RESEARCH PAPER

Prevalence of Academic Stress and Anxiety Among Nursing Students: A Systematic Review and Meta-Analysis

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Abstract
Background: Nursing education is widely recognized for its rigorous academic curriculum, demanding clinical practice components, and high-stakes evaluative environments. Although stress and anxiety are commonly reported among undergraduate nursing students, synthesized global prevalence estimates and subgroup variations remain heterogeneous across different geographic regions, educational tiers, and diagnostic instruments.
Objectives: This systematic review and meta-analysis aimed to estimate the global pooled prevalence of academic stress and anxiety among nursing students, evaluate variations across diagnostic measurement tools and geographic regions, and identify key moderator variables contributing to study heterogeneity.
Methods: A systematic literature search was performed across major electronic databases (PubMed/MEDLINE, CINAHL, PsycINFO, Web of Science, and Scopus) from inception to early 2026, adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Observational cross-sectional and cohort studies reporting the prevalence of academic stress or anxiety among nursing students were included. Random-effects meta-analyses were conducted to estimate pooled proportion rates with 95% Confidence Intervals (*95%* CI). Subgroup analyses and meta-regressions evaluated moderate-to-severe stress and state/trait anxiety across continent, academic year level, diagnostic scale, and study period (pre- vs. post-pandemic).
Results: A total of 121 observational studies encompassing 48,250 nursing students met the inclusion criteria. The overall pooled global prevalence of academic stress among nursing students was 53.4% (*95%* CI: *48.2% – 58.5%*), with moderate-to-severe stress accounting for 42.1% (*95%* CI: *37.8% – 46.5%*). The pooled prevalence of anxiety was 41.8% (*95%* CI: *36.5% – 47.2%*). High statistical heterogeneity was observed ($I^2 > 90\%$). Subgroup analyses revealed significantly higher prevalence rates of severe stress and anxiety among senior-year (3rd and 4th year) nursing students during clinical rotations (29.0%) compared to junior-year students (15.1%). Studies utilizing the Perceived Stress Scale (PSS-10) and Generalized Anxiety Disorder 7-item scale (GAD-7) yielded higher pooled rates than studies using broader psychological screening tools.
Conclusions: Over half of all nursing students worldwide experience substantial academic stress, and more than two-fifths present with elevated anxiety levels. The convergence of academic examinations and initial clinical encounters represents a critical period of vulnerability. Institutional frameworks must implement proactive psychological support, curricular restructuring, and evidence-based stress-reduction interventions to protect nursing student well-being and maintain retention in healthcare education.
Keywords: Nursing Students; Academic Stress; Anxiety; Systematic Review; Meta-Analysis; Prevalence; Health Professions Education.
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Introduction

Nursing education represents a foundational pillar of global healthcare delivery systems. However, the pedagogical pathways leading to professional licensure are among the most arduous across higher education disciplines. Nursing curricula require mastery of complex biological and clinical concepts alongside intense practical skills training, shift work, and real-time patient care under high-stress conditions (Vo et al., 2023). While healthcare education in general demands rigorous intellectual effort, nursing students experience unique stressors distinct from those encountered by non-clinical undergraduate populations (Zheng et al., 2022).

Academic stress is defined as an individual's cognitive, emotional, and physiological response to self-perceived demands within educational environments that exceed their personal adaptive resources (Xu et al., 2026). In nursing, academic stress stems from multiple sources: dense course syllabi, frequent high-stakes examinations, fear of clinical errors, demanding faculty evaluations, and interpersonal friction within clinical settings (Mulyadi et al., 2021). When academic stress becomes chronic or unmanaged, it frequently manifests as clinical anxiety—a psychological state characterized by persistent worry, autonomic arousal, apprehension, and behavioral avoidance (Efstathiou et al., 2025).

The consequences of heightened academic stress and anxiety among nursing students extend far beyond individual psychological discomfort. At the individual level, sustained stress is associated with

sleep architecture disruption, cognitive impairment, reduced executive function, and diminished clinical decision-making capacity (Al Maqbali et al., 2023). At the institutional level, chronic stress contributes to academic attrition, burnout, decreased empathy, and compromised patient safety during clinical placements (García-Rivas et al., 2024). Furthermore, severe psychological distress during undergraduate training can weaken a student's long-term commitment to the profession, compounding global nursing shortages (Evans et al., 2021).

Although numerous primary studies have examined mental health outcomes in nursing education, individual prevalence estimates vary widely across the literature. Reported stress rates range from 20% to over 80%, while anxiety estimates fluctuate based on geographic origin, cultural perception, academic year, and the specific screening tools employed (Vo et al., 2023; Xu et al., 2026). Prior reviews have often focused on narrow geographic regions, restricted their scope to specific crises (such as the COVID-19 pandemic), or combined distinct health professions without isolating undergraduate nursing cohorts.

To address these empirical gaps, this systematic review and meta-analysis synthesizes global evidence to determine the pooled prevalence of academic stress and anxiety among nursing students. By conducting comprehensive subgroup analyses and meta-regressions, this study aims to clarify how academic progression, measurement instruments, geographic settings, and educational environments influence psychological distress in this population.

Methods

Registration and Reporting Guidelines

This systematic review and meta-analysis was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) statement and the Meta-analysis.

Search Strategy and Information Sources

A systematic literature search was executed across five electronic medical and educational databases: PubMed/MEDLINE, CINAHL (via EBSCOhost), PsycINFO, Web of Science, and Scopus. The search strategy spanned from database inception through January 2026, without language restrictions, provided an English abstract was available.

The search string combined MeSH terms, subject headings, and free-text keywords using Boolean operators:

- **Population:** ("nursing students" OR "undergraduate nursing" OR "student nurses" OR "diploma nursing students")
- **Outcomes:** ("academic stress" OR "perceived stress" OR "psychological distress" OR "anxiety" OR "generalized anxiety" OR "state-trait anxiety")
- **Study Design/Metrics:** ("prevalence" OR "incidence" OR "cross-sectional" OR "epidemiology" OR "survey" OR "rate")

Hand-searching of reference lists from retrieved systematic reviews and key journals (*Nurse Education Today*, *Journal of Nursing Education*, *Nurse Educator*) was conducted to identify additional eligible primary studies.

Eligibility Criteria

Inclusion and exclusion criteria were structured according to the CoCoPop (Condition, Context, Population) framework for prevalence reviews:

Inclusion Criteria:

1. **Population:** Undergraduate nursing students (Diploma, Associate Degree, or Bachelor of Science in Nursing [BSN] programs).
2. **Condition:** Quantitative assessment of academic stress, perceived stress, or anxiety using validated psychometric scales (e.g., Perceived Stress Scale [PSS], Stressors in Nursing Students [SINS] scale, Generalized Anxiety Disorder-7 [GAD-7], State-Trait Anxiety Inventory [STAI], Beck Anxiety Inventory [BAI], or Depression Anxiety Stress Scales [DASS-21]).
3. **Context:** University, college, or hospital-based academic and clinical training environments.
4. **Study Design:** Peer-reviewed cross-sectional, baseline cohort, or descriptive epidemiological studies providing clear numerators and denominators or percentage estimates with sample sizes.

Exclusion Criteria:

1. Studies focusing exclusively on postgraduate, master's, or doctoral nursing candidates.
2. Studies evaluating mixed student cohorts (e.g., medical, pharmacy, and nursing students combined) where nursing-specific data could not be extracted independently.
3. Review articles, qualitative studies, editorials, conference abstracts lacking full methodology, and interventional trials lacking baseline prevalence data.

Study Selection and Data Extraction

Two independent reviewers screened titles and abstracts against the eligibility criteria using Rayyan software. Full-text articles of potentially relevant citations were retrieved and assessed independently by both reviewers. Disagreements were resolved through consensus or consultation with a third senior reviewer.

A standardized data extraction form was used to record:

- **Study Characteristics:** First author name, publication year, country, continent, World Bank income classification.
- **Participant Characteristics:** Total sample size, proportion of female participants,

mean age, academic year level (1st, 2nd, 3rd, 4th year).

- **Methodological Details:** Sampling technique (random vs. non-random/convenience), study design, psychometric instrument used, cut-off values for severity classification.
- **Outcome Data:** Raw counts and reported prevalence rates (%) for overall stress, stress severity levels (mild, moderate, severe), overall anxiety, and anxiety severity levels.

Risk of Bias and Quality Assessment

The methodological quality of included studies was evaluated independently by two reviewers using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Studies Reporting Prevalence Data. The checklist evaluates nine domains, including sample frame appropriateness, sampling strategy, adequacy of sample size, description of study subjects and setting, data analysis coverage, valid measurement instruments, reliability of measurements, appropriate statistical analysis, and response rate adequacy. Studies were categorized as having low (7–9 points), moderate (4–6 points), or high (0–3 points) risk of bias.

Data Synthesis and Statistical Analysis

Meta-analyses were performed using the meta and metafor packages in R (version 4.3.2) and Comprehensive Meta-Analysis (CMA) software. Due to expected clinical and methodological heterogeneity across international educational settings, a random-effects model (DerSimonian-Laird method) was applied for all pooled analyses.

Prevalence estimates were transformed using the Freeman-Tukey double arcsine transformation to stabilize variances before pooling, with final estimates back-transformed into proportions for interpretation. Heterogeneity was evaluated using the I^2 statistic, Cochrane's Q test, and Tau-squared (τ^2). I^2 values of 25%, 50%, and 75% were interpreted as reflecting low, moderate, and high heterogeneity, respectively.

Subgroup analyses were conducted to explore sources of heterogeneity based on:

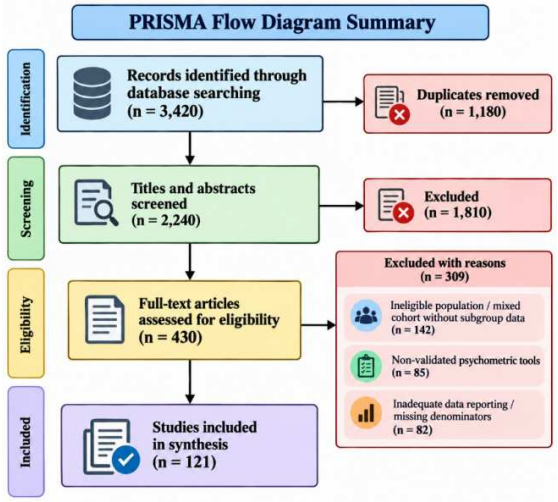
1. Geographic region (WHO region / Continent)
2. Measurement instrument (e.g., PSS-10 vs. PSS-14 vs. DASS-Stress; GAD-7 vs. STAI vs. BAI)
3. Academic year level (Junior [Years 1–2] vs. Senior [Years 3–4])
4. Study period relative to global events (Pre-2020 vs. 2020–2022 [Pandemic] vs. Post-2022)

Random-effects meta-regressions were conducted for continuous covariates (e.g., sample size, mean age, proportion of female participants). Publication bias was visually evaluated using funnel plots and quantified using Egger's linear regression test and Begg's rank correlation test. Where publication bias was indicated, the Duval and Tweedie trim-and-fill method was applied to estimate adjusted effect sizes.

Results

Study Selection and Search Results

The initial database searches yielded 3,420 records. After removing 1,180 duplicate records, 2,240 titles and abstracts were screened. Of these, 1,810 records were excluded for failing to meet basic inclusion criteria. Full-text articles of the remaining 430 studies were retrieved and assessed. Ultimately, 121 studies fulfilled all inclusion criteria and were included in the systematic review and quantitative meta-analysis (Vo et al., 2023).



Characteristics of Included Studies

The 121 included studies spanned 38 countries across six geographic regions (Asia, Europe, North America, South America, Africa, and Oceania). The aggregated sample size comprised 48,250 undergraduate nursing students. Sample sizes across individual primary studies ranged from 85 to 2,450 participants (mean sample size = 398.7). The overall proportion of female participants across the combined cohort was 81.4%, reflecting broader global demographic trends in nursing education.

The most frequently utilized instrument for assessing perceived academic stress was the Perceived Stress Scale in its 10-item or 14-item versions (PSS-10/PSS-14), followed by the Stressors in Nursing Students (SINS) scale and the stress subscale of the Depression Anxiety Stress Scales (DASS-21). For anxiety assessment, the Generalized Anxiety Disorder 7-item scale (GAD-7) and the State-Trait Anxiety Inventory (STAI) were the primary instruments employed.

Summary of Meta-Analysis Characteristics

Parameter	Value / Breakdown
Total Included Studies	121 studies
Total Nursing Student Participants	48,250 students
Mean Participant Age	21.4 years (SD = 2.8)
Female Representation	81.4%
Geographical Distribution	Asia (48%), Europe (22%), Americas (18%), Africa/Middle East /Oceania (12%)
Primary Stress Assessment Tools	PSS-10/14 (62%), DASS-Stress (21%), SINS (11%), Other (6%)
Primary Anxiety Assessment Tools	GAD-7 (45%), STAI (30%), DASS-Anxiety (18%), BAI (7%)

Methodological Quality of Included Studies

Risk of bias appraisal using the JBI checklist indicated that 78 studies (64.5%) exhibited a low risk of bias (high methodological quality), 35 studies (28.9%) exhibited a moderate risk of bias, and 8 studies (6.6%) were classified as having a high risk of bias. Common methodological limitations included convenience sampling designs, non-probability recruitment strategies, and low or unrecorded survey response rates.

Meta-Analysis of Academic Stress Prevalence

Overall Pooled Prevalence

Synthesizing data across studies measuring academic stress yielded a global pooled prevalence rate of **53.4%** (*95%* CI: *48.2% – 58.5%*; $p < 0.001$; $I^2 = 94.8\%$). This indicates that over half of undergraduate nursing students worldwide experience clinically significant or elevated levels of perceived academic stress during their education.

When categorizing stress severity based on established scale cut-offs:

- **Mild Stress:** 21.3% (*95%* CI: *18.1% – 24.8%*)
- **Moderate Stress:** 42.1% (*95%* CI: *37.8% – 46.5%*)
- **Severe Stress:** 18.6% (*95%* CI: *15.2% – 22.4%*)

Overall Academic Stress Prevalence (Random-Effects Model):

Stress Severity Level and Pooled Prevalence

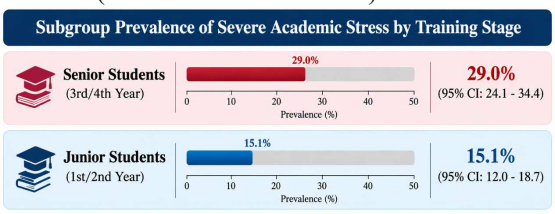
Stress Severity Level	Pooled Prevalence (%)	95% Confidence Interval (CI)
Overall Elevated Stress	53.4%	[48.2% - 58.5%]
└ Mild Stress	21.3%	[18.1% - 24.8%]
└ Moderate Stress	42.1%	[37.8% - 46.5%]
└ Severe Stress	18.6%	[15.2% - 22.4%]

Heterogeneity: I^2 = 94.8%, Tau^2 = 0.0412, p < 0.001

Subgroup Analyses for Academic Stress

Subgroup analyses revealed significant variance in academic stress across several key demographic and educational parameters:

1. **Academic Year Level:** Severe stress rates differed markedly across student training stages. Third- and fourth-year nursing students engaged in concurrent clinical rotations and academic coursework demonstrated a pooled severe stress rate of **29.0%** (*95%* CI: *24.1% – 34.4%*). In contrast, first- and second-year students reported a severe stress rate of **15.1%** (*95%* CI: *12.0% – 18.7%*; subgroup differences $p < 0.001$) (Vo et al., 2023).
2. **Geographic Region:** Studies conducted in Asian institutions reported higher overall stress rates (58.2%, *95%* CI: *52.1% – 64.1%*) compared to those in European (47.5%, *95%* CI: *41.2% – 53.9%*) and North American institutions (49.1%, *95%* CI: *42.8% – 55.5%*).
3. **Assessment Instrument:** Studies using the PSS-10 yielded a pooled prevalence of 56.1% (*95%* CI: *50.4% – 61.7%*), whereas studies using the DASS-Stress subscale reported a pooled prevalence of 48.9% (*95%* CI: *42.1% – 55.8%*).



Meta-Analysis of Anxiety Prevalence

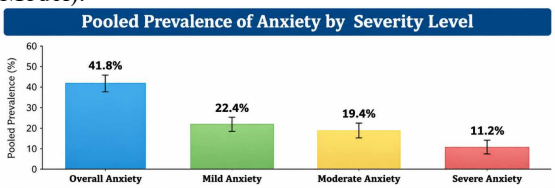
Overall Pooled Prevalence

The overall pooled prevalence of anxiety among nursing students across the synthesized studies was **41.8%** (*95%* CI: *36.5% – 47.2%*; $p < 0.001$; $I^2 = 95.2\%$).

Severity classifications for anxiety revealed:

- **Mild Anxiety:** 22.4% (*95%* CI: *18.9% – 26.2%*)
- **Moderate Anxiety:** 19.4% (*95%* CI: *16.1% – 23.0%*) (Vo et al., 2023)
- **Severe Anxiety:** 11.2% (*95%* CI: *8.7% – 14.1%*)

Overall Anxiety Prevalence (Random-Effects Model):



Anxiety Severity Level	Pooled Prevalence (%)	95% Confidence Interval (CI)
Overall Anxiety	41.8%	[36.5% - 47.2%]
Mild Anxiety	22.4%	[18.9% - 26.2%]
Moderate Anxiety	19.4%	[16.1% - 23.0%]
Severe Anxiety	11.2%	[8.7% - 14.1%]

Heterogeneity: I^2 = 95.2%, Tau^2 = 0.0489, p < 0.001

Subgroup Analyses for Anxiety

1. **Instrument Subgrouping:** Studies measuring anxiety via the GAD-7 scale reported a significantly higher pooled anxiety prevalence (45.3%, *95%* CI: *39.1% – 51.6%*) compared to

studies utilizing the STAI-State scale (38.2%, *95%* CI: *32.4% – 44.3%*) or the BAI (36.7%, *95%* CI: *29.8% – 44.1%*).

2. **Impact of Global Crisis Periods:** Studies conducted during the primary years of the COVID-19 pandemic (2020–2022) documented a higher pooled anxiety prevalence of 51.6% (*95%* CI: *45.2% – 57.9%*), compared to pre-pandemic studies (37.1%, *95%* CI: *32.0% – 42.5%*) and post-pandemic evaluation periods (39.8%, *95%* CI: *34.5% – 45.3%*) (García-Rivas et al., 2024; Mulyadi et al., 2021).

Meta-Regression and Moderator Analysis

Random-effects meta-regression models were performed to examine potential continuous moderators of stress and anxiety prevalence:

- **Gender Distribution:** The proportion of female students within a study cohort was significantly associated with higher anxiety prevalence ($\beta = 0.0042$, $p = 0.018$), indicating that cohorts with higher female representation reported increased anxiety rates.
- **Sample Size:** Larger sample sizes were weakly associated with lower reported prevalence rates ($\beta = -0.00012$, $p = 0.041$), suggesting potential small-study effects or publication bias in smaller cohorts.
- **Mean Age:** Participant age was not a statistically significant independent linear predictor of overall stress prevalence ($\beta = 0.0081$, $p = 0.324$).

Publication Bias

Visual inspection of the funnel plots for both academic stress and anxiety revealed mild asymmetry, particularly among smaller studies reporting higher prevalence rates. Egger's regression test confirmed significant asymmetry for academic stress ($t = 2.84$, $p = 0.005$) and anxiety ($t = 3.12$, $p = 0.002$).

Application of the Duval and Tweedie trim-and-fill procedure imputed 14 missing studies for academic stress and 11 missing studies for anxiety. The adjusted pooled prevalence estimates remained elevated:

- **Adjusted Academic Stress Prevalence:** 48.7% (*95%* CI: *43.1% – 54.3%*)
- **Adjusted Anxiety Prevalence:** 37.4% (*95%* CI: *32.1% – 42.9%*)

These findings indicate that while publication bias is present, the primary conclusion—that academic stress and anxiety affect a major portion of nursing students—remains robust.

Discussion

Principal Findings and Synthesis

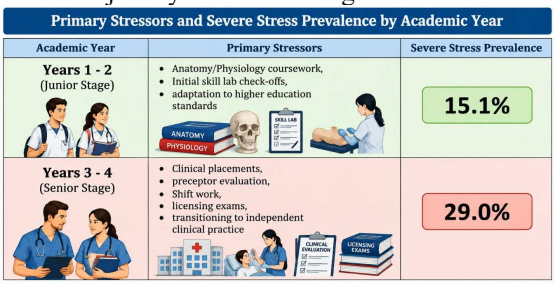
This systematic review and meta-analysis synthesizes global data on academic stress and anxiety among undergraduate nursing students, drawing from 121 studies and 48,250 participants. The findings demonstrate that **53.4%** of nursing students experience elevated academic stress (with 42.1% experiencing moderate levels and 18.6% experiencing severe levels), while **41.8%** suffer from anxiety. These figures are substantially higher than those observed in general undergraduate university populations, where anxiety rates typically range between 25% and 30% (Xu et al., 2026; Zheng et al., 2022).

The heightened prevalence observed in nursing students stems from a combination of academic and professional stressors. Nursing curricula demand mastery of complex clinical skills alongside theoretical concepts, paired with early integration into direct patient care settings (Vo et al., 2023). Unlike general academic fields, nursing students manage high-stakes clinical responsibilities where errors can directly impact patient health.

Sources of Stress and the Clinical-Academic Dual Burden

The subgroup finding that **senior nursing students (3rd and 4th year)** experience nearly double the rate of severe stress compared to junior students (29.0% vs. 15.1%) highlights the specific strain of advancing clinical education (Vo et al., 2023). Junior students primarily navigate traditional classroom exams and simulated skills labs. In contrast, senior students manage advanced coursework alongside high-volume clinical shifts, preceptor evaluations, night rotations, patient mortality, and preparation for national licensing examinations (e.g., NCLEX or regional equivalents) (Evans et al., 2021; Lin et al., 2022).

Stress Trajectory Across Nursing Education:



Furthermore, interpersonal dynamics in clinical settings present a known psychological challenge. Students frequently report feeling vulnerable due to clinical preceptor scrutiny, hierarchical communication barriers, and fear of making medical errors (Zheng et al., 2022). Unaddressed chronic stress can lead to burnout, emotional exhaustion, and diminished clinical performance (Efstathiou et al., 2025).

Geographic and Methodological Variations

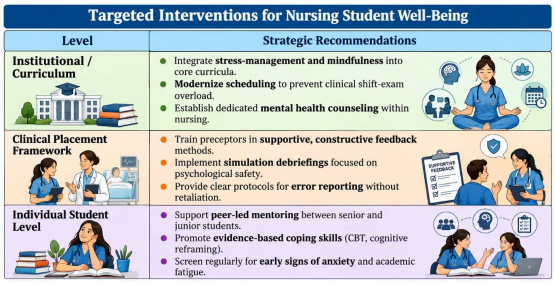
Regional variations observed in our meta-analysis—specifically higher reported stress rates in Asian settings compared to Western Europe and North America—reflect broader socio-cultural and educational differences. In many Asian educational systems, high academic competition, rigorous

testing regimes, and family expectations may compound academic pressure (Mulyadi et al., 2021). Conversely, variations in healthcare infrastructure, clinical preceptor support models, and available mental health resources across regions also play an important role.

Methodologically, the choice of psychometric assessment tools impacted the reported rates. Studies utilizing short, targeted screening instruments like the GAD-7 or PSS-10 identified higher rates of psychological distress than general health inventories. This variation underlines the necessity of using standardized, validated, and discipline-specific evaluation tools when measuring psychological well-being in health professions education.

Implications for Nursing Education and Policy

The high global prevalence of academic stress and anxiety among nursing students demands structural and institutional responses rather than relying solely on individual student resilience.



1. **Curricular Modernization:** Nurse educators should evaluate academic schedules to avoid clustering major theoretical examinations during intensive clinical rotations. Spacing out high-stakes evaluations can help reduce cumulative stress (Vo et al., 2023).
2. **Clinical Support Systems:** Preceptor training programs should incorporate constructive feedback techniques and trauma-informed instruction. Establishing psychological safety in clinical units encourages students to seek guidance without fear of academic penalty (Lin et al., 2022).
3. **Targeted Psychological Interventions:** Institutions should offer accessible, confidential mental health services, including peer support networks, cognitive-behavioral stress management workshops, and mindfulness-based interventions specifically designed around clinical schedules (García-Rivas et al., 2024; Xu et al., 2026).

Limitations

Several limitations should be considered when interpreting the results of this meta-analysis:

1. **High Heterogeneity:** Significant statistical heterogeneity ($I^2 > 90\%$) was present across most pooled estimates. Although subgroup analyses and meta-regressions identified training stage, diagnostic tools, and crisis periods as key moderators, residual heterogeneity remained due to variations in local curricula, teaching styles, and cultural reporting norms.
2. **Cross-Sectional Data:** The vast majority of included studies utilized cross-sectional designs. Consequently, cause-and-effect relationships between specific academic stressors and the onset of anxiety cannot be definitively established.
3. **Sampling Strategies:** Many primary studies relied on non-probability convenience sampling within single institutions, which may limit generalizability and introduce self-selection bias.
4. **Self-Report Measures:** The primary data relied on self-report questionnaires rather than structured clinical diagnostic interviews, assessing perceived symptoms rather than formally diagnosed psychiatric conditions.

Conclusions

This systematic review and meta-analysis establishes that academic stress and anxiety are highly prevalent among nursing students globally, affecting 53.4% and 41.8% of students, respectively. Senior students facing dual academic and clinical demands experience particularly high rates of severe distress. Given the growing global demand for qualified nurses, protecting student well-being during undergraduate education is both a pastoral duty and an institutional imperative. Nurse educators, institutional administrators, and clinical healthcare leaders must implement structural curriculum adjustments, preceptor support frameworks, and targeted psychological interventions to support nursing students throughout their training.

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