

Stress Factors and Their Association with Mental Health Problems Among Public Health Students in Makassar: A Cross-Sectional Path Analysis Study

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ARTICLE INFO	ABSTRACT
Manuscript Received: 23 Oct, 2025 Revised: 23 Apr, 2026 Accepted: 25 Jun, 2026 Date of Publication: 16 Jul, 2026 Volume: 9 Issue: 7 DOI: 10.56338/mppki.v9i7.8964	Introduction: Student mental health remains a major concern in higher education, particularly among final-year students who face increasing academic and personal pressures. This study aimed to examine the role of stress as a mediator between personal and family factors and mental health among public health students in Makassar. Methods: A cross-sectional study was conducted involving 279 final-year students. Data were analyzed using path analysis to evaluate direct and indirect relationships among variables. Results: The findings indicate that personal factors significantly increased stress across all educational levels, while family factors were significant primarily among undergraduate students. Stress demonstrated a consistent and increasingly strong negative effect on mental health from undergraduate to doctoral levels ($\beta = -0.532$ to -0.709). Personal factors influenced mental health mainly through stress mediation, whereas the role of family support diminished at higher academic levels. These results highlight a developmental shift in mental health determinants from external support toward internal coping demands as academic level increases. Conclusion: The study underscores the importance of level-specific mental health strategies focusing on family support for undergraduates and stress management interventions for postgraduate students.
KEYWORDS	
Mental Health; Student Stress; Family Support; Path Analysis	
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INTRODUCTION

University life represents a critical transitional stage in which students must adapt to academic pressures, social expectations, and identity formation, all of which may challenge their mental well-being. Numerous studies across regions have demonstrated that university students are particularly vulnerable to psychological distress. A systematic review in Southeast Asia found median prevalence rates of 29.4% for depression, 42.4% for anxiety, and 16.4% for stress, highlighting the significance of mental health problems in higher education (1). Similarly, Zhao, Ahmed, Faraz, and Ma (2020) observed that family functioning, perceived social support, and coping styles are critical determinants of students' psychological adjustment in Chinese universities (2).

In Indonesia, similar patterns have been observed, particularly among students in medical and health-related programs who face intense academic demands and high-performance expectations. Putra, Siregar, and Harahap (2022) found that heavy workload, academic burnout, and sleep disturbances were significantly associated with anxiety and depressive symptoms among medical students (3). These findings suggest that stress has become a pervasive feature of the academic environment, with potentially serious implications for students' mental health, academic functioning, and long-term professional development.

Stress among university students arises from multiple interacting sources, including academic workload, financial strain, interpersonal relationships, uncertainty about future careers, and limited coping capacity. Although many students experience temporary stress, prolonged exposure without adequate coping resources may lead to more severe psychological conditions such as anxiety, depression, and emotional exhaustion. This risk is particularly pronounced among final-year students who must complete demanding academic tasks, such as theses or research projects, while simultaneously preparing for transition into professional life.

To provide a conceptual foundation for this study, the relationships among personal factors, family influences, perceived stress, and mental health are grounded in established psychosocial theories of stress and coping. According to the transactional model of stress and coping proposed by Lazarus and Folkman, stress emerges from individuals' cognitive appraisal of environmental demands relative to their perceived coping resources (4). In academic settings, students who perceive personal or academic challenges as exceeding their coping capacity are more likely to experience heightened stress, which may in turn contribute to psychological distress. Furthermore, the stress-buffering hypothesis posits that social support, particularly from family, can mitigate the negative effects of stress by enhancing coping and adaptive cognitive appraisal. However, as students progress to higher levels of education and gain greater autonomy, reliance on family support may decrease, while personal coping capacities become more central to psychological adjustment. Based on these perspectives, stress is conceptualized in this study as a mediating mechanism through which personal and family factors influence mental health outcomes.

Despite extensive research on student stress and mental health, most studies have examined these constructs in isolation. Few have explored how stress-inducing factors, perceived stress, and mental health outcomes are structurally interconnected within a single analytical framework, particularly across different levels of higher education. This gap limits our understanding of how psychosocial influences operate differently among undergraduate, master's, and doctoral students.

This study aims to analyze the factors influencing mental health among university students through the mediating role of stress. Specifically, it seeks to examine the relationship among stress-inducing factors (academic, personal, and family), levels of stress, and indicators of mental health among final year students. Identify the direct and indirect effects of these stress-related factors on students' mental health using path analysis, and explore how these relationships differ across educational levels (undergraduate, master's, and doctoral programs). The findings are expected to provide empirical evidence to inform the development of targeted mental health promotion strategies that address stressors specific to different stages of higher education.

METHODS

This research employed a cross-sectional design, conducted at a single point in time to examine the relationships among variables without any intervention from the researchers. This design was selected because it allows for the identification of both direct and indirect effects among variables within the population at the time of data collection. The cross-sectional approach also enables the exploration of causal pathways in a non-experimental setting, providing an analytical snapshot of the relationships within the study model.

Stress-related personal factors were measured by assessing time management difficulties, learning motivation, and interpersonal problems with peers, representing psychosocial stressors. Family factors were operationalized using perceived family support items. Stress level was assessed as perceived stress categorized into mild, moderate, and severe levels. Mental health problems were measured using a screening-based indicator of psychological distress. Item validity was evaluated using item-total correlation analysis, with all items demonstrating correlation coefficients exceeding the critical value ($r > 0.333$), indicating satisfactory construct validity. Scale reliability was assessed using Cronbach's alpha, and all constructs showed alpha coefficients above 0.60, which is considered acceptable for social and behavioral research. These results confirm that the measurement instruments used in this study were sufficiently valid and reliable for subsequent path analysis.

Because path analysis is a special case of Structural Equation Modeling (SEM) involving only observed variables, SEM-based sample size conventions were used to justify the adequacy of the sample. Following Hair et al. (2019), a minimum of 5-10 observations per estimated parameter is recommended (5). The structural model in this study included four regression paths and four variance parameters (total = 8 free parameters), indicating a minimum requirement of 40-80 cases. The final sample of 279 respondents substantially exceeded this threshold, confirming that the data had sufficient statistical power for reliable path model estimation.

This study population comprised all students who met the inclusion criteria within the designated research area. Inclusion criteria included being enrolled as an active student in the Faculty of Public Health and completing final-year academic requirements. Respondents were selected to represent different academic levels (undergraduate, master's, and doctoral programs) to capture variations in stress and mental health indicators across educational stages. Participants were selected using a proportional random sampling technique, in which respondents were randomly drawn based on the proportional distribution of students within each study program or educational level. This technique was applied to minimize sampling bias and ensure balanced representation of each subpopulation according to its relative size. This final sample consisted of 279 students, determined using a proportionate allocation method based on the total student enrolment program.

Data Analysis

Path analysis was conducted using IBM SPSS version 27 and AMOS version 24. Model estimation was performed using the Maximum Likelihood (ML) method. Prior to model estimation, assumptions of multivariate normality, absence of multicollinearity, and linearity among variables were assessed and found to be acceptable. Model fit was evaluated using multiple goodness-of-fit indices, including the Chi-square statistic (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The model was considered to demonstrate acceptable fit when CFI and TLI values exceeded 0.90, RMSEA was below 0.08, and SRMR was below 0.08.

This study received ethical approval from the Research Ethics Committee of the Faculty of Public Health, Universitas Hasanuddin (Approval No: 1477/UN4.14.1/TP.01.02/2025). All procedures adhered to the ethical principles outlined in the Declaration of Helsinki. Prior to data collection, participants were provided with information regarding the study's purpose, procedures, and confidentiality. Written informed consent was obtained from all participants, and their participation was entirely voluntary. Anonymity and confidentiality of responses were strictly maintained throughout the study process.

RESULTS

The following section outlines the main findings derived from the analysis of data collected from final-year public health students. The results describe not only the general characteristics of the respondents but also the patterns of association among stress-inducing factors, perceived stress levels, and mental health outcomes. Through path analysis, the study provides insights into how individual, familial, and academic factors interact in shaping students' psychological well-being.

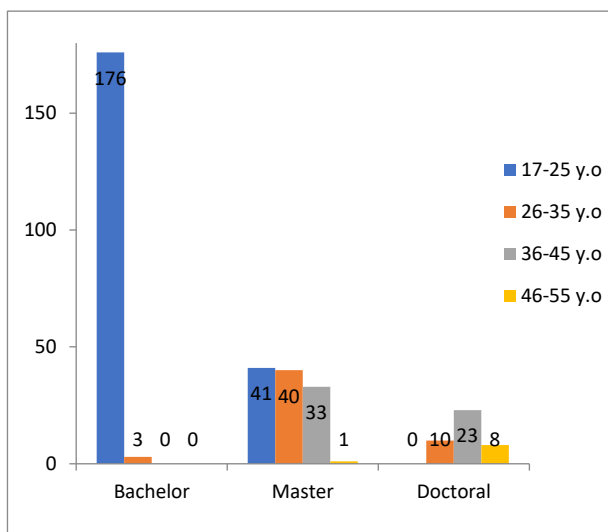
Characteristic Respondent

The respondents in this study were final-year students from the Faculty of Public Health. The number of participants was determined proportionally according to each level of education to ensure balanced representation

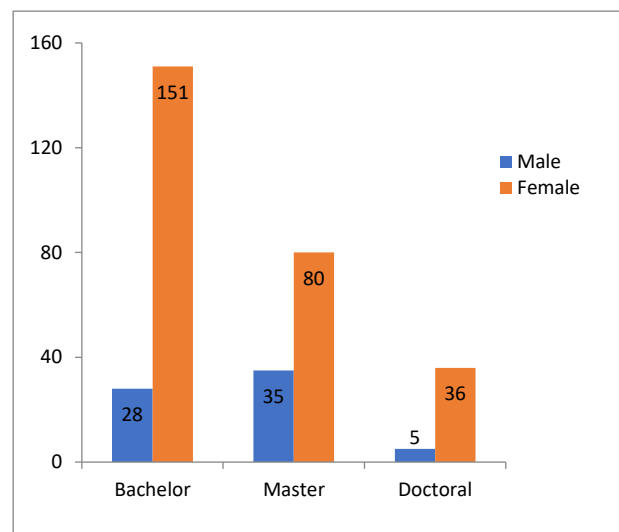
across academic strata. **Table 1** presents the demographic distribution of respondents by educational level and study program, providing an overview of the sample composition included in this analysis.

Table 1. Demographic Characteristic of Respondents by Education Level (N=279)

Variable	Category	Bachelor n (%)	Master n (%)	Doctoral n (%)
Age	17–25 years	176 (98.3)	41 (35.7)	0 (0.0)
	26–35 years	3 (1.7)	40 (34.8)	10 (24.4)
	36–45 years	0 (0.0)	33 (28.7)	23 (56.1)
	46–55 years	0 (0.0)	1 (0.9)	8 (19.5)
Sex	Male	28 (15.6)	35 (30.4)	5 (12.2)
	Female	151 (84.4)	80 (69.6)	36 (87.8)
Marital status	Not married	178 (99.4)	68 (59.1)	1 (2.4)
	Married	1 (0.6)	47 (40.9)	40 (97.6)
Employment	Unemployed	174 (97.2)	48 (41.7)	41 (100)
	Employed	5 (2.8)	67 (58.3)	0 (0.0)
Scholarship	Scholarship	31 (17.3)	20 (17.4)	29 (70.7)
	Non-scholarship	148 (82.7)	95 (82.6)	12 (29.3)



A



B

Table 1 presents the demographic distribution of respondents by educational level and study program. Among bachelor's degree students, the majority were in late adolescence (17–25 years old), female, unmarried, and not employed. Nearly all financed their studies independently, indicating that this group primarily consisted of undergraduate students who were still financially dependent on their families. Respondents enrolled in the master's degree program displayed a more balanced age distribution, ranging from late adolescence to early adulthood. While females remained the majority, a greater proportion were married and employed compared to those in the bachelor's group. Most of these students relied on personal or family funding for their education, with a smaller proportion supported by scholarships. Participants in the doctoral program were predominantly in the late adulthood age group (36–45 years). Most were female, married, and not currently employed. In contrast to the previous groups, the majority of doctoral students received scholarships as their main source of educational funding, reflecting the advanced academic level and institutional support associated with doctoral studies.

Overall, the data reveal a clear progression in demographic characteristics across academic levels: higher degrees are associated with older age, marital status, and a greater likelihood of receiving scholarships. This trend mirrors the academic and life trajectories of public health students, where postgraduate participants generally have more established personal and professional circumstances than undergraduate students.

Factors Influencing Mental Health

This section presents the results of the path analysis examining factors that influence mental health among public health students. The analysis aims to identify both direct and indirect effects of stress-related variables—such as academic pressure, social support, coping strategies, and self-efficacy—on mental health outcomes. By employing path analysis, this study provides a more comprehensive understanding of the structural relationships between variables rather than simple bivariate associations. The findings highlight which factors exert the strongest predictive power on mental health status, offering insights into potential intervention points to improve psychological well-being among students in higher education.

Table 2. Path Model of Personal and Family Factors, Stress, and Mental Health among Bachelor Students

Bachelor Student			Estimate	S.E.	C.R.	P	Label
Stres	<---	Personal	0,643	0,096	11,417	0,000	Direct
Stres	<---	Family	0,150	0,052	2,660	0,008	Direct
Mental	<---	Stres	-0,532	0,070	-7,234	0,000	Direct
Mental	<---	Personal	-0,146	0,118	-2,011	0,044	Direct
Mental	<---	Family	-0,163	0,050	-2,895	0,004	Direct
Mental <--- Stres <--- Personal			-0,342				Indirect
Mental <--- Stres <--- Family			-0,080				Indirect

The standardized path coefficients revealed that personal stress-related factors had a strong effect on stress level ($\beta = 0.643$), whereas family factors exerted only a small effect ($\beta = 0.150$). Stress level, in turn, showed a strong negative association with mental health status ($\beta = -0.532$), indicating that higher stress substantially increased the likelihood of mental health problems. Direct effects of personal ($\beta = -0.146$) and family factors ($\beta = -0.163$) on mental health were statistically significant but relatively small in magnitude, suggesting that their influence on mental health is primarily mediated through stress. This is supported by the indirect effect of personal factors via stress ($\beta = -0.342$), which was of moderate size, compared with the relatively weak indirect effect of family factors ($\beta = -0.080$). These findings indicate a partial mediation mechanism in which stress serves as the main pathway through which psychosocial stressors—particularly personal stressors such as time management, motivation, and peer-related problems—translate into mental health vulnerability among public health students.

Table 3. Path Model of Personal and Family Factors, Stress, and Mental Health among Master's Students

Master Student			Estimate	S.E.	C.R.	P	Label
Stres	<---	Personal	0,560	0,150	7,319	0,000	Direct
Stres	<---	Family	0,140	0,087	1,835	0,067	Direct
Mental	<---	Stres	-0,677	0,068	-8,139	0,000	Direct
Mental	<---	Personal	-0,017	0,132	-0,203	0,839	Direct
Mental	<---	Family	-0,008	0,065	-0,113	0,910	Direct
Mental <--- Stres <--- Personal			-0,379				Indirect
Mental <--- Stres <--- Family			-0,095				Indirect

Among master's students, personal stress-related factors exerted a strong positive effect on stress level ($\beta = 0.560$), while the effect of family factors was small and not statistically significant ($\beta = 0.140$, $p = 0.067$). Stress level demonstrated a strong negative association with mental health status ($\beta = -0.677$), indicating that stress is the dominant predictor of mental health problems in this group. Notably, the direct effects of personal ($\beta = -0.017$, $p = 0.839$) and family factors ($\beta = -0.008$, $p = 0.910$) on mental health were not significant. However, personal factors

showed a substantial indirect effect through stress ($\beta = -0.379$), indicating a full mediation mechanism in which personal stressors influence mental health entirely through increased stress levels.

Table 4. Path Model of Personal and Family Factors, Stress, and Mental Health among Doctoral Students

Doctoral Student			Estimate	S.E.	C.R.	P	Label
Stres	<---	Personal	0,496	0,289	3,722	0,000	Direct
Stres	<---	Family	0,214	0,179	1,605	0,108	Direct
Mental	<---	Stres	-0,709	0,079	-5,143	0,000	Direct
Mental	<---	Personal	0,122	0,168	0,904	0,366	Direct
Mental	<---	Family	-0,078	0,093	-0,651	0,515	Direct
Mental	<---	Stres	<---				Indirect
Mental	<---	Stres	<---				Indirect
Mental	<---	Personal	-0,351				Indirect
Mental	<---	Family	-0,151				Indirect

The results presented in Table 4 show that, among doctoral students, personal stress-related factors had a moderate to strong effect on stress level ($\beta = 0.496$), whereas family factors were not statistically significant ($\beta = 0.214$, $p = 0.108$). Stress level exhibited a very strong negative association with mental health ($\beta = -0.709$), indicating that stress is the dominant determinant of mental health problems in this group. The direct effects of personal ($\beta = 0.122$, $p = 0.366$) and family factors ($\beta = -0.078$, $p = 0.515$) on mental health were not significant, while personal factors showed a meaningful indirect effect through stress ($\beta = -0.351$). This pattern indicates a full mediation mechanism in which stress fully transmits the influence of personal stressors on mental health among doctoral students.

Table 5. Mediation Patterns of Stress across Educational Levels

Level	Patern
S1	Partial mediation
S2	Full mediation
S3	Strong full mediation

Across educational levels, a coherent pattern is observed in which perceived stress serves as the principal mechanism linking personal and family-related factors to students' mental health. In all three groups, personal factors significantly predict stress, whereas their direct effects on mental health become weaker and statistically non-significant at the master's and doctoral levels, indicating a predominantly indirect pathway operating through stress. Family-related factors show a similar pattern, with their influence on mental health increasingly mediated by stress as students progress to higher levels of education. Notably, the negative effect of stress on mental health is strongest among master's and doctoral students, reflecting the greater academic, professional, and role-related demands characteristic of advanced study. Collectively, these findings demonstrate that stress constitutes the central explanatory pathway across educational strata, while the relative importance of personal and family factors shifts as students gain autonomy and face more complex academic pressures.

DISCUSSION

The observed effects of stress on mental health in this study should be interpreted within a psychosocial framework. Stress reflects students' subjective experience of academic pressure, interpersonal difficulties, and role demands, which can overwhelm coping resources and increase psychological vulnerability. Personal stressors such as time management problems, low motivation, and peer conflicts therefore exert their influence on mental health primarily by intensifying perceived stress, rather than through biological mechanisms not assessed in this study.

Stress as a Major Determinant of Mental Health

The findings indicate distinct patterns in the relationships between personal factors, family factors, stress, and mental health among undergraduate, master's, and doctoral students. Among undergraduate students, both personal and family factors were found to have a direct influence on stress and a negative contribution to mental health, either directly or indirectly through stress. Moreover, stress consistently emerged as a strong mediating variable across all educational levels (bachelor's, master's, and doctoral programs), with an increasingly negative coefficient as the level of education advanced—from -0.532 among bachelor's students, to -0.677 among master's students, and -0.709 among doctoral students. This finding reinforces the notion that as students face greater academic demands and responsibilities, the impact of stress on mental health becomes more pronounced (6).

Recent studies have consistently shown that chronic stress exerts a cumulative effect that worsens psychological well-being. For example, a longitudinal study by Hori et al. (2022) found that prolonged exposure to occupational stress was associated with higher incidences of depression among working-age adults (7). This finding emphasizes that stress has not only short-term effects but also long-term consequences for mental and social functioning (8). Furthermore, stress acts as a mediator in the relationship between socioeconomic factors and mental health. Individuals from lower socioeconomic groups tend to experience higher stress levels due to limited access to healthcare services, unstable employment, and low social support (9,10). Thus, stress is not merely rooted in internal factors but is also profoundly shaped by social and environmental contexts.

Practically, understanding the role of stress as a major determinant of mental health provides opportunities for promotive and preventive interventions. Mindfulness-based stress management, enhanced social support, and adaptive coping strategies have been shown to effectively reduce the risk of mental disorders in both the general population and vulnerable groups (1,11,12). Therefore, stress management is a crucial element in comprehensive strategies to promote mental health at the population level.

The Personal Factors on Stress and Mental Health

The results of this study indicate that personal factors play a significant role in shaping students' mental health, primarily through the escalation of stress. Among undergraduate students (bachelor's), personal factors exert both direct and indirect effects on mental health, while for master's and doctoral students, the influence is predominantly mediated by stress. This finding suggests that coping ability, resilience, and emotional regulation are key components in maintaining students' mental well-being, emphasizing the importance of interventions that strengthen personal attributes across all educational levels (13).

Personal factors determine how individuals respond to stress and sustain their mental health. These factors include personality traits, coping styles, resilience, self-efficacy, and emotional regulation. Such individual variations explain why people exposed to similar stressors experience different psychological outcomes (14). One of the most widely studied personal factors is resilience—the ability to recover from adversity. Individuals with higher resilience levels tend to have a lower risk of depression or anxiety, even when facing intense stress (15). Recent research has confirmed that resilience serves as a buffer that mitigates the adverse effects of stress on mental health (16).

Moreover, coping styles significantly influence mental well-being. Adaptive coping strategies, such as problem-focused coping or mindfulness-based approaches, have been shown to improve psychological well-being. In contrast, maladaptive coping—such as avoidance or substance use—tends to worsen the psychological impact of stress (17). Self-efficacy, or an individual's belief in their ability to overcome challenges, also contributes to maintaining mental health. Those with higher self-efficacy are generally better able to regulate stress perception and demonstrate greater psychological resilience (18). Emotional regulation likewise plays a crucial role; difficulties in managing negative emotions are often linked to increased vulnerability to anxiety and depression (19). Thus, personal factors influence not only how stress is perceived but also the success of psychosocial interventions. Programs designed to enhance resilience, strengthen self-efficacy, and improve emotional regulation skills have proven effective in reducing the risk of mental health problems (13).

The Family Factors on Stress and Mental Health

The findings of this study demonstrate a shifting pattern in the influence of family factors across educational levels. Among undergraduate students, family factors were found to significantly affect both stress and mental health

directly and indirectly. However, this influence became non-significant among master's and doctoral students, indicating a gradual decline in the role of family support as students progress through higher levels of education. This pattern reflects developmental transitions in which students move from dependency toward autonomy, thereby altering the relevance of familial influence on psychological well-being. Recent studies have confirmed that family support remains a significant predictor of stress reduction and psychological well-being among undergraduate populations (20). From a theoretical perspective, this finding aligns with contemporary extensions of Family Systems Theory, which emphasize the continuing but evolving role of family dynamics in emotional regulation during emerging adulthood (21). Undergraduate students typically remain embedded within family support structures, making family dynamics highly influential in their stress experiences. However, as individuals advance academically and socially, increasing autonomy reduces dependence on familial emotional resources and shifts coping strategies toward internal regulation and professional networks (22).

Furthermore, recent applications of Social Support Theory indicate that while family-based emotional and instrumental support buffers stress at earlier academic stages, postgraduate students increasingly rely on peer, supervisory, and institutional support systems (23,24). The declining statistical significance of family factors in postgraduate groups in this study supports the growing evidence that the protective function of family support becomes less central as academic and developmental maturity increase. This theoretical integration highlights the novelty of the present findings by demonstrating that family support is not uniformly influential across academic stages. Instead, its importance is context-dependent and evolves in line with students' developmental and educational trajectories. Therefore, interventions aimed at improving student mental health should consider educational level when designing family-based or broader social-support-based programs.

CONCLUSION

The findings of this study affirm that stress is a major determinant of mental health among students across all levels of higher education. The influence of stress on mental health is consistent, significant, and becomes stronger with higher levels of study, from undergraduate to doctoral programs. Personal factors were found to contribute substantially to the emergence of stress, thereby exerting an indirect effect on students' mental health. Among undergraduate students, personal factors also had a direct, albeit smaller, effect, whereas in master's and doctoral students, the effect was primarily mediated by stress. This indicates that individual capacity in managing academic demands, resilience, and coping skills plays a central role in maintaining psychological well-being.

Furthermore, family factors were found to be significant only among undergraduate students, both directly and indirectly through stress, while their influence diminished among master's and doctoral students. This finding illustrates a shift in the determinants of mental health in line with increasing independence and academic responsibility. Therefore, mental health promotion strategies should be tailored to the level of education: strengthening family support and coping skills among undergraduate students, while emphasizing stress management and personal capacity development for master's and doctoral students.

Taken together, these findings indicate that perceived stress constitutes the most critical leverage point for improving students' mental health across all levels of higher education. Although personal and family-related factors contribute to psychological vulnerability, their effects are largely transmitted through stress, particularly among master's and doctoral students. This pattern suggests that mental health interventions in universities should prioritize systematic stress-management strategies, such as workload regulation, academic counseling, and coping-skills training, rather than focusing solely on individual traits or family background. Importantly, the strengthening impact of stress at higher educational levels implies that graduate and doctoral students require more targeted and structurally supported interventions, including mentoring systems, research supervision support, and psychosocial services tailored to the demands of advanced academic training. By aligning mental health promotion with the specific stress profiles of each educational stage, universities can more effectively mitigate psychological distress and foster sustainable academic performance.

AUTHOR'S CONTRIBUTION STATEMENT

This research involved contributions from multiple authors, each with specific roles in the research process and manuscript preparation. The details of each author's contributions are as follows:

SR: Conceptualized the research, developed the methodology, supervised data collection, performed path analysis, and drafted the initial manuscript.

AA: Contributed to the literature review, assisted in data collection, and participated in the writing and revision of the manuscript.

RC: Designed the research instruments, conducted data validation, and contributed to the interpretation of results and manuscript revisions.

MS: Performed statistical analysis, evaluated research findings, and contributed to the discussion and refinement of the manuscript.

FT: Managed data collection, conducted initial data processing, and assisted in writing the introduction and methods sections.

All authors have reviewed and approved the final version of the manuscript and are accountable for the accuracy and integrity of the work.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest. No financial or personal relationships with individuals, organizations, or institutions exist that could have inappropriately influenced the design, execution, analysis, or reporting of this research.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that no generative AI or AI-assisted technologies were used in the writing, analysis, or preparation of this manuscript. All content, including the study design, data collection, analysis, and writing, was conducted by the authors without the assistance of automated tools.

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