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The Association of Social Interaction, Overthinking Habits, and Emotion Regulation with Academic Stress Among Final-Year Medical Students

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Abstract: Academic stress is a common condition experienced by university students, particularly medical students who face high and sustained academic demands. The prevalence of academic stress among students has been reported to be 38.9% globally, 61.3% in Asia, and as high as 71.6% in Indonesia, indicating a substantial burden of academic stress in the student population. Psychosocial factors such as social interaction, overthinking habits, and emotion regulation are presumed to play a role in increasing or decreasing levels of academic stress. This study aimed to analyze the association of social interaction, overthinking habits, and emotion regulation with academic stress among medical students. This study employed an analytic observational design with a cross-sectional approach. The research subjects consisted of 95 students selected using total sampling technique. Data analysis was conducted univariately and bivariately using Spearman correlation test with a significance level of 0.05. As many as 68 respondents (71.6%) had high social interaction, 47 respondents (49.5%) had moderate overthinking, 78 respondents (82.1%) had moderate emotion regulation, and 49 respondents (51.6%) had high academic stress. Bivariate analysis showed significant association between social interaction ($p = 0.049$; $\rho = -0.203$) and academic stress. Overthinking habits were also significantly associated with academic stress ($p = 0.000$; $\rho = 0.373$). However, emotion regulation was not significantly associated with academic stress ($p = 0.520$; $\rho = -0.067$). Academic stress among medical students is associated with psychosocial factors, particularly the quality of social interaction and overthinking habits. These findings highlight the importance of strengthening social support and managing thought patterns as part of efforts to prevent academic stress, while emotion regulation has not shown a meaningful contribution.

Keywords: Academic stress; Emotion regulation; Overthinking; Social interaction

Introduction

Mental health is a fundamental component of overall individual health and refers to a state of well-being that enables individuals to cope with daily stressors and function effectively. The Indonesian Ministry of Health classifies mental health problems into three main categories, namely stress, depression, and anxiety disorders (Kemenkes RI, 2024). According to the World Health Organization (WHO, 2023), mental health disorders remain highly prevalent worldwide, affecting hundreds of millions of people. More than 264 million individuals experience depression, and approximately 800,000 deaths occur annually due to suicide. In Indonesia, data from the Sample Registration System reported around 1,800 suicide cases per year, with 47.7% occurring among individuals aged 10–39 years (Kemenkes RI, 2024).

Stress is defined as a state of mental tension or worry that arises when there is a discrepancy between

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expectations and reality. While stress may have adaptive and motivating effects when experienced within manageable limits, excessive stress can negatively impact mental health, physical well-being, mood, and social relationships (WHO, 2023). Among university students, stress is a common problem caused by heavy academic workload, uncertainty about future careers, financial difficulties, and complex social interactions, which may adversely affect mental health and academic performance (Rivaldi, 2024).

Stress experienced within educational settings is commonly referred to as academic stress, which occurs when academic demands exceed an individual's perceived coping capacity (Yusuf & Yusuf, 2020). The prevalence of academic stress among university students has been reported to be 38.91% globally, 61.3% in Asia, and as high as 71.6% in Indonesia (Nadeak & Simbolon, 2023). Several psychosocial factors contribute to academic stress, including social interaction, overthinking habits, and emotion regulation. Poor social interactions, such as peer conflict and competition, may intensify academic stress (Rohmah & Mahrus, 2024). High academic demands and self-expectations may also trigger overthinking, characterized by excessive and repetitive thinking that disrupts daily functioning (Putra, 2024). Additionally, limited social support and family disharmony can impair students' ability to regulate emotions effectively (Hasanah et al., 2024).

Medical students are particularly vulnerable to academic stress due to the intensive curriculum that includes block lectures, tutorials, practical sessions, clinical skills laboratories, and frequent assessments such as Objective Structured Clinical Examinations (OSCEs) (Pala et al., 2021). According to the WHO (2023), medical students are among the student groups with the highest risk of academic stress. This risk is further increased among final-year medical students who must complete final projects while preparing for the transition to clinical training (Sabda et al., 2024).

Previous studies have reported inconsistent findings regarding the association between psychosocial factors and academic stress among university students. Basar et al. (2021) found no significant association between social interaction and academic stress. In contrast, Zuo et al. (2024) reported that overthinking mediates the association between academic stress and burnout. Qualitative findings by Fauziah & Hanami (2024) highlighted that imbalance between academic demands and personal life contributes to stress among final-year students, while Handayani et al. (2023) reported a minimal contribution of emotion regulation to stress ($R^2 = 1.8\%$).

Understanding these psychosocial factors is important for developing effective strategies to prevent academic stress among medical students. Therefore, studies simultaneously examine the association between social interaction, overthinking habits, and emotion regulation with academic stress among medical students remain limited and inconclusive. This study aims to analyze the association between these psychosocial factors and academic stress among final-year medical students, in order to contribute evidence relevant to academic stress prevention efforts in medical education.

Method

This study was conducted in October 2025 among final-year medical students at the Faculty of Medicine of X University in Indonesia. The aim of the study was to examine the association between social interaction, overthinking habits, and emotion regulation with academic stress. An analytic observational design with a cross-sectional approach was employed, in which all variables were measured simultaneously at a single point in time.

The study population consisted of final-year medical students at the Faculty of Medicine of X University. The sampling technique used was total sampling, involving 100 students. Data collection was carried out through face-to-face administration, beginning with the distribution of written informed consent forms, in which respondents provided their agreement to participate in the study. Subsequently, respondents completed the social interaction questionnaire, the Ruminative Responses Scale (RRS), the Emotion Regulation Questionnaire (ERQ), and the Academic Stress Scale (ASS).

The Social Interaction Questionnaire used in this study was developed by Wahyu Miraningsih (2013) and consists of 33 items measured using a 5-point Likert scale. Validity testing was conducted using the Corrected Item–Total Correlation (CITC) method on 27 respondents with a minimum criterion of ≥ 0.30, and all items were found to be valid. Reliability testing produced a Cronbach's alpha value of 0.947, indicating excellent internal consistency. Overthinking habits were measured using the Ruminative Responses Scale (RRS), which assesses repetitive and persistent negative thinking patterns. The instrument consists of 20 items covering three dimensions: brooding, reflection, and depressive-related rumination, measured using a 4-point Likert scale ranging from 1 to 4. Previous studies reported reliability coefficients of $\alpha = 0.608$ for brooding, $\alpha = 0.606$ for reflection, and $\alpha = 0.827$ for depressive-related rumination. Emotion regulation was measured using the Emotion Regulation Questionnaire (ERQ) developed by Gross & John (2003). The instrument consists of 13 items that assess two main strategies: cognitive reappraisal and expressive suppression.

Responses were measured using a 4-point Likert scale ranging from 1 to 4, with higher scores indicating better emotional regulation ability. Validity testing using Confirmatory Factor Analysis (CFA) showed that all items had t-values greater than 1.96, indicating good construct validity. Academic stress was measured using based on the stress theory proposed by Sarafino & Smith (2014). The instrument consists of 20 items that measure physiological and psychological responses to academic stress. Each item is rated on a 4-point Likert scale ranging from 1 (never) to 4 (always). Reliability testing showed a Cronbach's alpha value of 0.904, indicating very high internal consistency. After data collection, the completeness and consistency of the responses were reviewed. Five respondents were excluded for not meeting the inclusion and exclusion criteria, resulting in a final sample of 95 students for analysis.

Valid data were analyzed using univariate analysis to describe the frequency distribution and characteristics of each variable, and bivariate analysis using the Spearman Rank Correlation test to determine the associations between the independent variables (social interaction, overthinking habits, and emotion regulation) and the dependent variable (academic stress).

Result and Discussion

Respondent Characteristics

Based on the data collected, a total of 95 respondents were included and categorized according to gender and age The results are presented in Table 1.

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency	
	Number	Percentage (%)
Gender		
Male	38	40
Female	57	60
Age (years)		
20	5	5.3
21	56	58.9
22	29	30.5
23	4	4.2
24	1	1.1
Total	95	100

The majority of respondents were female, comprising 57 students (60%), while male respondents accounted for 38 students (40%). Based on age distribution, respondents ranged from 20 to 24 years old, with most being 21 years old (58.9%), followed by 22 years old (30.5%), 20 years old (5.3%), 23 years old (4.2%), and 24 years old (1.1%).

Univariate Analysis

Univariate analysis was conducted to examine the frequency distribution and percentages of each variable studied, namely social interaction, overthinking habits, emotion regulation, and academic stress. The results are presented in Table 2.

Table 2. Univariate Analysis

Univariate Analysis	Frequency	
	Number	Percentage (%)
Social Interaction		
Low	0	0
Moderate	27	28.4
High	68	71.6
Overthinking habit		
High	39	41.1
Moderate	47	49.5
Low	9	9.5
Emotion Regulation		
Low	0	0
Moderate	78	82.1
High	17	17.9
Academic Stress		
High	49	51.6
Moderate	10	10.5
Low	36	37.9
Total	95	100

The distribution of social interaction levels among final-year medical students showed that most respondents had a high level of social interaction (68 students; 71.6%), while the remaining respondents had a moderate level (27 students; 28.4%). No respondents were categorized as having low social interaction.

For overthinking habits, most respondents were classified as having moderate overthinking habits (47 students; 49.5%), followed by low overthinking habits (39 students; 41.1%), and high overthinking habits (9 students; 9.5%).

Regarding emotion regulation, the majority of respondents demonstrated a moderate level of emotion regulation (78 students; 82.1%), while 17 students (17.9%) showed a high level of emotion regulation. No respondents were classified as having low emotion regulation.

In terms of academic stress, 49 students (51.6%) experienced high academic stress, 36 students (37.9%) experienced low academic stress, and 10 students (10.5%) experienced moderate academic stress.

Overall, the univariate analysis indicates that final-year medical students at the faculty of medicine of X university in Indonesia tend to have high social interaction, moderate levels of overthinking and emotion regulation, and predominantly moderate to high levels of academic stress.

Bivariate Analysis

Bivariate analysis was conducted to examine the association between two variables, either comparatively or correlatively. In this study, bivariate analysis aimed to analyze the association between social interaction, overthinking habits, and emotion regulation with academic stress among final-year medical students at the Faculty of Medicine of X University in Indonesia. The statistical method used was Spearman's Rank Correlation test, which is a non-parametric statistical analysis.

Table 3. Association between Social Interaction and Stress Academic

Social Interaction	Low (%)	Moderate (%)	High (%)	Stress Academic Total (%)	*P-value*	(***ρ***)
Moderate	4 (14.8%)	17 (63.0%)	6 (22.2%)	27 (100.0%)	0.049	- 0.203
High	6 (8.8%)	32 (47.1%)	30 (31.6%)	68 (100.0%)		
Total	10 (10.5%)	49 (51.6%)	36 (37.9%)	95 (100.0%)		

The results of the bivariate analysis presented in Table 3 show variations in academic stress distribution among students with different levels of social interaction. Among students with moderate social interaction, most respondents experienced moderate academic stress (17 students; 63.0%), followed by high academic stress (6 students; 22.2%) and low academic stress (4 students; 14.8%). Meanwhile, among students with high social interaction, the majority also experienced moderate academic stress (32 students; 47.1%), with a higher proportion of high academic stress (30 students; 31.6%) compared to low academic stress (6 students; 8.8%).

Spearman correlation analysis indicated a significant association between social interaction and academic stress ($p = 0.049$), with a weak negative correlation ($\rho = -0.203$). This negative correlation suggests that higher levels of social interaction tend to be associated with lower levels of academic stress. Although the strength of the relationship is weak, these findings indicate that social interaction plays a role in influencing academic stress among students.

Table 4. Bivariate Analysis between Overthinking Habit and Stress Academic

Overthi-king Habit	Low (%)	Moderate (%)	High (%)	Academic Stress Total (%)	*p-value*	(***ρ***)
Low	1 (2.6%)	17 (43.6%)	21 (53.8%)	39 (100.0%)	0.000	0.373
Moderate	4 (8.5%)	29 (61.7%)	14 (29.8%)	47 (100.0%)		
High	5 (55.6%)	3 (33.3%)	1 (11.1%)	9 (100.0%)		
Total	10 (10.5%)	49 (51.6%)	36 (37.9%)	95 (100.0%)		

Table 5. Bivariate Analysis between Emotion Regulation Habit and Stress Academic

Emotion Regulation	Low (%)	Moderate (%)	High (%)	Academic Stress Total (%)	*p-value*	(***ρ***)
Moderate	8 (10.3%)	42	28 (35.9%)	78	0.520	- 0.067
	2 (11.8%)	(53.8%)	8	(100.0%)		
High		7	(47.1%)	17		
		(41.2%)		(100.0%)		
Total	10 (10.5%)	49 (51.6%)	36 (37.9%)	95 (100.0%)		

As shown in Table 4, differences in academic stress distribution were observed across overthinking levels. In the low overthinking group, most respondents experienced high academic stress (21 students; 53.8%), followed by moderate stress (17 students; 43.6%) and low stress (1 student; 2.6%). In the moderate overthinking group, the majority experienced moderate academic stress (29 students; 61.7%), followed by high stress (14 students; 29.8%) and low stress (4 students; 8.5%).

In contrast, in the high overthinking group, the largest proportion of respondents experienced low academic stress (5 students; 55.6%), followed by moderate stress (3 students; 33.3%) and high stress (1 student; 11.1%). Spearman correlation analysis showed a significant positive association between overthinking habits and academic stress ($p = 0.000$), with a moderate correlation strength ($\rho = 0.373$). This indicates that higher levels of overthinking are associated with a greater tendency to experience academic stress.

The bivariate analysis presented in Table 5 shows that among students with moderate emotion regulation, most experienced moderate academic stress (42 students; 53.8%), followed by high stress (28 students; 35.9%) and low stress (8 students; 10.3%). Among students with high emotion regulation, 8 students (47.1%) experienced high academic stress, 7 students (41.2%) experienced moderate stress, and 2 students (11.8%) experienced low stress.

Spearman correlation analysis revealed no significant association between emotion regulation and academic stress ($p = 0.520$), with a very weak negative correlation ($\rho = -0.067$). This suggests that although better emotion regulation may be associated with slightly lower academic stress, the relationship is weak and not statistically significant, and therefore cannot be used as a basis for a definitive conclusion.

Discussion

Social Interaction and Academic Stress

This study found a statistically significant association between social interaction and academic stress among final-year medical students at the Faculty of Medicine of X University. The bivariate analysis showed a p-value of 0.049 ($p < 0.05$), indicating a significant relationship between social interaction and academic stress, with a negative correlation coefficient ($\rho = -0.203$). This suggests that higher levels of social interaction are associated with lower levels of academic stress.

This finding is consistent with the transactional stress theory proposed by Folkman & Lazarus (1986), which states that stress arises from the interaction between individuals and their environment through primary and secondary appraisal processes. In medical students, social interaction serves as an external resource that can help reduce perceived academic stress. Students with positive social interactions tend to feel more capable of coping with academic demands.

Social interaction is an essential aspect of human life, as humans are inherently social beings who rely on relationships for sharing, cooperation, and emotional support (Hariyani et al., 2025). Social interaction occurs in various contexts, including family, educational settings, workplaces, and broader communities (Utami, 2024). Effective social interaction can help students cope with psychological challenges, particularly academic stress encountered during their studies (Islamiyah et al., 2024).

Conversely, maladaptive social interactions, such as conflict and unhealthy competition, may create a highly competitive environment in which students feel pressured to outperform peers and fear failing to meet expectations from themselves and others. This situation may lead to persistent self-comparison, anxiety, decreased concentration, and an increased risk of academic stress (Wulandari et al., 2022).

The findings of this study are consistent with those of Hariyani et al. (2025), who reported a significant negative association between social interaction and academic stress, highlighting the importance of social support from peers, family, and lecturers in managing academic stress. Similar findings were reported by Ansyah & Susanti (2023), who found a negative correlation between academic stress and social support among university students, indicating that academic stress tends to decrease as social interaction and support increase.

Overthinking and Academic Stress

This study demonstrated a significant association between overthinking habits and academic stress among final-year medical students at the Faculty of Medicine of X University. The bivariate analysis showed a significant positive correlation ($p = 0.000$; $\rho = 0.373$), indicating that higher levels of overthinking are associated with higher levels of academic stress.

Overthinking in this study is understood as a maladaptive cognitive pattern characterized by rumination (repetitive thinking about past problems) and worry (excessive concern about potential negative outcomes in the future), particularly related to academic demands. Overthinking involves excessive contemplation of situations, events, or decisions and is often associated with anxiety, procrastination, and stress (Putra, 2024).

Medical students face complex academic demands, including intensive schedules, high expectations for mastery of material, continuous evaluations, and pressure to achieve academic excellence (Pala et al., 2021). Under these conditions, overthinking can exacerbate students' stress responses. Students who engage in overthinking tend to dwell on academic mistakes, fear future failure, and struggle to control negative thoughts related to academic performance, which may deplete cognitive and emotional resources and increase vulnerability to academic stress (Suroiyya & Habsy, 2024).

These findings are supported by previous research indicating that rumination is significantly associated with perceived stress among medical students and acts as a mediator between stress and psychological disorders (Hong et al., 2025). Additional studies have shown that rumination and worry are linked to academic stress, anxiety, and academic burnout, as these cognitive processes cause individuals to remain focused on academic pressures without effective problem-solving, leading to persistent and escalating stress (Gil et al., 2023).

Furthermore, Fathoni et al. (2025) reported that overthinking has a significant impact on students' mental health, increasing vulnerability to stress, anxiety, and depression. These findings support the conclusion that higher levels of overthinking increase the risk of academic stress among medical students.

Emotion Regulation and Academic Stress

The results of this study indicate that there is no significant association between emotion regulation and academic stress among final-year medical students at the Faculty of Medicine of X University. Spearman correlation analysis showed no significant relationship ($p = 0.520$), with a very weak negative correlation ($\rho = -0.067$).

These findings differ from several previous studies that reported a significant negative relationship between emotion regulation and academic stress (Aprilia & Yoenanto, 2022; Nabila & Wahyudi, 2026; Putra, 2024). The discrepancy may be explained by the transactional stress theory of Folkman & Lazarus (1986), which suggests that stress arises from dynamic interactions between individuals and their environment. Although emotion regulation serves as an internal coping resource, it may not directly reduce stress when individuals face complex and recurring stressors, such as the academic demands experienced by medical students (Zahara et al., 2022).

Additionally, Rosenbaum et al. (2022) reported that the effectiveness of emotion regulation may be diminished in individuals who engage in rumination or overthinking. Thus, although students may possess adequate emotion regulation skills, maladaptive cognitive patterns can weaken the protective effect of emotion regulation against stress.

Univariate analysis showed that emotion regulation among final-year medical students at the Faculty of Medicine of X University was generally good, with no respondents classified as having low emotion regulation. However, many students still experienced high levels of academic stress, suggesting that effective emotion regulation alone may not be sufficient to reduce academic stress, which can be influenced by multiple factors such as overthinking, sleep quality, academic workload, internal and external pressures, and environmental stressors.

This situation may be exacerbated by the fact that students from the final-year were in the process of completing their undergraduate thesis, facing additional stressors such as family expectations to graduate on time, limited time, high personal expectations, and challenges in communication with thesis supervisors (Nadeak & Simbolon, 2023).

Gender differences may also influence stress coping strategies, as Dalimunthe & Daulay (2024) found that male students tend to use problem-focused coping, whereas female students are more likely to use emotion-focused coping. These differences may contribute to variations in academic stress levels despite similar emotion regulation abilities.

The findings of this study are consistent with previous research conducted among university students, which reported no significant association between emotion regulation and academic stress, possibly due to the presence of more dominant stress-related factors such as social support, gender, academic workload, environmental conditions, and family and self-expectations (Zahara et al., 2022).

Conclusion

This study among final-year medical students at the Faculty of Medicine of X University found that most students had high social interaction, moderate of overthinking habits, and emotion regulation. Academic stress was predominantly high. Social interaction was negatively associated with academic stress, while overthinking habits were positively associated with academic stress. Emotion regulation was not significantly associated with academic stress. These findings suggest that strategies aimed at enhancing social interaction and managing overthinking habits may help reduce academic stress among medical students.

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The authors declare no conflict of interest.

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