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CORRELATION BETWEEN STRESS AND ANXIETY AND ACADEMIC BURNOUT AMONG FIRST-YEAR MEDICAL STUDENTS AT DIPONEGORO UNIVERSITY

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ABSTRACT

Background: Entering university is a critical transition for first-year students, marked by numerous academic, social, and personal adjustments. Navigating these changes requires substantial mental resilience. Failure to adapt may lead to psychological strain, particularly stress and anxiety, which can escalate into academic burnout. Medical students are at higher risk than other undergraduates. **Objective:** To analyze the relationship between stress, anxiety, and academic burnout among first-year medical students. **Methods:** This analytical cross-sectional study involved 81 first-year medical students from the Faculty of Medicine, Diponegoro University. Participants were recruited through purposive sampling. Stress levels were assessed using the Perceived Stress Scale (PSS), anxiety was measured with the Beck Anxiety Inventory (BAI), and academic burnout was evaluated using the Maslach Burnout Inventory–Student Survey (MBI-SS). Descriptive statistics were applied to present frequency distributions, while correlations were examined using Spearman's rank and Lambda tests. **Results:** Most participants experienced moderate stress (55.6%), mild anxiety (60.5%), and moderate academic burnout (48.1%). Stress was very strongly correlated with academic burnout ($r = 0.799$, $p < 0.001$), while anxiety showed a strong correlation ($r = 0.597$, $p < 0.001$). **Conclusion:** Stress and anxiety were both significantly associated with academic burnout in first-year medical students. Stress exhibited a very strong positive relationship, whereas anxiety demonstrated a strong positive association. These findings highlight the importance of early intervention strategies to reduce stress and anxiety, while also underscoring the need for stress management and mental health support programs tailored to early-year medical students to mitigate burnout risk.

BACKGROUND

The commencement of higher education marks a pivotal developmental transition for first-year students, bridging the period between late adolescence and early adulthood.[1] During the first year, these students must navigate a variety of academic, social, and personal challenges. Adapting to a new learning environment, balancing heavy coursework and deadlines, participating in practical sessions, and adjusting to new lifestyle are among the notable demands. For many, living away from home requires self-reliance, the establishment of new social connections, and the adoption of effective study habits. Furthermore, uncertainties regarding future career paths and the expectation to independently manage adult responsibilities add to the complexity of this transitional phase.[1,2]

Resilience and adaptability are essential for managing these demands effectively. Successful adaptation mitigates potential challenges, whereas difficulties in adjustment can result in mental health disturbances.[1,2] Stress and anxiety are among the most common psychological concerns during this period.[3] Stress represents a generalized physiological and psychological response to internal or external demands, while anxiety often reflects a heightened

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state of anticipation in response to perceived threats real or imagined. Although these conditions may serve as adaptive mechanisms, prolonged or unmanaged symptoms can have detrimental consequences. [4]

Persistent stress and anxiety are recognized as precursors to burnout, a syndrome characterized by emotional exhaustion, depersonalization, and diminished personal accomplishment.[5] Academic burnout, a specific manifestation of this syndrome, is particularly prevalent among first-year students. It typically arises from sustained academic pressure, both self-imposed and externally driven, combined with inadequate adaptation strategies. The consequences of academic burnout include disengagement from the learning process, absenteeism, neglect of assignments, decreased examination performance, and, in severe cases, course repetition or withdrawal from studies.[6]

Medical students face an even higher risk due to the substantial academic workload, intensive learning requirements, and high expectations inherent in medical training. Previous research has reported stress prevalence rates between 71.7% and 78.7%, and anxiety prevalence rates between 71% and 73.75% among first-year medical students, alongside higher burnout rates compared to peers in other disciplines.[7–9]

In light of these concerns, this study aims to examine the relationship between stress, anxiety, and academic burnout in first-year medical students. Understanding this relationship is crucial for the development of preventive strategies and interventions to support mental well-being and academic performance in this vulnerable population.

METHODS

This analytical observational study with a cross-sectional design was conducted at the Faculty of Medicine, Diponegoro University, Semarang, Indonesia, from 22 May to 2 June 2023.

Stress and anxiety were the independent variables, measured using the Perceived Stress Scale (PSS) and the Beck Anxiety Inventory (BAI), respectively. The dependent variable, academic burnout, was assessed using the Maslach Burnout Inventory–Student Survey (MBI-SS). All variables were assessed concurrently in a single session.

Participants were first-year medical students (Class of 2022) aged 18–20 years who were actively enrolled in the Medical Study Program, Faculty of Medicine, Diponegoro University. Eligible participants were required to provide written informed consent and complete the MBI-SS with consistent internal reliability. Students were excluded if they had a documented psychiatric diagnosis, were undergoing mental health treatment, or were taking psychotropic medications such as antipsychotics, antidepressants, or anxiolytics.

A total of 81 participants were included using a purposive sampling method, involving only individuals who met the eligibility criteria.

Primary data were collected using self-administered questionnaires. After providing informed consent, participants completed a demographic questionnaire and three standardized instruments: the PSS, BAI, and MBI-SS. Data collection continued until the targeted sample size of 81 was reached. All responses were reviewed for completeness and accuracy before analysis.

Data processing included editing, coding, cleaning, tabulation, and entry before statistical analysis using SPSS for Windows. Univariate analysis was conducted to describe demographic characteristics (gender, age, GPA, birth order, number of siblings, residential status, and monthly allowance) as well as levels of stress, anxiety, and academic burnout.

Bivariate analysis explored correlations between stress and academic burnout, and between anxiety and academic burnout, using Spearman's rank correlation test since all variables were ordinal. Associations between demographic characteristics and burnout were assessed using Spearman's or Lambda correlation tests, depending on the variable type.

Multivariate analysis was performed using multiple linear regression modeling to determine the relative influence of the three core dimensions of academic burnout such as Exhaustion (E), Cynicism (C), and Professional Efficacy (P) on overall burnout scores.

RESULTS

General Characteristics of Respondents

A total of 97 students completed the questionnaires and provided informed consent. Sixteen respondents were excluded, eight due to

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psychiatric diagnoses or ongoing mental health treatment, and eight whose MBI-SS responses did not meet internal consistency criteria. Thus, the final sample comprised 81 first-year medical students.

Table 1. General Characteristics of Respondents

Variable	Frequency	%
Gender		
Male	18	22.2
Female	63	77.8
Age		
≤ 18 years	13	16.0
18 – 20 years	68	84.0
≥ 20 years	0	0
GPA		
Very good	5	6.2
Good	34	42.0
Satisfactory	41	50.6
Poor	1	1.2
Birth Order		
Only child	10	12.3
Firstborn	26	32.1
Middle child	15	18.5
Lastborn	30	37.0
Number of siblings		
None	10	12.3
1 sibling	30	37.0
2 siblings	25	30.9
≥ 3 siblings	16	19.8
Living arrangement		
Live with parents	25	30.9
Live independent	52	64.2
Live with relative	4	4.9
Month allowance		
Low income	8	9.9
Moderate income	44	54.3
High income	18	22.2
Very high income	11	13.6

Most participants were female (77.8%) and aged 18–20 years (84.0%). GPA distribution showed that the majority achieved good (42.0%) or satisfactory (50.6%) results. In terms of birth order, 37.0% were youngest children, and 37.0% had one sibling. The majority lived independently (64.2%) and reported a moderate monthly allowance (54.3%).

Distribution of Respondents According to Stress Levels (Perceived Stress Scale / PSS)

Table 2. Respondent Characteristics According to Stress Level

Variable	Frequency	%
Stress Level		
Mild	33	40.7
Moderate	45	55.6
Severe	3	3.7

The majority of respondents (55.6%) experienced moderate stress, followed by mild (40.7%) and severe stress (3.7%).

Distribution of Respondents According to Anxiety Levels (Beck Anxiety Inventory / BAI)

Table 3. Respondent Characteristics According to by Anxiety Level

Variable	Frequency	%
Anxiety Level		
Mild	49	60.5
Moderate	25	30.9
Severe	7	8.6

Mild anxiety predominated among respondents (60.5%), while (30.9%) had moderate anxiety, and (8.6%) experienced severe anxiety.

Distribution of Respondents According to Academic Burnout Levels (Maslach Burnout Inventory–Student Survey / MBI-SS)

Table 4. Respondent Characteristics According to Academic Burnout Level

Variable	Frequency	%
Academic Burnout Level		
Mild	29	35.8
Moderate	39	48.1
Severe	13	16.0

The majority (48.1%) experienced moderate academic burnout, while (35.8%) had mild and (16.0%) had severe burnout.

Correlation Between Respondent Characteristics and Academic Burnout

Table 5. Correlation Between Respondent Characteristics and Academic Burnout

Variable	Academic Burnout			p	r
	Mild	Moderate	Severe		
Gender					
Male	11 (13.6)	5 (6.2)	2 (2.5)	0.128[λ]	0.143
Female	18 (22.2)	34 (42)	11 (13.6)		
Age					
≤ 18 years	2 (2.5)	8 (9.9)	3 (3.7)	0.110[§]	-0.179
18 – 20 years	27 (33.3)	31 (38.3)	10 (12.3)		
GPA					
Very good	1 (1.2)	4 (4.9)	0 (0)	0.573[§]	0.064
Good	13 (16)	17 (21)	4 (4.9)		
Satisfactory	15 (18.5)	17 (21)	9 (11.1)		
Poor	0 (0)	1 (1.2)	0 (0)		
Birth order					
Only child	3 (3.7)	6 (7.4)	1 (1.2)	0.795[§]	0.029
Firstborn	13 (16)	7 (8.6)	6 (7.4)		
Middle child	4 (4.9)	7 (8.6)	4 (4.9)		
Lastborn	9 (11.1)	19 (23.5)	2 (2.5)		
Number of siblings					
None	3 (3.7)	6 (7.4)	1 (1.2)	0.086[§]	0.192
1 siblings	15 (18.5)	12 (14.8)	3 (3.7)		
2 siblings	6 (7.4)	16 (19.8)	3 (3.7)		
≥ 3 siblings	5 (6.2)	5 (6.2)	6 (7.4)		
Living arrangement					
With parents	10 (12.3)	10 (12.3)	5 (6.2)	1.000[λ]	0.000
Independent	19 (23.5)	26 (32.1)	7 (8.6)		
With relative	0 (0)	3 (3.7)	1 (1.2)		
Month allowance					
Low	3 (3.7)	4 (4.9)	1 (1.2)	0.083[§]	0.194
Moderate	19 (23.5)	19 (23.5)	6 (7.4)		
High	5 (6.2)	12 (14.8)	1 (1.2)		
Very high	2 (2.5)	4 (4.9)	5 (6.2)		

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The association between respondents' demographic characteristics and levels of academic burnout was examined using both Lambda and Spearman's correlation tests, depending on the type of variable. No significant correlations were found between demographic characteristics including gender, age, GPA, birth order, number of siblings, living arrangement, monthly allowance, and levels of academic burnout (all $p > 0.05$). These findings suggest that demographic factors did not significantly influence burnout levels among first-year medical students.

Correlation Between Stress Level and Academic Burnout

Table 6. Correlation Between Stress Level and Academic Burnout

Variable	Academic Burnout			p	r
	Mild	Moderate	Severe		
Stress level					
Mild	28 (34.6)	4 (4.9)	1 (1.2)	<0.001§*	0.799
Moderate	1 (1.2)	35 (43.2)	9 (11.1)		
Severe	0 (0)	0 (0)	3 (3.7)		

Note: * Significant ($p < 0.05$); § Spearman's Correlation

A very strong positive correlation was found between stress and academic burnout ($r = 0.799$, $p < 0.001$). Higher stress was associated with higher burnout, and all students with severe stress reported severe burnout. Respondents with higher stress scores were more likely to experience moderate to high academic burnout. Specifically, among those with mild stress, the majority reported low burnout, whereas students with moderate stress were predominantly in the moderate burnout category, and those with severe stress all reported high burnout. This pattern suggests a direct relationship where an increase in stress intensity corresponds to higher burnout risk, and conversely, lower stress is associated with reduced burnout likelihood.

Correlation Between Anxiety Level and Academic Burnout

Table 7. Correlation Between Anxiety Level and Academic Burnout

Variable	*Academic Burnout*			p	r
	Mild	Moderate	Severe		
Anxiety level					
Mild	28 (34.6)	19 (23.5)	2 (2.5)	<0.001§*	0.597
Moderate	1 (1.2)	16 (19.8)	8 (9.9)		
Severe	0 (0)	4 (4.9)	3 (3.7)		

Note: * Significant ($p < 0.05$); § Spearman's Correlation

Similarly, a strong positive correlation was identified between anxiety level and academic burnout. Although both variables were significantly correlated with burnout, stress demonstrated a stronger association ($r = 0.799$) compared to anxiety ($r = 0.597$). Students with mild anxiety predominantly exhibited low burnout, whereas moderate and severe anxiety groups showed progressively higher proportions of moderate and high burnout, respectively. This trend reflects that greater anxiety severity increases the probability of experiencing burnout.

Influence of Exhaustion, Cynicism, and Professional Efficacy Dimensions on Academic Burnout

Table 8. Influence of Exhaustion, Cynicism, and Professional Efficacy Dimensions on Academic Burnout

Variable	p	Standardized Beta Coefficient (β)
Dimensions on *Academic Burnout*		
Dimension E	<0.001¥*	0.370
Dimension C	<0.001¥*	0.289
Dimension P	<0.001¥*	- 0.359

Note: * Significant ($p < 0.05$); ¥ Multiple Linear Regression

Multiple linear regression analysis was conducted to evaluate the contribution of the three dimensions measured by the Maslach Burnout Inventory–Student Survey such as Exhaustion (E), Cynicism (C), and Professional Efficacy (P) to overall burnout scores. The results indicated that all three dimensions significantly influenced academic burnout both in the combined model and when assessed individually ($p < 0.001$ for all). Exhaustion emerged as the strongest positive predictor ($\beta = 0.370$), followed by Cynicism ($\beta = 0.289$). In contrast, Professional Efficacy was negatively association ($\beta = –0.359$), indicating that higher perceived academic competence reduces burnout levels.

DISCUSSION

Stress, Anxiety, and Academic Burnout

Assessment using the Perceived Stress Scale (PSS) showed that most first-year medical students experienced moderate stress (55.6%), followed by mild (40.7%) and severe (3.7%). Although studies in Middle Eastern populations reported a higher prevalence of severe stress among early-year students.[7,10,11] Our findings aligned more closely with Indonesian research which also identified moderate stress as the dominant category. These similarities suggested that, even in the absence of severe stress,

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moderate stress levels were already sufficient to contribute to early burnout symptoms, particularly emotional fatigue and difficulty adapting to new academic demands.[8]

Using the Beck Anxiety Inventory (BAI), we found that mild anxiety was predominated (60.5%), while (30.9%) experienced moderate and (8.6%) experienced severe anxiety. Although some international studies reported higher rates of severe anxiety in first-year cohorts, our results were consistent with several Indonesian findings showing mild anxiety as the most common presentation. The predominance of mild anxiety may have reflected the early adjustment phase of medical education. However, persistent academic workload, competition, and limited recovery time remained important contributors to students' psychological distress.[12–14]

In addition to stress and anxiety, burnout patterns also provided important insights into students' psychological well-being. Burnout levels measured with the Maslach Burnout Inventory–Student Survey (MBI-SS) revealed that 83.9% of students experienced low to moderate burnout, a pattern consistent with prior research indicating that burnout often appears early in medical training.[15–17] Our regression analysis showed that Exhaustion emerged as the strongest predictor of overall burnout ($\beta = 0.370$), while Cynicism also contributed positively ($\beta = 0.289$) and Professional Efficacy demonstrated a protective effect ($\beta = –0.359$). These findings expanded upon prior studies by reinforcing that emotional exhaustion is the primary pathway through which stress and anxiety develop into burnout, even when severe psychological symptoms are not dominant.[18]

Correlation Between Respondent Characteristics and Academic Burnout

Analysis of demographic factors revealed no statistically significant association with academic burnout ($p > 0.05$ for all variables).

Gender was not significantly correlated with academic burnout ($p = 0.128$), consistent with findings from multiple studies that also reported no meaningful gender differences. However, conflicting evidence exists, with some studies (Salmelo et al.) indicating higher burnout prevalence among females due to perfectionism and menstrual-related physiological stress, while others (Yunita et al.) suggest higher burnout in males linked to sleep deprivation and maladaptive lifestyle patterns. These inconsistencies implied that gender alone was not a determining factor. Broader influences such as cultural norms, coping strategies, emotional support, and academic expectations likely played a more substantial role.[19,20]

Age likewise did not demonstrate a significant relationship with burnout ($p = 0.110$). The result is consistent with Triyana et al., although other studies (Maria et al., Gabola) have reported both negative and positive associations between age and burnout, depending on population context. Prior studies suggest younger individuals may display higher vulnerability due to less experience in managing stress, while older students often face more complex challenges but may also develop stronger coping strategies. Our findings reflected a relatively homogeneous population. Most respondents were between 18-20 years old (84%), sharing similar academic demands and psychosocial transitions, which likely minimized any age-related variability.[1,21]

GPA did not show a significant association with academic burnout ($p = 0.573$). Although several studies identified an inverse relationship in which lower academic achievement was associated with higher burnout risk, this pattern was not observed in the present study. In many medical programs, students often focused more on progressing through academic blocks rather than obtaining exceptionally high grades, which may have reduced GPA variability and its potential influence on burnout.[22–24]

Neither birth order ($p = 0.795$) nor number of siblings ($p = 0.086$) similarly showed no significant relationship with burnout. While some literature suggests unique psychological pressures for firstborns, only children, or those in large families. Although previous studies proposed that firstborns may carry heavier responsibilities, only children may face greater expectations, and students from larger families may experience limited resources, these effects did not appear in this sample. The influence on burnout appears mediated by factors such as family dynamics, social support, and socioeconomic conditions rather than family structure alone.[23]

No significant relationship was found between living arrangements and burnout ($p = 1.000$). This aligns with findings from Zohreh et al.[25] Students

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living alone may have experienced loneliness and limited social support**,** while those living with family benefit from emotional and practical support that may buffer burnout risk.[26] Nonetheless, individual family conditions and interpersonal dynamics may outweigh the effect of living arrangements alone.[23]

Economic status, as reflected by monthly allowance, did not demonstrate a significant correlation with burnout ($p = 0.083$). Although financial strain is known to increase vulnerability to burnout, available institutional scholarships and financial aid programs may have mitigated economic stressors among students in this population.[27]

Correlation Between Stress and Anxiety Level with Academic Burnout

In contrast to the non-significant demographic factors, both stress and anxiety were strongly associated with academic burnout. Stress showed a very strong correlation with burnout (Spearman's $r = 0.799$, $p < 0.001$), indicating that increases in stress were closely linked to substantial rises in emotional exhaustion and disengagement. Anxiety also demonstrated a strong positive correlation with burnout ($r = 0.597$, $p < 0.001$), indicating that students with higher anxiety tend to report greater burnout. While the magnitudes differed—stress showing a stronger association than anxiety—both variables played a meaningful role in shaping students' vulnerability to burnout. [28]

These findings were consistent with earlier studies reporting that psychological distress is a major contributor to burnout among medical students. This pattern aligns with Selye's General Adaptation Syndrome, which conceptualizes burnout as the exhaustion phase that emerges when prolonged stress responses overwhelm an individual's capacity to cope. Within this framework, stress exerts a more direct and immediate physiological and emotional burden, which may explain its stronger statistical association compared to anxiety, whereas anxiety may act as a secondary psychological amplification of ongoing stress.[28,29]

Medical students, particularly in their initial years, were uniquely vulnerable because they were simultaneously adapting to a demanding academic environment and navigating the psychosocial challenges of late adolescence to early adulthood. Heavy coursework, examinations, practical sessions, and limited recovery time often coincided with fluctuating social support and uncertainty about the future, creating a fertile ground for stress and anxiety. When left unmanaged, these psychological pressures can evolve into chronic conditions that manifest across the three hallmark dimensions of burnout: emotional exhaustion, cynicism or detachment from studies, and reduced sense of professional efficacy.[30]

Effective coping strategies appeared to play a crucial moderating role. Problem-focused coping, such as time management or seeking academic support, has been shown to buffer stress and reduce burnout risk. Conversely, maladaptive strategies, such as avoidance, denial, or emotional withdrawal, may exacerbate the risk of burnout. Thus, early detection of stress and anxiety, coupled with interventions aimed at strengthening adaptive coping mechanisms and providing institutional support, may be essential in preventing the progression toward academic burnout in medical students.[18]

CONCLUSION AND RECOMMENDATION

Conclusion

The findings of this study demonstrate that stress and anxiety substantially contribute to academic burnout among first-year medical students. Higher levels of psychological distress were associated with increased emotional exhaustion, greater cynicism toward academic tasks, and reduced professional efficacy. All three burnout dimensions such as Exhaustion, Cynicism, and Professional Efficacy were significantly associated with overall burnout scores, with Exhaustion emerging as the strongest predictor, indicating that emotional fatigue is the primary channel through which stress and anxiety evolve into burnout. These results emphasize the need for early identification and management of psychological distress to prevent the development and escalation of academic burnout in medical students. Strengthening preventive efforts, including regular psychological screening and targeted mental health interventions, may help reduce the progression of burnout in this vulnerable group.

Recommendations

Future research should explore additional determinants of academic burnout, involve broader student populations with varied academic backgrounds, and employ cohort designs. Universities

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are encouraged to provide targeted academic guidance for students affected by burnout.

ETHICAL APPROVAL

This study was conducted following the acquisition of ethical clearance from the Health Research Ethics Committee, Faculty of Medicine, Diponegoro University, with certificate No. 184/EC/KEPK/FK-UNDIP/V/2023.

CONFLICTS OF INTEREST

The researcher declares that no potential conflicts of interest are associated with the materials, procedures, or outcomes of this study.

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