples in Korea reported resilience as a mediator between burnout and psychological well-being; together with longitudinal and cross-sectional evidence, this positions resilience as both a mechanism (mediator) and a modifiable exposure (predictor) relevant to academic mental health (23). Finally, prior work identifying motivation and self-efficacy as determinants of burnout invites an expanded multivariable framework in which resilience may partner with motivational constructs; our estimates indicate resilience alone confers substantial explanatory power and may be the most tractable lever for early implementation (24).

Biological and cognitive mechanisms plausibly account for these relationships. Resilience has been linked to faster cortisol recovery, lower inflammatory tone, and greater parasympathetic activity, as well as prefrontal–limbic profiles favoring executive control over threat reactivity; such profiles would blunt the cumulative neuroendocrine load that typically converts high academic demands into emotional exhaustion and cynicism (11). The observed non-differences by academic year and gender imply that the stress–burnout physiology and the buffering effect of resilience are broadly stable across training stages and demographic strata in this setting, arguing for universal rather than niche targeting of resilience programs. Clinically and educationally, the take-home is actionable: modest gains in resilience—as achievable through structured skills training, coached reflection, peer support, and supervisor feedback—are likely to yield material reductions in burnout burden, with downstream benefits for patient safety behaviors, error recognition, and retention in the nursing workforce (19–21).

This study offers several strengths germane to education science and implementation. First, instruments with strong psychometric performance in student populations were applied with standardized scoring, improving construct validity and comparability (12–14). Second, the analysis plan included effect sizes, precision estimates, and model diagnostics, enhancing interpretability and reproducibility. Third, recruitment spanned classroom and clinical blocks across all academic years, limiting selection bias to the extent feasible within a convenience framework. Important limitations temper inference. The cross-sectional design precludes causal attribution; while triangulation with longitudinal literature suggests directional effects from resilience to well-being, temporal ordering cannot be confirmed here (18). The multivariable model operated on a subset of the sample due to incomplete scale data, introducing potential attrition bias if missingness correlated with severity of stress or burnout; nonetheless, the effect estimate for resilience was large and precise, making qualitative reversal unlikely. Generalizability is restricted to a single university context and similar curricular structures; replication across institutions, clinical placement intensity, and cultural milieus is warranted. All measures were self-reported, which may inflate shared method variance, though procedural steps to minimize social desirability and immediate completeness checks were implemented.

CONCLUSION

This study highlights the intricate relationship between burnout, resilience, and academic stress among nursing students, demonstrating that higher academic stress significantly elevates burnout risk, while resilience exerts a robust protective effect that mitigates these negative outcomes. The findings underscore that resilience is not merely associated with improved psychological outcomes but functions as an independent predictor of lower burnout, even when stress levels are high, positioning it as a pivotal modifiable factor in nursing education. Clinically, these results suggest that enhancing resilience through structured interventions such as mentorship, cognitive-behavioral strategies, and stress management training could improve mental well-being, academic performance, and professional readiness, ultimately strengthening workforce capacity and patient care quality. From a research perspective, the study provides a foundation for longitudinal and interventional investigations to test causal pathways, explore resilience-enhancing strategies, and integrate biological and behavioral markers into future models, thereby advancing both theoretical understanding and practical approaches to safeguarding psychological health in healthcare trainees.

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