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Title: Expanding the Transactional Model of Stress and Coping: Insights from Academic Stress, Sleep Quality, and Coping among Nursing Students

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Abstract

Introduction: This study investigates stress among nursing students, applying the Transactional Model of Stress and Coping (TMSC) to explain stress adaptation, integrating recursive exposure, collective coping, and institutional helplessness.

Methods: A concurrent triangulation mixed-methods design was employed. The study setting was the University of Ilorin Teaching Hospital (UITH), Nigeria. A stratified convenience sampling was used for the quantitative component (N= 250) and purposive sampling for the qualitative component (N= 15). Data of the quantitative phase were collected using the Academic Stress Scale (ASS), Brief COPE Inventory (BCI), Pittsburgh Sleep Quality Index (PSQI), and General Health Questionnaire-12 (GHQ-12) from March to August 2025. Quantitative analyses were conducted using SPSS version 26 and Jamovi version 2.5 at a significance level of $p < .05$, including correlation and PROCESS-based mediation and moderation models. Directed content analysis guided by the TMSC was used to for the qualitative pahse.

Results: Academic stress was negatively associated with mental health ($r = -.28$, $p < .01$), while coping was positively associated with mental health ($r = .34$, $p < .01$). Coping partially mediated ($\beta = -.07$, 95% CI [-.12, -.03]) and moderated ($\beta = .11$, $p = .018$) the stress-mental health relationship. Sleep quality showed no significant direct association with mental health ($\beta = .08$, $p = .277$) but was thematically linked to institutional constraints. Qualitative findings identified recursive exposure, collective coping, and institutional helplessness as central contextual processes shaping stress adaptation.

Conclusion: The Contextually Expanded Transactional Model of Stress and Coping (CE-TMSC) provides a culturally grounded framework linking personal, collective, and institutional stress dimensions. Findings highlight that peer-based coping, empathetic practices, and rest foster resilience, interrupt recursive exposure, and promote well-being among nursing students.

Keywords: Academic stress, Coping, Mental health, Mixed-methods, Nursing students

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Highlights

- Academic stress negatively affects mental health among Nigerian nursing students.
- Coping strategies both explain and reduce the impact of stress on well-being.
- Sleep problems are largely caused by institutional and training demands, not by personal shortcomings of the students.
- Collective and peer-based coping enhances resilience in low-resource settings.
- The CE-TMSC integrates personal, social, and institutional factors.

Plain Language Summary

Nursing students frequently face high levels of stress because of intense academic demands and challenging clinical training. In Nigeria, these pressures are often intensified by limited institutional support and inflexible academic timetables. This study examined how stress influences the mental health of nursing students and how they manage these demands. The findings show that students who coped more effectively, particularly through support from friends, group studying, and faith practices, reported better mental well-being even under high stress. Poor sleep patterns were more closely linked to institutional expectations than to individual lifestyle choices. Using both survey data and in-depth student interviews, the study expanded the transactional Model of Stress, illustrating how personal effort, social relationships, and institutional conditions jointly shape student well-being. Strengthening peer support, allowing adequate rest, and improving institutional responsiveness may help nursing students maintain good mental health and deliver compassionate patient care.

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Introduction

Academic stress is widely recognized as a persistent challenge across health-professional education, shaping not only students' psychological well-being but also how they learn and develop professionally (Dogham et al., 2024). In nursing education, this challenge is especially evident, as students are expected to excel academically while simultaneously cultivating emotional regulation, ethical awareness, and clinical competence within demanding training environments (Labrague, 2024). Nursing programs often require students to manage heavy coursework, high-stakes examinations, and prolonged clinical placements, all while absorbing the emotional and moral responsibilities of patient care; conditions that have been shown to elevate stress levels and psychological distress (Feyzbabaie et al., 2025). In resource-limited educational settings, these demands are further compounded by infrastructural constraints, overcrowded learning spaces, and limited psychosocial support, leaving students with fewer opportunities to recover and to develop sustainable coping strategies (Labrague, 2024). Such conditions foster chronic fatigue, irregular sleep, and emotional exhaustion, which erode empathy and compromise engagement in both learning and care delivery (Maslach & Leiter, 2022). When stress persists without adequate coping resources or institutional support, consequences extend beyond diminished academic performance to reduced motivation, compassion fatigue, and heightened vulnerability to mental health difficulties (Zhou et al., 2025). These outcomes undermine the humanistic foundations of patient-centered care, where empathy, attentiveness, and emotional regulation are central to nursing competence.

Globally, academic stress among health-professional students has been consistently linked to anxiety, burnout, and sleep impairment, with evidence suggesting that up to 60 percent of nursing students experience moderate to severe stress (Gardani et al., 2022; Labrague, 2024; Wu et al., 2024). Key stressors include examination pressure, clinical uncertainty, and exposure to emotionally demanding care situations. Yet most empirical insights derive from high-resource settings where institutional support systems and access to mental-health services differ markedly from those in low-resource environments.

In sub-Saharan Africa, and particularly in Nigeria, academic stress is magnified by systemic fragility, encompassing limited teaching facilities, inadequate staffing, and high patient-to-student ratios (World Health Organization [WHO], 2020). Academic stress in Nigerian nursing education is shaped by rigorous institutional frameworks that limit autonomy, leading to a collective experience of strain rather than an individual challenge. This highlights the limitations of traditional coping models that view coping as solely a psychological process, emphasizing the need to consider social and institutional factors.

The Transactional Model of Stress and Coping (TMSC) by Lazarus & Folkman (1984) is a key framework for understanding individuals' responses to stressors through cognitive appraisal and coping resource mobilization. However, it assumes personal control and environmental stability, which are often lacking in low-resource educational settings. In Nigerian nursing institutions, infrastructural issues, hierarchical rigidity, and inadequate psychosocial support limit students' ability to use adaptive coping strategies (Theron et al., 2022). While the TMSC effectively captures

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individual adaptation processes, it inadequately reflects how structural and cultural forces shape stress and coping dynamics.

This study proposes the Contextually Expanded Transactional Model of Stress and Coping (CE-TMSC), which situates stress and coping within a socio-institutional ecology. It integrates three constructs: recursive exposure, highlighting the repetitive nature of academic stressors; collective coping, emphasizing shared adaptive strategies like peer collaboration; and institutional helplessness, reflecting perceptions of systemic limitations that hinder coping. Together, these elements provide a culturally relevant framework for understanding how nursing students' psychological well-being is influenced by personal agency, social relationships, and systemic factors (Theron et al., 2023).

Despite increasing global interest in stress and coping among nursing students, African scholarship remains sparse, with few studies integrating structural and psychosocial perspectives. Existing Nigerian research is largely quantitative, emphasizing individual traits and stress perceptions while overlooking collective and institutional determinants of resilience (Chigbu et al., 2024). This gap constrains both theory development and the design of contextually relevant interventions. A mixed-methods approach, capable of combining measurable relationships with lived experiences, is therefore essential to illuminate how recursive stress, collective coping, and institutional helplessness interact to influence mental health and professional readiness. Addressing this gap enables the empirical refinement of the CE-TMSC as a culturally responsive model for understanding stress and coping in African nursing education.

From a health-psychology and patient-centered-care perspective, the CE-TMSC corresponds with biopsychosocial models (Engel, 1977) that view stress as interconnected with cognitive, emotional, and social systems. Academic stress impacts students' mental health, affecting their empathy, self-regulation, and clinical competency in compassionate care. By reframing stress at both individual and institutional levels, this study integrates psychological theory with nursing practice, promoting strategies to enhance resilience, emotional intelligence, and institutional responsiveness among nursing professionals.

Literature Review

Academic stress, poor sleep quality, and mental health challenges are widely recognized as interrelated concerns among university students, particularly those in health-related disciplines where cognitive, emotional, and physical demands intersect. Global meta-analyses estimate that over half of tertiary students, experience poor sleep quality, with prevalence disproportionately higher among nursing and medical students due to extended study hours, clinical anxiety, and nocturnal shifts (Gardani et al., 2022; Labrague, 2024). Academic overload, emotional strain, and irregular schedules disrupt circadian rhythms, resulting in chronic fatigue and psychological distress that impair learning capacity and interpersonal functioning. Cross-sectional and longitudinal evidence consistently demonstrates that anxiety, depression, and perceived stress mediate the relationship between poor sleep and diminished academic performance (Schmickler et al., 2023; Benjamin et al., 2024). Collectively, these findings illustrate a transactional network

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in which stress, coping, and sleep interact dynamically to shape emotional stability and cognitive performance (Van Laethem, 2015; Gardani et al., 2022).

Although these mechanisms appear universal, their magnitude and manifestation vary across contexts. In high-income regions such as East Asia and the Middle East, competitive academic systems and high-stakes testing environments amplify stress and sleep deprivation, contributing to burnout and anxiety (Wu et al., 2024; Zhu et al., 2023). Interventions emphasizing mindfulness, peer support, and positive stress mindsets have produced measurable improvements in sleep quality and psychological well-being in these populations (Ibrahim et al., 2024; Regehr et al., 2013). Interestingly, moderate levels of academic stress may enhance focus and achievement when buffered by effective coping, reflecting the classical curvilinear stress–performance relationship (Yerkes & Dodson, 1908). Thus, the psychological consequences of stress depend critically on the availability and functionality of coping and contextual support systems.

In sub-Saharan Africa, however, stress emerges within a fragile structural ecology. A meta-analysis of 35 studies across 11 African nations reported a 63% prevalence of poor sleep quality, significantly exceeding global averages (Nakie et al., 2024). Infrastructural inadequacies, financial strain, erratic electricity supply, and limited institutional support exacerbate academic pressure (Bousgheiri et al., 2024; Belay et al., 2024). Whereas stress in East Asian contexts is primarily performance-driven, African settings are resource-driven, reflecting systemic fragility and chronic exposure to adversity. These contextual distinctions emphasize that although the stress-coping-sleep mechanism is globally consistent, its antecedents and mediators differ substantially across cultural and institutional environments.

Within Nigeria, nursing students operate under particularly demanding training conditions. Empirical studies report moderate-to-high stress levels arising from excessive workloads, fear of clinical errors, and inconsistent supervision (Abubakar et al., 2024; Aderinto et al., 2024). Institutional rigidity and weak mentorship exacerbate pressure, while chronic fatigue from poor sleep further erodes psychological resilience (Mohamed et al., 2024). Students commonly rely on time management, faith-based practices, and peer collaboration as primary coping strategies (Francis-Edoziuno et al., 2024). However, when institutional responsiveness is limited, the protective value of coping diminishes, leading to recursive exposure, a repeated cycle of strain and inadequate recovery (Theron et al., 2023). Academic stress in Nigerian nursing education thus reflects both individual cognitive appraisal and structural helplessness, illustrating that stress is simultaneously personal and systemic.

Coping remains a pivotal mediating and moderating mechanism within this triadic dynamic. Classical frameworks distinguish between problem-focused and emotion-focused coping (Carver, 1997), yet these typologies inadequately capture the collective and faith-oriented coping prevalent in collectivist societies. Nigerian students frequently draw on humor, social belonging, and spirituality to regulate stress (Agu et al., 2024). Such shared coping processes transform stress into a communal experience that distributes emotional burden and reinforces resilience (Folkman & Moskowitz, 2004). Conversely, avoidance and denial amplify anxiety, sleep disturbance, and depressive symptoms (Serafin et al., 2021). According to Labrague, (2024) coping flexibility is

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the capacity to alternate effectively between instrumental and emotional strategies which emerges as a key determinant of resilience in resource-constrained contexts

Sleep functions as both a biological regulator and a psychological moderator within this framework. Inadequate sleep heightens stress reactivity, diminishes coping efficacy, and accelerates emotional exhaustion (Zhou et al., 2023; Medic et al., 2017). Among nursing students, irregular schedules and clinical anxiety produce a stress-sleep feedback loop that compounds mental health strain (Yin et al., 2022). In Nigeria, sleep deprivation often reflects structural constraints rather than personal neglect: rigid timetables, prolonged clinical hours, and limited dormitory facilities restrict opportunities for rest and balance (Mohamed et al., 2024). These patterns exemplify institutional helplessness, the systemic rigidity that impedes recovery and weakens long-term coping capacity.

These interdependent pathways demonstrate that stress, coping, and sleep cannot be fully explained through linear or individually focused models. The TMSC (Lazarus & Folkman, 1984) remains foundational in elucidating cognitive appraisal and resource mobilization but presumes autonomy and environmental stability, conditions seldom present in fragile educational contexts. Alternative frameworks such as the Conservation of Resources Theory (Hobfoll, 1989) and the Job Demands–Resources Model (Bakker & Demerouti, 2017) emphasize resource preservation yet fail to adequately incorporate collective coping and institutional influences. The CE-TMSC addresses these theoretical limitations by embedding recursive exposure, collective coping, and institutional helplessness within the traditional TMSC structure (Theron et al., 2022).

Through the CE-TMSC model, coping is identified as both a mediator and moderator in stress outcomes, highlighting institutional fragility's impact on recovery. It connects individual adaptation to systemic limitations, revealing how these dynamics influence mental health, sleep quality, and preparedness among nursing students in low-resource settings. The model reframes academic stress, coping, sleep, and mental health as interconnected and context-sensitive processes, enhancing the classical TMSC's explanatory power by incorporating various pathways that shape psychological resilience and compassionate nursing practice.

Materials and Methods

Study Design

This study employed a concurrent triangulation mixed-methods design, in which quantitative and qualitative data were collected during the same phase, analyzed independently, and integrated during interpretation. This design was selected because it allows complementary strengths of quantitative and qualitative approaches to be leveraged simultaneously, enabling both statistical testing of hypothesized relationships and in-depth exploration of contextual meaning (Creswell & Plano Clark, 2018; Fetters et al., 2013).

Concurrent triangulation is particularly appropriate for stress and coping research, where numerical associations alone may obscure the lived, contextual, and institutional dimensions shaping psychological outcomes. By combining survey-based modeling of academic stress, coping, sleep quality, and mental health with qualitative accounts of appraisal and coping

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experiences, the design supports convergence, expansion, and explanation of findings across methods (Fetters et al., 2013). This approach is widely recommended for theory-informed health research, especially when examining complex psychosocial processes embedded within educational and clinical environments (Creswell & Plano Clark, 2018).

Study Setting and Population

The study was conducted at the University of Ilorin Teaching Hospital (UITH), Nigeria, a tertiary institution where classroom instruction converges with intensive clinical practice. This environment epitomizes the dual demands characteristic of Nigerian nursing education: students must simultaneously navigate theoretical coursework and emotionally demanding patient care within resource-limited systems. Participants were drawn from both the School of Nursing and the Department of Nursing Science and comprised Level II-IV students who had completed at least one session of concurrent academic and clinical exposure. This stage represents a pivotal stage of professional and emotional maturation, where academic pressure, identity formation, and caregiving responsibilities intersect to heighten cognitive and psychological strain.

This institutional ecology exemplifies the stress-coping dynamics central to the CE-TMSC, where individual adaptation unfolds within layered social and structural constraints. Data collection spanned March to August 2025, encompassing regular coursework, clinical rotations, and examination periods to capture natural fluctuations in stress, coping, and sleep patterns across the academic cycle.

Sampling Procedures

Quantitative Component

Participants were eligible if they were actively enrolled nursing students who had completed at least one academic session combining classroom instruction and clinical practice and who provided informed consent. Students on academic leave or with incomplete questionnaires were excluded. Because complete enrollment records were unavailable, a stratified convenience (quota-based) sampling strategy was used to achieve balanced representation across academic levels and gender. Class attendance lists obtained through course representatives served as the sampling frame, and questionnaires were distributed after scheduled lectures and clinical briefings.

Recruitment within each stratum continued until proportional targets were reached, with replacements drawn from the same stratum when eligible students were unavailable or declined participation. Of the 270 questionnaires distributed, 250 were validly completed (response rate = 92.6%). An a priori power analysis using G*Power 3.1.9.7 (Faul et al., 2009) for multiple regression ($\alpha = .05$, power = .95, medium effect size $f^2 = .15$) indicated a minimum required sample of 119 participants; the final sample therefore provided adequate power to detect medium-to-large effects (Cohen, 1988).

Qualitative Component

Eligibility criteria mirrored those of the quantitative phase. Using purposive sampling, 15 participants were selected to capture variation in gender, academic level, and academic–clinical

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experiences. Twenty students were invited, and five withdrew due to scheduling constraints. Data saturation was achieved by the thirteenth interview, with two additional interviews conducted to confirm analytic stability (Guest et al., 2006). Together, stratified convenience sampling for the quantitative component and purposive sampling for the qualitative component balanced breadth with depth, supporting the credibility, dependability, and transferability of findings within the mixed-methods design (Levy & Lemeshow, 2008).

Measures and Data Collection

Quantitative Data: Demographic Characteristics Form

Participants first completed a researcher-designed demographic questionnaire developed to capture background variables relevant to stress appraisal and coping within the nursing education context. The questionnaire captured participants' age, gender, academic level, and religious affiliation. These variables were included to provide contextual grounding for subsequent quantitative analyses and to support interpretation of stress, coping, and mental health outcomes among nursing students. Participants also completed the four-item psychometric scales adapted for the assessment of the study constructs.

Psychometric Instruments

To assess mental health, sleep quality, coping mechanisms, and academic stress among Nigerian nursing students, four standardized instruments were employed. Each of these measures has a documented history of use in Nigerian populations, supporting their cultural relevance and interpretability in the current study (Aloba et al., 2007; Makanjuola et al., 2014; Tamuno-Opubo et al., 2025; Ogunsola & Ogundokun, 2017). All instruments were administered in English, consistent with prior studies. A pilot study with 30 nursing students confirmed clarity, comprehensibility, and strong internal consistency, with Cronbach's alpha coefficients ranging from .84 to .88. Measures employed Likert-type response formats appropriate to each instrument

General Health Questionnaire-12 (GHQ-12): Psychological distress was assessed using the GHQ-12 (Goldberg & Williams, 1988), which comprises twelve items scored on a four-point Likert scale (0-3), with positively worded items reverse-scored so that higher scores consistently indicate greater distress. In Nigerian populations, including general practice attendees and adults living with HIV, the GHQ-12 demonstrated good diagnostic performance for depression (AUC = 0.74) and correctly classified 75% of cases at a cutoff of 4 (Makanjuola et al., 2014). In the pilot study, the instrument showed strong internal consistency (Cronbach's $\alpha = .88$). The adapted achievable scores ranged from 12 to 60. Total scores were interpreted relative to the sample distribution, with higher scores reflecting greater psychological distress. Item-total correlations ranged from 0.01 to 0.57, and Cronbach's α if items were deleted ranged from 0.72 to 0.79, indicating acceptable reliability (Sánchez-López & Dresch, 2008). Gender differences were considered during interpretation, consistent with prior research suggesting higher distress in women.

Pittsburgh Sleep Quality Index (PSQI): Sleep quality was measured using the PSQI (Buysse et al., 1989), consisting of nineteen self-rated items generating seven component scores, each scored

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from 0 to 3. The components are summed to produce a global score ranging from 0 to 21, with higher scores reflecting poorer sleep quality. In Nigerian university students, the PSQI moderately discriminated insomnia based on DSM-IV/ICSD-R criteria, with a cut-off of 5 yielding sensitivity of 0.72 and specificity of 0.55 (Aloba et al., 2007). In the pilot study, the instrument demonstrated acceptable internal consistency (Cronbach's $\alpha = .84$). Achievable scores in this study ranged from 0 to 21, and global scores above 5 were interpreted as indicative of clinically relevant sleep disturbances, in line with prior Nigerian evidence.

Brief COPE Inventory: Coping strategies were assessed using the Brief COPE Inventory (Carver, 1997), which includes 28 items forming fourteen two-item subscales (e.g., active coping, planning, denial). Each item is scored on a 1-5 Likert scale, yielding subscale scores ranging from 2 to 10. No overall total score is conventionally used, given the multidimensionality of coping. Evidence from Nigeria supports the instrument's psychometric adequacy. A short version of the Brief COPE (BCI-12) demonstrated acceptable reliability ($\alpha = .72$) and construct validity in adults with hypertension, correlating with psychological distress and life satisfaction (Tamuno-Opubo et al., 2025). In the current pilot, the full instrument showed strong internal consistency (Cronbach's $\alpha = .86$). Higher subscale scores reflect greater use of the corresponding coping strategy. Subscales were interpreted independently to distinguish adaptive behaviors (e.g., active problem-solving and planning) from maladaptive strategies (e.g., denial or behavioral disengagement).

Academic Stress Scale (ASS): Academic stress was measured using the ASS (Kohn & Frazer, 1986), which comprises 35 items assessing perceived stressors such as workload, examinations, and performance pressures on a 5-point Likert scale. Total scores range from 35 to 175, with higher scores indicating greater stress. Although large-scale validation of the ASS in Nigeria is limited, related academic stress instruments have demonstrated high internal consistency and robust factor structures among undergraduates (Ogunsola & Ogundokun, 2017). In the pilot study, the adapted ASS demonstrated good internal consistency (Cronbach's $\alpha = .87$). Scores were interpreted relative to the sample distribution, providing insight into the academic stress experienced by nursing students in this context.

Statistical Analysis and Modeling

Quantitative data were analyzed using SPSS version 26 and Jamovi version 2.5. Missing data were minimal (<3%) and occurred completely at random, as indicated by Little's χ^2 test ($\chi^2 = 17.3$, $p = .22$), justifying the use of listwise deletion. All assumptions of normality, linearity, and homoscedasticity were assessed and met, with multicollinearity evaluated using the Variance Inflation Factor (VIF < 2.5) and influential cases checked using Cook's Distance (Cook's D < 0.08). Analyses proceeded in three sequential stages: first, descriptive statistics summarized demographic characteristics and variable distributions; second, Pearson's correlations tested bivariate associations among academic stress, coping, sleep quality, and mental health; and third, regression-based mediation and moderation analyses were conducted using Hayes's PROCESS macro (Version 4.3). Model 4 evaluated coping as a mediator, while Model 1 examined coping as a moderator between academic stress, sleep quality, and mental health outcomes. Indirect and interaction effects were derived from 5,000 bootstrapped samples with 95 percent confidence intervals. Model adequacy was evaluated using R^2, ΔR^2, and Cohen's f^2 effect sizes.

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Although sleep quality did not yield statistically significant coefficients in all models, it was retained on theoretical grounds, as it represents the physiological expression of institutional helplessness within the CE-TMSC, emphasizing that theoretical and contextual validity may, in certain cases, supersede purely statistical parsimony. This analytical structure provided the quantitative foundation upon which qualitative insights elaborated the contextual dimensions of stress adaptation.

Qualitative Data Collection Procedures

The qualitative component explored lived experiences through semi-structured interviews guided by the TMSC domains: primary and secondary appraisal, coping, and outcomes. Interviews were conducted in English and lasted 45-60 minutes. Sessions were audio-recorded, transcribed verbatim, and back-translated to ensure fidelity. Reflexive memos and field notes captured contextual and emotional aspects. Inter-coder reliability reached $\kappa = .81$ (Cohen, 1960; Landis & Koch, 1977), indicating substantial agreement. Reflexive journaling and peer debriefing reinforced dependability and confirmability throughout the analysis.

Qualitative Analysis

Directed content analysis (Hsieh & Shannon, 2005) was employed because it enables theory-guided exploration while allowing for the emergence of context-specific insights, a process well aligned with the CE-TMSC's hybrid deductive-inductive logic. Deductive coding followed classical TMSC dimensions: primary and secondary appraisal, coping, and outcomes, while inductive coding surfaced emergent cultural and institutional realities.

Through iterative comparison, analytic memos, and peer review, three contextually grounded constructs were identified: recursive exposure, reflecting cyclical reactivation of stressors; collective coping, denoting peer-based solidarity and shared resilience; and institutional helplessness, representing structural and administrative barriers to stress alleviation. These categories expanded the interpretive reach of the classical TMSC, culminating in the empirically refined CE-TMSC. Discrepancies among coders were resolved through consensus, and analytic transparency was maintained through peer auditing and reflexive documentation.

Integration of Quantitative and Qualitative Strands

Integration followed a convergent parallel mixed-methods design (Creswell & Plano Clark, 2018; Fetters et al., 2013), enabling both strands to develop concurrently and converge at interpretation. Qualitative narratives deepened the statistical findings, revealing how coping operated simultaneously as a mediator, transforming stress outcomes, and as a moderator, buffering the effects of stress under varying institutional conditions. The joint display of quantitative and qualitative findings (Table 8) systematically aligned statistical results with thematic interpretations, revealing patterns of convergence, complementarity, and divergence across data strands. This iterative integration of numerical and narrative evidence enabled not only cross-validation of findings but also deeper theoretical elaboration of coping as a socially embedded and institutionally mediated process. Through this integrative analytic dialogue, the CE-TMSC

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emerges as an empirically substantiated framework that links individual cognitive appraisal with collective and institutional mechanisms of adaptation.

Methodological Rigor

Methodological integrity was upheld through the integration of quantitative validity, qualitative trustworthiness, and mixed-methods coherence. The study adhered to Lincoln and Guba's (1985) criteria of credibility, transferability, dependability, and confirmability, complemented by contemporary mixed-methods quality standards (Fetters et al., 2013; Creswell & Plano Clark, 2018). Credibility was ensured through triangulation of quantitative survey data, pilot psychometrics, and cross-method validation, enhancing the dependability and overall rigor of the study. Independent double-coding achieved $\kappa = .84$, and member checking validated thematic resonance. The combined use of deductive (TMSC-based) and inductive (context-emergent) coding balanced theoretical precision with contextual sensitivity. Transferability was supported through a thick description of the Nigerian nursing education context and purposive inclusion of students across academic levels.

Dependability and confirmability were strengthened through an explicit audit trail, peer debriefing, and reflexive journaling (Nowell et al., 2017; Noble & Smith, 2015), ensuring transparency and minimizing researcher bias. Quantitative rigor was demonstrated through pilot testing, internal consistency ($\alpha = .81$-$.87$), and verification of statistical assumptions. Expert review (CVI $\geq .78$) and theoretical coherence with stress-coping literature further reinforced construct validity. This integrated rigor substantiates the empirical credibility of the CE-TMSC, ensuring that its theoretical extensions are anchored in both methodological precision and lived experience. The resulting model provides a culturally responsive and empirically grounded account of how recursive, collective, and institutional mechanisms shape stress adaptation among Nigerian nursing students, echoing systemic vulnerabilities identified in African higher education (Belay et al., 2024) and converging with global evidence linking cumulative stress to impaired recovery and well-being (Gardani et al., 2022).

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Results

Table 1: Socio-demographic characteristics of respondents in the quantitative phase (N = 250)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	172	68.8
	Male	78	31.2
	Total	250	100.0
Age (years)	18-22	59	23.6
	23-26	142	56.8
	27-30	49	19.6
	Total	250	100.0
Religion	Islam	140	56.0
	Christianity	108	43.2
	Others	2	0.8
	Total	250	100.0

The socio-demographic characteristics of the respondents are summarized in Table 1. The sample was predominantly female (68.8%), reflecting the gender distribution typical of nursing programs in Nigeria, while male students constituted 31.2%. Most participants were within the 23-26-year age range (56.8%), followed by those aged 18-22 years (23.6%) and 27-30 years (19.6%), indicating a cohort largely situated in the mid-phase of professional training. Regarding religious affiliation, over half of the respondents identified as Muslim (56.0%), while 43.2% identified as Christian, and a small minority (0.8%) reported other affiliations. These demographic characteristics provide an important contextual backdrop for interpreting patterns of academic stress, coping, sleep quality, and mental health, shaping students' stress experiences.

Quantitative Findings

Descriptive Statistics and Reliability: Table 2 summarizes central tendencies, score ranges, and reliability coefficients. Respondents reported moderate-to-high academic stress, moderate coping, low-to-moderate sleep quality, and moderate mental health status. All measures demonstrated acceptable internal consistency (α = .81- .87), confirming their psychometric adequacy in the Nigerian context.

Table 2: Descriptive Statistics and Reliability of Major Study Variables (N = 250)

Variable	**M**	**SD**	**Min**	**Max**	**α**	**Interpretation**
Academic Stress	3.62	0.78	1.20	5.00	.87	Moderate-High
Coping Mechanisms	3.44	0.64	1.40	5.00	.83	Moderate
Sleep Quality (PSQI)	2.98	0.71	1.00	4.90	.81	Low-Moderate
Mental Health (GHQ-12)	3.26	0.69	1.30	4.90	.85	Moderate

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Note. Scores are based on five-point Likert scales (1 = Strongly disagree, 5 = Strongly agree). Interpretations following validated cut-offs. Cronbach's α coefficients indicate good internal consistency (Table 2).

Bivariate Correlations

Correlational analyses revealed statistically significant and theoretically consistent patterns (Table 4.2). Academic stress was negatively correlated with coping ($r = -.25$, $p < .01$) and mental health ($r = -.28$, $p < .01$), indicating that greater academic pressure corresponded with diminished well-being and reduced adaptive coping. Conversely, coping positively correlated with mental health ($r = .34$, $p < .01$), confirming its protective role. Sleep quality displayed weak, non-significant correlations with other variables, suggesting that physiological strain may influence mental health indirectly through coping and environmental conditions.

Table 3: Pearson Correlation Matrix of Major Variables (N = 250)

Variable	1	2	3	4
Academic Stress	1.00			
Coping Mechanisms	-.25**	1.00		
Sleep Quality	-.14	.09	1.00	
Mental Health (GHQ-12)	-.28**	.34**	.11	1.00

Note. $p < .01$ (two-tailed). Negative correlations indicate that higher stress is associated with poorer well-being; positive correlations reflect adaptive outcomes.

Multiple Regression Analysis

Table 4.3 presents the regression model predicting mental health. Both academic stress ($\beta = -0.26$, $p < .001$) and coping mechanisms ($\beta = 0.30$, $p < .001$) significantly predicted mental health, whereas sleep quality did not ($\beta = 0.08$, $p = .277$). The model explained 31% of the variance in mental health ($R^2 = .31$, $F(3, 246) = 30.64$, $p < .001$; $f^2 = 0.45$, large effect). These results substantiate that coping serves as a critical compensatory mechanism mitigating stress-related impairment.

Table 4: Multiple Regression Predicting Mental Health (GHQ-12) (N = 250)

Predictor	B	t	p	95% CI [LL, UL]
Academic Stress	-0.26	-3.87	< .001	[-0.39, -0.13]
Coping Mechanisms	0.30	4.15	< .001	[0.16, 0.42]
Sleep Quality	0.08	1.09	.277	[-0.07, 0.22]

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Model Summary: $R^2 = .31$ [95% CI 0.24-0.38]; $F(3, 246) = 30.64$, $p < .001$; Cohen's $f^2 = 0.45$ (large).

These results affirm the CE-TMSC proposition that psychological outcomes reflect the dynamic balance between stress appraisal and coping resources, while physiological strain exerts contextually mediated effects.

Mediation and Moderation Analyses

Coping was tested as both a mediator and moderator within the CE-TMSC framework using Hayes' PROCESS macro (v4.3). Mediation: Academic stress significantly predicted coping ($\beta = -.24$, $p < .001$), and coping, in turn, predicted mental health ($\beta = .31$, $p < .001$). The indirect effect ($\beta = -.07$, 95% CI -.12, -.03]) indicated partial mediation, suggesting that coping accounts for part of the negative influence of stress on mental health.

Moderation: The interaction between stress and coping was significant ($\beta = .11$, $p = .018$), showing that students with stronger coping skills experienced attenuated effects of stress on mental health. Coping did not moderate the sleep-mental health relationship ($\beta = .05$, $p = .24$), underscoring that sleep quality operates through institutional, rather than individual mechanisms.

Table 5: Summary of Hypotheses and Theoretical-Practical Implications

Hypothesis	**Statistical Evidence**	**CE-TMSC Construct**	**Practical Implication**
H_1: Academic stress → ↓ Mental health	$\beta = -0.26$, $p < .001$	Recursive Exposure	Chronic stress diminishes empathy and attentiveness in care.
H_2: Coping → ↑ Mental health	$\beta = 0.30$, $p < .001$	Collective Coping	Peer collaboration and shared reflection strengthen resilience.
H_3: Sleep quality → ↑ Mental health	$\beta = 0.08$, $p = .277$ (ns)	Institutional Helplessness	Sleep deprivation reflects systemic neglect, undermining recovery.

Note. β = Standardized regression coefficient; ns = non-significant.

Qualitative Findings

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Table 6. Participant Characteristics and Sampling Variation

Participant ID	Age (years)	Gender	Academic Level	Program of Study
1	18	F	100-level	BSc Nursing
2	19	M	100-level	BSc Nursing
3	20	F	200-level	BSc Nursing
4	21	M	200-level	BSc Nursing
5	22	F	300-level	BSc Nursing
6	23	F	300-level	BSc Nursing
7	24	M	400-level	BSc Nursing
8	25	F	400-level	BSc Nursing
9	21	F	200-level	BSc Nursing
10	19	M	100-level	BSc Nursing
11	22	M	300-level	BSc Nursing
12	23	F	300-level	BSc Nursing
13	20	F	200-level	BSc Nursing
14	24	M	400-level	BSc Nursing
15	21	F	200-level	BSc Nursing

Directed and Emergent Themes

Table 7: Directed Qualitative Content Analysis of Student Nurses' Experiences (N = 15)

Theme Type	**Main Themes**	**Subtheme/ Subcategory**	**Frequency (n)**	**Participants %**	**Illustrative Quote (Participant ID)**
Deductive	Primary Appraisal	Perceived Threat	14	93%	"I always feel the exams and clinical tasks are more than I can handle."(P3)
Deductive	Secondary Appraisal	Individual Coping Strategies	11	73%	"I try to make study schedules and pray for strength; sometimes

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					it works." (P7)
Deductive	Outcome	Emotional Response	13	87%	"I get anxious and exhausted; sometimes I feel I can't continue." (P1)
Inductive	Recursive Exposure	Repeated Semester Pressure	12	80%	"Every semester feels like we are repeating the same pressures without relief." (P5)
Inductive	Collective Coping	Peer Support	10	67%	"Sharing jokes, studying together, and praying with my friends really helps." (P9)
Inductive	Institutional Helplessness	Administrative/Structural Barriers	9	60%	"Timetables are tight, and no one seems to care about how tired we are." (P12)

Note. Deductive codes align with TMSC domains; inductive codes emerge from data. Coding reliability: Cohen's $\kappa = .78$ (substantial agreement).

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Integration of Quantitative and Qualitative Findings

Triangulation of the quantitative and qualitative strands demonstrated strong conceptual convergence. The inverse relationship between stress and mental health reflected recursive exposure, as repeated academic and clinical strain accumulated over time. The positive role of coping corresponded with collective coping, in which peer, humor, and faith-based practices transformed stress into social resilience. The non-significant statistical role of sleep paralleled

narratives of institutional helplessness, revealing structural constraints that limit recovery despite individual effort.

Table 8: Integrated Joint Display of Quantitative and Qualitative Findings

(N = 250 quantitative; N = 15 qualitative)

Analytical Focus	**Quantitative Result**	**Qualitative Corroboration**	**Integration & Convergence Status**
Academic stress → Mental health	β = –0.26, t = –3.87, p < .001; r = –.28**	"Every semester feels like we are repeating the same pressures without relief." (P5)	Convergent: Recursive exposure validates quantitative pattern.
Coping → Mental health	β = 0.30, t = 4.15, p < .001; r = .34**	"Sharing jokes, studying together, and praying with my friends really helps." (P9)	Convergent: Collective coping mirrors statistical buffering.
Sleep quality → Mental health	β = 0.08, t = 1.09, p = .277 (ns)	"Timetables are tight, and no one seems to care how tired we are." (12)	Partial divergence: non-significant quantitatively, yet thematically salient.
Integrated model outcome	R^2 = .31; F(3, 246) = 30.64; p < .001; f^2 = 0.45	Cross-case synthesis: recursive exposure, collective coping, institutional helplessness	Overall convergence: CE-TMSC validated across strands.

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Synthesis and Theoretical Validation

The integrated findings reaffirm the central principle of the TMSC, that stress outcomes are co-determined by appraisal and coping, while extending it through the CE-TMSC, which embeds these processes in social and institutional contexts.

Recursive Exposure captures the cyclical reactivation of stress across semesters, illustrating cumulative strain. Collective Coping reframes resilience as socially co-regulated, grounded in cultural and faith-based solidarity. Institutional Helplessness exposes systemic rigidity that impedes recovery and perpetuates fatigue. Together, these constructs empirically demonstrate that academic stress adaptation among Nigerian nursing students is both personal and collective, situated within fragile institutional ecologies. The CE-TMSC thus advances the theoretical reach of the original TMSC by linking micro-level cognitive processes to macro-level structural realities, illuminating how resilience, empathy, and well-being evolve under recursive and constrained conditions (Figure 1).

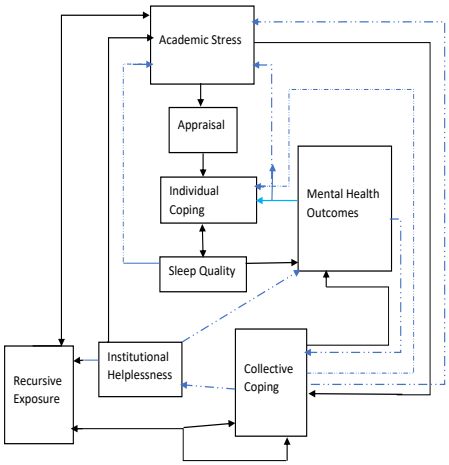


Figure 1: Contextually Expanded Transactional Model of Stress and Coping (CE-TMSC) Linking Individual Appraisal, Collective Coping, and Institutional Constraints

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Discussion

Academic Stress and Psychological Functioning

Consistent with global evidence (Labrague et al., 2020), this study reaffirms that academic stress is a powerful determinant of psychological distress among nursing students. The inverse association between academic stress and mental health emphasizes the cumulative toll of balancing theoretical coursework, clinical responsibilities, and emotional labor. Within the CE-TMSC framework, this pattern is encapsulated by recursive exposure, the cyclical reactivation of stress across semesters without sufficient institutional or emotional recovery (Figure 1). This conceptualization transcends traditional transactional models that treat stress as episodic, reframing it as a chronic, compounding process characteristic of low-resource nursing education. This theoretical depth strengthens understanding of burnout and compassion fatigue in African nursing contexts, where systemic overload and limited psychosocial support exacerbate vulnerability (Belay et al., 2024; Eze et al., 2022).

Coping as Mediator and Moderator of Well-Being

The dual mediating and moderating roles of coping underscore its pivotal influence on student mental health. Quantitative findings demonstrated that coping both explained and buffered the relationship between stress and well-being, while qualitative narratives illuminated coping as a shared social process rather than an isolated psychological act. Students described faith-based practices, humor, group study, and emotional reciprocity as key strategies transforming isolation into solidarity. This collective coping aligns with research emphasizing interdependence and communal emotion regulation as the basis of resilience in collectivist cultures (Thoits, 2011; Mosanya, 2020). Accordingly, the CE-TMSC advances Lazarus and Folkman's (1984) model by reconceptualizing coping as a relational and culturally mediated process embedded within peer, familial, and spiritual networks (Figure 1).

Sleep Quality

Although sleep quality did not emerge as a significant quantitative predictor, qualitative data revealed its profound physiological and symbolic relevance. Students described chronic fatigue, poor sleep, and cognitive exhaustion as manifestations of institutional helplessness, a structural condition shaped by rigid timetables, inadequate facilities, and limited administrative empathy. This interpretation does not imply causal influence but reflects the contextual meaning of sleep deprivation within institutional constraints. This aligns with meta-analytic findings linking organizational strain to disrupted sleep and psychological fatigue (Gardani et al., 2022). Within the CE-TMSC (Figure 1), sleep operates as an embodied indicator of systemic dysfunction rather than a mere physiological variable.

Integration and Theoretical Advancement

The integration of both strands of data consolidates the CE-TMSC as an evolved form of the classical TMSC. While the original model emphasized individual appraisal and coping, the CE-TMSC (Figure 1) incorporates three interdependent constructs: exposure, collective coping, and institutional helplessness, which together connect psychological, social, and institutional dimensions of adaptation. This tripartite model resonates with ecological perspectives on human development (Bronfenbrenner, 1994; Chen et al., 2023), positioning stress adaptation as a systemically embedded process. Beyond integrating prior frameworks such as the Job Demands-Resources (JD-R), Conservation of Resources theory (COR), and Self-Determination Theory (SDT), the CE-TMSC contributes original conceptual value by explaining how structural fragility and cultural collectivism jointly moderate coping trajectories, a synthesis rarely articulated in stress theory. Thus, it provides a more inclusive and globally adaptable paradigm for understanding stress in professional education.

Comparative and Cross-Cultural Insights

Findings parallel global research on academic stress in nursing education (Labrague et al., 2020) but diverge by revealing culturally specific mediators. While Western frameworks often emphasize self-efficacy and problem-focused coping (Carver, 1997; Folkman & Moskowitz, 2004), Nigerian students drew strength from communal and faith-based strategies, reflecting African epistemologies of shared resilience. The emergence of institutional helplessness as a determinant of distress further distinguishes this context, highlighting how systemic rigidity erodes adaptive capacity. These insights affirm the necessity of embedding coping theory within sociocultural and institutional realities that shape both the perception of stress and the availability of coping resources.

Theoretical and Practical Implications

The CE-TMSC redefines stress adaptation as an interplay between personal agency, collective support, and institutional structure. Recursive exposure parallels cumulative stress theories, illustrating how unresolved strain compounds vulnerability. Collective coping aligns with COR (Hobfoll, 1989) and SDT (Ryan & Deci, 2000), demonstrating the restorative power of belonging and relatedness. Institutional helplessness extends the JD-R (Demerouti et al., 2001; Bakker &

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Demerouti, 2017), revealing how systemic fragility diminishes recovery and resilience. Together, these constructs articulate a more ecologically valid theory of adaptation in professional education.

Practically, the findings call for an institutional re-orientation of nursing education: academic timetables should incorporate scheduled recovery periods, structured mindfulness and resilience training, and dedicated post-clinical debriefing sessions (Veigh et al 2021; Aryuwat et al., 2023. Franco-Tantuico & Btoush 2025). Peer mentorship and reflective circles should be formalized to institutionalize collective coping as a core pedagogical resource. Administrative reforms promoting flexible scheduling, rest infrastructure, and confidential counseling are vital to dismantle institutional helplessness. Faculty and supervisors should be trained to identify early distress and foster psychological safety. Collectively, these interventions embed mental health as central to academic excellence and professional readiness, aligning Nigerian nursing education with international well-being standards (WHO, 2021; ICN, 2022).

Limitations and Future Directions

Although the concurrent mixed-methods design strengthened triangulation, its cross-sectional nature limits causal inference. Longitudinal studies are needed to trace the evolution of recursive exposure and coping trajectories across academic years. Comparative research across public and private nursing schools would illuminate institutional variations in coping resources and well-being. Future studies should employ structural equation modeling to empirically validate the CE-TMSC and incorporate physiological indicators, such as cortisol levels, actigraphy, and heart-rate variability, to strengthen its biopsychosocial grounding. Moreover, gender- and culture-sensitive research is needed to explore how faith, family, and social norms influence coping repertoires within collectivist settings, thereby extending the CE-TMSC's global relevance.

Conclusion

Academic stress among Nigerian nursing students is not a transient or purely personal phenomenon but a structurally sustained condition rooted in recursive academic cycles, collective coping dynamics, and institutional fragility. The CE-TMSC captures this complexity by linking cognitive appraisal with cultural interdependence and systemic constraint. It reframes coping as a shared, context-sensitive process and elevates institutional empathy as a determinant of both mental health and professional competence. Institutions that cultivate rest, solidarity, and psychological safety not only protect student well-being but also nurture the empathy and judgment essential for patient-centered care. By aligning personal resilience with institutional responsibility, the CE-TMSC transforms the discourse on nursing education from one of endurance to one of empowerment. Beyond Nigeria, it offers a transferable framework for rehumanizing health-professional education across the Global South, where stress, culture, and structure converge to shape both learning and life. The CE-TMSC thus stands as both a theoretical innovation and an ethical imperative: to recognize student well-being as the moral foundation of the nursing profession.

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Ethical Considerations

Compliance with ethical guidelines

Ethical approval was granted by the University of Ilorin Psychology Department Ethics Committee (Protocol No. UIL/PSYREC/025/062; approved 3 March 2025). Participation was voluntary and based on written informed consent. Confidentiality and anonymity were assured, and participants retained the right to withdraw without penalty. Provisions were made for students who might experience distress at the university counselling unit, and no participant reported distress during data collection. All data were encrypted and stored securely with a five-year plan at the departmental laboratory unit of the psychology department, consistent with the World Medical Association's Declaration of Helsinki (2013).

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Authors' Contributions

Alliu, Sadiat Iyabode conceived and designed the study, led data collection, conducted the quantitative and qualitative analyses, and drafted the manuscript. Stephen Ishola Babatunde, Odey Praise Akpe-Taiye, and Agesin Bamikole Emmanuel contributed to methodological refinement, data interpretation, and critical review of the analytic framework. Orji L.C. and Folake Soremi Adedeji contributed to the interpretation of findings, theoretical integration, and critical revision of the manuscript for intellectual content. All authors reviewed and approved the final version of the manuscript and have agreed to be accountable for all aspects of the work.

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Conflict of Interest

The authors declare that there are no conflicts of interest.

Accepted Manuscript (Uncorrected Proof)

References

Abubakar, M. S., Ibrahim, H. U., & Aliyu, I. (2024). Assessment of sleep quality among nursing students on clinical posting in a tertiary health facility in North-Western Nigeria. *Nigerian Journal of Basic and Clinical Sciences, 21*(1), 79-83. https://doi.org/10.4103/njbcs.njbcs_77_23

Aderinto, N., Olatunji, G., Afolabi, S., Muili, A., Olaniyi, P., Edun, M., & Olakanmi, D. (2024, March 22). Sleep patterns and quality among Nigerian medical students: A cross-sectional study. *Medicine (Baltimore), 103*(12), e37556. https://doi.org/10.1097/MD.0000000000037556

Agu, I. S., Ogbonnaya, N. P., Nwankwo, N. I., Chinwuba, A. U., & Ihudiebube, S. C. (2024). Parental involvement moderates the relationship between stress, peer influence, and academic performance among nursing students in Imo State. *African Journal of Biomedical Research, 27*(4S), 4414-4425. https://doi.org/10.53555/AJBR.v27i4S.1400

Aloba, O. O., Adewuya, A. O., Ola, B. A., & Mapayi, B. M. (2007). Validity of the Pittsburgh Sleep Quality Index (PSQI) among Nigerian university students. *Sleep Medicine, 8*(3), 266-270. https://doi.org/10.1016/j.sleep.2006.08.003

Aryuwat, P., Asp, M., Lövenmark, A., Radabutr, M., & Holmgren, J. (2023). An integrative review of resilience among nursing students in the context of nursing education. *Nursing Open, 10*(5), 2793–2818. https://doi.org/10.1002/nop2.1559

Bakker, A. B., & Demerouti, E. (2017). Job demands–resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273–285. https://doi.org/10.1037/ocp0000056

Belay, A. E., Tegegne, E. T., Shitu, A. K., Belay, K. E., & Belayneh, A. G. (2024). Satisfaction towards clinical learning environment and its associated factors among undergraduate nursing students at public universities in Northwest Ethiopia, 2022: A multi-centre cross-sectional study. *International Journal of Africa Nursing Sciences, 20.* https://doi.org/10.1016/j.ijans.2024.100666

Benjamin, L. S., Pasay-An, E., Pangket, P., Alqarni, A. S., Gonzales, F., Sacgaca, L., Mahmoud, D. A., Mohsen, M. M., Ali Hamdi, Y. S., & Shanmugam, S. R. (2024, March 21). Impact of sleep and psychological well-being on the academic and clinical performance of nursing students in Saudi Arabia. *Psychology Research and Behavior Management, 17*, 1355–1364. https://doi.org/10.2147/PRBM.S453685

Bousgheiri, F., Allouch, A., Sammoud, K., Navarro-Martínez, R., Ibáñez-Del Valle, V., Senhaji, M., Cauli, O., El Mlili, N., & Najdi, A. (2024, May 5). Factors affecting sleep quality among university medical and nursing students: A study in two countries in the Mediterranean region. *Diseases, 12*(5), 89. https://doi.org/10.3390/diseases12050089

Accepted Manuscript (Uncorrected Proof)

Bronfenbrenner, U. (1994). Ecological models of human development. *Readings on the Development of Children, 2*(1), 37–43. https://docs.edtechhub.org/lib/P7AUMPEJ

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Carver, C. S. (1997). You want to measure coping but your protocol's too long? Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*(1), 92–100. https://doi.org/10.1207/s15327558ijbm0401_6

Chen, J., Zhang, X., & Xiaoxia Zhang. (2023). The impact of career calling on higher vocational nursing students' learning engagement: The mediating roles of career adaptability and career commitment. *Frontiers in Psychology, 14,* 1111842. https://doi.org/10.3389/fpsyg.2023.1111842

Chigbu, E. F., Ekejiuba, A. O. P., Nnadi, G. C., Ahaneku, I. C., & Okpala, M. C. (2024). Coping strategies as correlates of socio-political and economic uncertainty in tertiary institutions in South East Nigeria. *Multidisciplinary Journal of Current Research and Review, 7*(2), 1-10. https://aspjournals.org/Journals/index.php/mjcrr/article/view/628

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement, 20*(1), 37–46. https://doi.org/10.1177/001316446002000104

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16,* 297–334. https://doi.org/10.1007/BF02310555

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Dogham, R. S., Ali, H. F. M., Ghaly, A. S., *et al.* (2024). Deciphering the influence: Academic stress and its role in shaping learning approaches among nursing students: A cross-sectional study. *BMC Nursing, 23,* 249. https://doi.org/10.1186/s12912-024-01885-1

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129–136. https://doi.org/10.1126/science.847460

Accepted Manuscript (Uncorrected Proof)

Eze, P., Lawani, L. O., Agu, U. J., Amara, L. U., Okorie, C. A., & Acharya, Y. (2022). Factors associated with catastrophic health expenditure in sub-Saharan Africa: A systematic review. *PLoS ONE, 17*(10), e0276266. https://doi.org/10.1371/journal.pone.0276266

Faul, F., Erdfelder, E., Buchner, A. *et al.* (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods* 41, 1149-1160 https:/doi.org/10.3758/BRM.41.4.1149

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed-methods designs, Principles and practices. *Health Services Research, 48*(6 Pt 2), 2134-2156. https://doi.org/10.1111/1475-6773.12117

Feyzbabaie, M., Rajai, N., Alizadeh, A., *et al.* (2025). Psychological distress among nursing students during the COVID-19 pandemic: A hybrid concept analysis. *BMC Psychology, 13*, 218. https://doi.org/10.1186/s40359-025-02562-x

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*, 745–774. https://doi.org/10.1146/annurev.psych.55.090902.141456

Francis-Edoziuno, C., Abiona, M., & Odetola, T. (2024). Stressors and coping measures among undergraduate nursing students in Western Nigeria. *Pan Africa Science Journal, 4*(2). https://doi.org/10.47787/pasj.v4i02.74

Franco-Tantuico, M. A., & Btoush, R. (2025). Simulation debriefing in graduate nursing education: A literature review. *Nursing Education Perspectives, 46*(5), 278–283. https://doi.org/10.1097/01.NEP.0000000000001434

Gardani, M., Bradford, D. R. R., Russell, K., Allan, S., Beattie, L., Ellis, J. G., & Akram, U. (2022). A systematic review and meta-analysis of poor sleep, insomnia symptoms, and stress in undergraduate students. *Sleep Medicine Reviews, 61*, 101565. https://doi.org/10.1016/j.smrv.2021.101565

Goldberg, D. P., & Williams, P. (1988). *A user's guide to the General Health Questionnaire.* NFER-Nelson.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods, 18*(1), 59–82. https://doi.org/10.1177/1525822X05279903

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

Accepted Manuscript (Uncorrected Proof)

Ibrahim, F. M., Salmi, R. N., Saif, M. A., & Mohammed, A. (2024, August 16). Sleep disorders' prevalence and impact on academic performance among undergraduate nursing students in a selected university, United Arab Emirates. *SAGE Open Nursing, 10*, 23779608241274229. https://doi.org/10.1177/23779608241274229

International Council of Nurses. (2022). *The global mental health nursing workforce: Time to prioritize and invest in mental health and well-being.* https://www.icn.ch/resources/publications-and-reports/global-mental-health-nursing-workforce

Kohn, J. P., & Frazer, G. H. (1986). An academic stress scale: Identification and rated importance of academic stressors. *Psychological Reports, 59*(2), 415–426. https://doi.org/10.2466/pr0.1986.59.2.415

Labrague, L. J. (2024, February 5). Umbrella review: Stress levels, sources of stress, and coping mechanisms among student nurses. *Nursing Reports, 14*(1), 362–375. https://doi.org/10.3390/nursrep14010028

Labrague, L. J., & De los Santos, J. A. A. (2020). COVID-19 anxiety among front-line nurses: Predictive role of personal resilience, social support, and organizational support. *Journal of Nursing Management.* https://doi.org/10.1111/jonm.13121

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*(1), 159–174. https://doi.org/10.2307/2529310

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* Springer.

Lazarus, R. S., & Folkman, S. (2020). Stress: Appraisal and coping. In M. Gellman (Ed.), *Encyclopedia of Behavioral Medicine* (2nd ed.). Springer. https://api.semanticscholar.org/CorpusID:142905864

Levy, P. S., & Lemeshow, S. (2008). *Sampling of populations: Methods and applications* (4th ed.). Wiley.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Sage Publications, Inc.

Makanjuola, V. A., Onyeama, M., Nuhu, F. T., Kola, L., & Gureje, O. (2014). Validation of short screening tools for common mental disorders in Nigerian general practices. General Hospital Psychiatry, 36(3), 325–329. https://doi.org/10.1016/j.genhosppsych.2013.12.010

Maslach, C., & Leiter, M. P. (2022). *The burnout challenge: Managing people's relationships with their jobs.* Harvard University Press.

Medic, G., Wille, M., & Hemels, M. (2017). Short- and long-term health consequences of sleep disruption. *Nature and Science of Sleep, 9*, 151–161. https://doi.org/10.2147/NSS.S134864

Accepted Manuscript (Uncorrected Proof)

Mohamed, N. A., Ali, S. O., Ehrahim, E. E. E., Ahmed, A. L., & Wahba, A. M. (2024). Predictors of academic and clinical stress among nursing students. *SAGE Open Nursing, 10*, 23779608241290392. https://doi.org/10.1177/23779608241290392

Mohamed, R. A., et al. (2024). Exploring the potential impact of applying a web-based training program on nurses' knowledge, skills, and attitudes regarding evidence-based practice: A quasi-experimental study. *PLoS ONE*, *19*(2), e0299864. https://doi.org/10.1371/journal.pone.0299864

Mosanya, M. (2021). Buffering academic stress during the COVID-19 pandemic related social isolation: Grit and growth mindset as protective factors against the impact of loneliness. *International Journal of Applied Positive Psychology*, *6*, 159–174. https://doi.org/10.1007/s41042-020-00043-7

Nakie, G., Takelle, G. M., Rtbey, G., Andualem, F., Tinsae, T., Kassa, M. A., Tadesse, G., Fentahun, S., Wassie, Y. A., Segon, T., Kibralew, G., & Melkam, M. (2024, March 11). Sleep quality and associated factors among university students in Africa: A systematic review and meta-analysis study. *Frontiers in Psychiatry, 15*, 1370757. https://doi.org/10.3389/fpsyt.2024.1370757

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence-Based Nursing, 18*(2), 34–35. https://doi.org/10.1136/eb-2015-102054

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods, 16*, 1–13. https://doi.org/10.1177/16094069177338

Ogunsola, Jamiu & Ogundokun, Moses. (2017). Development and validation of the academic stress scale among undergraduates in Nigeria. IFE PsychologIA. 25. 1-20. https://doi.org/10.10520/EJC-b278037c7

Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of Affective Disorders, 148*(1), 1-11. https://doi.org/10.1016/j.jad.2012.11.026

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Sánchez-López, M. P., & Dresch, V. (2008). *The 12-Item General Health Questionnaire (GHQ-12): Reliability, external validity and factor structure in the Spanish population.* Psicothema, 20(4), 839–843

Schmickler, J. M., Blaschke, S., Robbins, R., & Mess, F. (2023, January 23). Determinants of sleep quality: A cross-sectional study in university students. *International Journal of*

Accepted Manuscript (Uncorrected Proof)

Environmental Research and Public Health, 20(3), 2019. https://doi.org/10.3390/ijerph20032019

Serafin, L. I., Fukowska, M., Zyskowska, D., Olechowska, J., & Czarkowska-Pączek, B. (2021, December 2). Impact of stress and coping strategies on insomnia among Polish novice nurses who are employed in their field while continuing their education: A cross-sectional study. *BMJ Open, 11*(12), e049787. https://doi.org/10.1136/bmjopen-2021-049787

Tamuno-Opubo, A. T., Idehen, E. E., & Aborisade, T. E. (2025). The Brief Cope Inventory Short Scale for persons living with hypertension: A Nigerian study of validity and reliability. *Nigerian Journal of Clinical Psychology*, *15*(1), 22–43. https://doi.org/10.5281/zenodo.15814584

Theron, L., Ungar, M., & Holtge, J. (2022). Pathways of resilience: Predicting school engagement trajectories for South African adolescents living in a stressed environment. *Contemporary Educational Psychology, 69*, 102062. https://doi.org/10.1016/j.cedpsych.2022.102062

Theron, L., Ungar, M., & Höltge, J. (2023). Multisystemic approaches to resilience. *Development and Psychopathology.* https://doi.org/10.1017/S0954579423000469

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior, 52*(2), 145–161. https://doi.org/10.1177/0022146510395592

Van Laethem, M., Beckers, D. G. J., Kompier, M. A. J., Kecklund, G., van den Bossche, S. N. J., & Geurts, S. A. E. (2015). Bidirectional relations between work-related stress, sleep quality and perseverative cognition. Journal of Psychosomatic Research, 79(5), 391–398. https://doi.org/10.1016/j.jpsychores.2015.08.011

Veigh, C. M., Reid, J., Carswell, C., Ace, L., Walsh, I., Graham-Wisener, L., Rej, S., Potes, A., Atkinson, K., Edginton, T., & Noble, H. (2021, December 20). Mindfulness as a well-being initiative for future nurses: A survey with undergraduate nursing students. *BMC Nursing*, *20*(1), 253. https://doi.org/10.1186/s12912-021-00783-0

World Health Organization. (2021). *Global strategic directions for nursing and midwifery 2021–2025.* https://creativecommons.org/licenses/by-nc-sa/3.0/igo

World Health Organization. (2020). *State of the world's nursing 2020: Investing in education, jobs and leadership.* https://iris.who.int/handle/10665/331677

Accepted Manuscript (Uncorrected Proof)

World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. JAMA, 310(20), 2191–2194. https://doi.org/10.1001/jama.2013.281053

Wu, Y., Guo, J., Liu, Q., Liu, J., Yu, T., Shen, Z., & Pan, X. (2024, November 5). Stress mindset and nurses' sleep quality: Mediating effects of stress overload and anxiety. *BMC Nursing, 23*(1), 805. https://doi.org/10.1186/s12912-024-02474-y

Yerkes, R. M., & Dodson, J. D. (1908). The relation of the strength of stimulus to the rapidity of habit-formation. *Journal of Comparative Neurology and Psychology, 18*, 459482. https://doi.org/10.1002/cne.920180503

Yin, M., Li, W., Yang, Q., Yue, Y., Fang, X., Yang, Z., … & Du, X. (2022). The mediating role of coping style in the relationship between sleep quality and burnout: A cross-sectional study among psychiatric nurses. *Frontiers in Psychiatry*, *13*, 926040. https://doi.org/10.3389/fpsyt.2022.926040

Zhou, H. (2025). Relationship between empathy and burnout as well as potential affecting and mediating factors from the perspective of clinical nurses: A systematic review. *BMC Nursing, 24*, 38. https://doi.org/10.1186/s12912-025-02701-0

Zhou, Y., Wang, S., Liu, M., Gan, G., Qin, N., Luo, X., … & Cheng, A. S. (2023). The role of sleep quality and perceived stress on depressive symptoms among tertiary hospital nurses: A cross-sectional study. *BMC Psychiatry*, *23*(1), 416.

Zhu, Y., Meng, R., Jiang, C., Yang, N., Huang, M., Wang, X., Zou, W., Lou, C., Xiao, R., Lu, J., Xu, J., Jiménez-Correa, U., Ma, H., Spruyt, K., & Dzierzewski, J. M. (2023, December 11). Sleep quality and subjective well-being in healthcare students: Examining the role of anxiety and depression. *Frontiers in Public Health*, *11*, 1281571. https://doi.org/10.3389/fpubh.2023.1281571

Accepted Manuscript (Uncorrected Proof)