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Depression Among Medical Students: Patterns Across Gender and Educational Phase

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Abstract

Medical students are vulnerable to mental health problems due to intense academic and psychosocial stress. This study aims to describe the severity of depressive symptoms and examine differences based on gender and educational phase (preclinical and clerkship). A quantitative descriptive and comparative non-experimental design with purposive sampling was used, involving 185 students from various universities in Indonesia. The instrument used was the Indonesian version of the Patient Health Questionnaire-9. The findings showed that most students experienced depressive symptoms, with the majority falling into the moderate category. The Mann-Whitney test revealed that preclinical students reported significantly higher depression scores than those in the clerkship phase. No significant difference was found based on gender. These findings highlight the importance of early detection and integrated psychological interventions within medical education systems to enhance students' mental well-being.

***Keywords**: depression, educational phase, gender, medical students, students*

Abstrak

Mahasiswa pendidikan dokter rentan terhadap gangguan kesehatan mental akibat tekanan akademik dan psikososial yang tinggi. Penelitian ini bertujuan mendeskripsikan tingkat keparahan gejala depresi serta menguji perbedaan berdasarkan jenis kelamin dan fase pendidikan (preklinik dan klinik). Penelitian menggunakan desain kuantitatif deskriptif dan komparatif non-eksperimental dengan teknik purposive sampling, melibatkan 185 mahasiswa dari berbagai universitas di Indonesia. Instrumen yang digunakan adalah Patient Health Questionnaire-9 versi Bahasa Indonesia. Hasil penelitian menunjukkan bahwa sebagian besar mahasiswa mengalami gejala depresi dengan kategori terbanyak adalah sedang. Uji Mann-Whitney menunjukkan bahwa mahasiswa preklinik memiliki tingkat depresi yang secara signifikan lebih tinggi dibandingkan mahasiswa klinik. Tidak ditemukan perbedaan signifikan berdasarkan jenis kelamin. Temuan ini menekankan pentingnya deteksi dini dan intervensi psikologis yang terintegrasi dalam sistem pendidikan kedokteran sebagai upaya peningkatan kesejahteraan mental mahasiswa

Kata kunci: depresi, fase pendidikan, jenis kelamin, kedokteran, mahasiswa

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1. INTRODUCTION

Medical students are widely recognized as a population vulnerable to significant academic and psychosocial stress throughout their educational journey. The demanding curriculum, the pressure to master complex medical knowledge, and high expectations from academic and social environments can lead to chronic stress (Melaku et al., 2015; Yusoff et al., 2010). If not properly managed, such stressors may escalate into mental health issues, particularly depression (Moir et al.,2018).

Depression is a common mood disorder among medical students (Mirza et al., 2021; Rotenstein et al., 2016). It is characterized by persistent sadness, loss of interest, sleep disturbances, fatigue, and difficulties in concentration (APA, 2013). This condition not only compromises psychological well-being but also negatively impacts academic performance and professional readiness to serve as future healthcare providers. Students suffering from depression are at higher risk of burnout, social withdrawal, and diminished clinical competency (Ranasinghe et al., 2021; Sinval et al., 2024).

Previous studies have consistently shown a high prevalence of depression among medical students. A meta-analysis by Rotenstein et al. (2016) reported that globally, approximately 27.2% of medical students exhibit depressive symptoms. In Indonesia, Sulistiawati et al. (2021) reported that more than 50% of medical students experience varying levels of depressive symptoms. Similarly, a 2024 survey by the Indonesian Ministry of Health found that 22.4% of specialist medical trainees had depressive symptoms, with some expressing suicidal ideation (Kementerian Kesehatan RI, 2024).

Numerous risk factors contribute to depression in this population, including academic overload, exam pressure, personal conflicts, and lack of social support (Mayer et al., 2016; Olum et al., 2020; Phomprasith et al., 2022). The transition into clinical environments and the high intensity of hospital-based education further complicate students' psychological resilience, particularly during the clerkship phase (Moir et al., 2018). These findings emphasize the need for early detection and systematic mental health support within medical education systems.

Gender is often considered a predictor of depression. Female students are frequently reported to be more susceptible to depressive symptoms than their male counterparts, potentially due to hormonal, sociocultural, and coping-related differences (Olum et al., 2020; Kedang et al., 2020; Ramadianto et al., 2022). Therefore, investigating the distribution of depression by gender is essential for designing more gender-sensitive mental health interventions.

Another variable worth examining is educational phase. Students in clinical education or clerkship are exposed to direct clinical responsibilities, long working hours, interactions with critically ill patients, and significant professional expectations that may exceed their psychological capacity (Sklar et al., 2018). These conditions pose additional mental health risks, including depression.

While depression among medical students has been extensively studied, research that classifies depressive symptoms using the PHQ-9 scale and simultaneously compares depression levels across gender and educational phases remains limited, particularly in Indonesia.

Moreover, many existing studies are confined to single institutions—such as Universitas Baiturrahmah (Anissa & Akbar, 2021), Universitas Udayana (Dewi et al., 2019), and Universitas Pembangunan Nasional 'Veteran' Jakarta (Syahputra et al., 2020)—making it difficult to generalize the findings across diverse institutional contexts. Therefore, this study contributes to the literature by offering descriptive and comparative data from a wider institutional scope to inform targeted psychological support policies in medical education.

This study aims to: (1) describe the severity of depressive symptoms among medical students based on PHQ-9 categories; (2) examine differences in depression levels by gender; and (3) examine differences in depression levels by educational phase (preclinical vs. clinical).

Hypotheses:

H1: There is a significant difference in depression levels between male and female medical students.

H2: There is a significant difference in depression levels between preclinical and clinical (clerkship) students.

2. METHOD

2.1 Participants

The participants consisted of 185 active medical students from various universities in Indonesia. The sampling technique used was purposive sampling, with the following inclusion criteria: (1) currently enrolled in a medical education program (either preclinical or clerkship phase), (2) domiciled and studying in Indonesia, and (3) willing to voluntarily complete the questionnaire.

Demographically, the majority of participants were female (83.2%) and aged between 18–24 years. Of the total sample, 77.8% were in the preclinical phase, while 22.2% were in the clerkship phase, representing students from various institutions. It should be noted that the sample distribution was not balanced across gender and educational phase groups, which may have influenced the comparative results. This imbalance reflects the voluntary and purposive sampling method and the actual gender composition in certain medical programs.

2.2 Design

The research employed a quantitative descriptive and comparative non-experimental design. This design was chosen to describe the severity levels of depressive symptoms among medical students and to examine potential differences across gender and educational phases (preclinical versus clerkship). As the study did not involve any intervention or manipulation of variables, group differences emerged naturally according to gender and stage of study. The comparison between these groups was considered important to explore whether variations in depressive symptoms were related to academic phase or gender-based differences.

2.3 Instrument

Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9), developed by Kroenke et al. (2001), based on the diagnostic criteria from the DSM-IV. The Indonesian version of PHQ-9 was adapted and validated by Dian et al. (2022). The instrument consists of 9 items assessing the frequency of depressive symptoms over the past two weeks. Each item is rated on a scale from 0 (not at all) to 3 (nearly every day), resulting in a total score range of 0–27. Severity levels are categorized as follows: no symptoms (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27).

The Indonesian version of PHQ-9 has demonstrated strong psychometric properties, with a Cronbach's alpha reliability coefficient of 0.873 and high validity confirmed through ROC analysis with an AUC of 92% (Dian et al., 2022). The instrument was distributed online without modification and did not undergo revalidation in this study due to its prior established use in similar populations.

2.4 Procedure

Data collection was conducted online via a Google Form link, which was disseminated through various digital platforms, including Instagram, WhatsApp, and email. Before completing the questionnaire, participants were provided with informed consent and research information, which they were required to read and agree to voluntarily. The data were analyzed using Jamovi statistical software. Descriptive statistics were used to present the distribution of depression severity levels according to PHQ-9 categories. Comparative analyses were performed using the Mann–Whitney U test to examine differences based on gender and educational phase. The choice of this non-parametric test was informed by the Kolmogorov–Smirnov test, which indicated that the data did not meet the assumption of normality. The significance level was set at $p < 0.05$ for all analyses.

3. RESULTS

Based on the PHQ-9 scoring classification, participants in this study exhibited various levels of depressive symptoms. Table 1 summarizes the severity categories.

Table 1. Distribution of Depression Severity among Medical Students (N = 185)

PHQ-9 Score	Severity Level	Frequency	Percentage
0 – 4	No symptoms	29	15.7%
5 – 9	Mild depression	45	24.3%
10 – 14	Moderate depression	64	34.6%
15 – 19	Moderately severe	31	16.8%
20 – 27	Severe depression	16	8.6%

The majority of students (60%) fell into the moderate to severe categories. These findings indicate that depression is a serious concern in medical education settings and must be addressed through adequate psychological support.

Table 2. Descriptive statistic

	Status	N	Mean	Median	SD	Min	Max
Depression	Preclinical students	151	11.25	12.00	5.92	0.00	27.00
	Clerkship studentes	34	9.26	8.50	7.14	0.00	26.00
Depression	Female	154	10.9	11.00	5.81	0.00	27.00
	Male	31	10.6	11.00	7.94	0.00	27.00

Descriptive statistics showed that preclinical students (N = 151) had a higher mean depression score (M = 11.25, SD = 5.92) compared to clerkship students (N = 34), who had a mean of 9.26 (SD = 7.14). The median depression score was 12.00 for preclinical students and 8.50 for clerkship students.

Descriptive analysis revealed that female students (N = 154) had a mean depression score of 10.90 (SD = 5.81), while male students (N = 31) had a slightly lower mean of 10.61 (SD = 7.94). Both groups had the same median score of 11.00.

To test the significance of this difference, the Mann–Whitney U test was used due to non-normal data distribution. The result indicated a significant difference between the two groups, $U = 1926$, $p = 0.023$ ($p < 0.05$). This suggests that preclinical students experience significantly higher levels of depressive symptoms than their clerkship-phase peers.

Inferential analysis using an independent samples t-test showed no significant difference between genders, $t(183) = 0.232$, $p = 0.817$ ($p > 0.05$). Due to the violation of the assumption of homogeneity of variances (Levene's Test significant), the Mann–Whitney U test was also conducted, yielding $U = 2283$ and $p = 0.703$ ($p > 0.05$). These results confirmed that there is no statistically significant difference in depression scores between male and female medical students.

4. DISCUSSION

This study aimed to describe the severity levels of depressive symptoms among medical students and to examine differences based on gender and educational phase (preclinical vs. clerkship). The findings showed that more than half of the participants (60%) experienced moderate to severe depressive symptoms. This pattern emphasizes that mood disorders among medical students deserve serious attention from higher education institutions, particularly in providing adequate psychological support.

The most frequent category was moderate depression (34.6%), followed by mild (24.3%), moderately severe (16.8%), and severe depression (8.6%). These results are consistent with previous studies which reported a high prevalence of depressive symptoms in medical students both globally and in Indonesia (Rotenstein et al., 2016). The prevalence of moderate to severe depressive symptoms in this study (60%) aligns with global meta-analytic findings. A meta-analysis by Jia et al. (2022) involving 36,608 medical students from 41 studies reported a depression prevalence of 37.9% during the COVID-19 pandemic. Similarly, Alruwaili et al. (2024) found that 34% of paramedical students experienced depression, with students (45%) being more vulnerable than workers (29%). In the Indonesian context, Wiguna et al. (2024)

reported that 49.1% of 1,023 preclinical medical students experienced mental health disturbances. The slightly higher rate in our study may be attributed to the use of PHQ-9 as a screening tool and the diverse institutional representation across Indonesia. The elevated rates of depression in this population can be understood within the context of complex academic demands, professional pressure, and emotional challenges faced by medical students. Heavy curricula, social expectations, and a lack of psychological recovery time serve as key risk factors for declining mental health (Melaku et al., 2015; Moir et al., 2018).

The high rate of depression can be interpreted through the Transactional Stress Model by Lazarus and Folkman (1984), which posits that emotional disorders such as depression arise when environmental demands exceed an individual's coping resources. In medical education, students are subjected to continuous assessments and mounting professional expectations. When coping strategies are insufficient, psychological distress such as depression may emerge. In addition, the diathesis-stress model supports the idea that extreme stress during medical training can activate latent psychological vulnerabilities. Empirical evidence supports this theoretical framework. A study by Cohen et al. (2022) on 81 preclinical medical students in Germany found that 35% exhibited clinically relevant depression at baseline, and these students reported higher stress levels throughout the intervention period. The study also confirmed that study satisfaction, life satisfaction, and low depression levels were significant predictors of lower stress among medical students. These findings reinforce the Transactional Stress Model by demonstrating how inadequate coping resources, such as low academic satisfaction can trigger depressive symptoms when faced with demanding educational environments.

A significant difference was found in depression levels between preclinical and clerkship students, with preclinical students reporting higher depressive symptoms. This supports the idea that early stages of medical education are more emotionally demanding due to the abrupt shift in academic responsibility and lack of clinical context. These findings align with Moir et al. (2018), who indicated that preclinical students often struggle with adapting to theoretical burdens and future career uncertainty. In contrast, although clerkship students face long hours and clinical pressure, they may have developed stronger coping strategies and derive more meaning from hands-on clinical experience.

No significant differences in depression scores were found between male and female students. While several previous studies have reported higher depression rates among female students (Kedang et al., 2020; Pacheco et al., 2019), our findings suggest that academic pressure in medical education may affect students across genders equally. Additionally, the relatively small proportion of male respondents (16.8%) may have limited the power of gender-based comparisons, increasing the risk of Type II error. Thus, the non-significant gender difference should be interpreted with caution.

The finding that preclinical students showed significantly higher levels of depression supports theories of professional identity development in medical education. Students in early stages are more likely to experience role confusion and anxiety related to future responsibilities, while those in clerkship may have better integrated their professional identity and receive social support from clinical environments (Irby & Hamstra, 2016).

Several limitations should be considered when interpreting this study's findings. First, although the possibility of self-selection bias in online data collection was recognized, the survey was distributed through multiple platforms to reach diverse student groups. However, it is still possible that students with greater interest in mental health were more inclined to participate.

Second, the sample was unevenly distributed, with a higher proportion of female (83.2%) and preclinical students (77.8%). This imbalance may have biased the comparative analyses, as unequal group sizes can affect statistical power and increase the risk of underestimating or overestimating differences. Consequently, the results, particularly the absence of gender differences and the higher depression scores among preclinical students should be interpreted in light of this limitation.

Third, the cross-sectional design limits the ability to draw causal conclusions. Future research using longitudinal approaches is recommended to explore changes in depressive symptoms over time.

Practically, the findings highlight the need for early detection and psychological support systems within medical education environments. Institutions should provide accessible counseling services, coping skills training, and resilience-building programs as part of the medical curriculum. Theoretically, this study contributes to the literature by empirically extending the application of transactional stress theory and professional development frameworks to the context of Indonesian medical students.

5. CONCLUSION

The findings of this study emphasize the psychological vulnerability of medical students, particularly in the early stages of their education. The majority of students experienced moderate to severe depressive symptoms, with the moderate category being the most frequent (34.6%). Although depression is a global issue among medical students, this study highlights the diverse severity of symptoms and underscores the need for context-specific interventions in Indonesian medical education. The absence of significant differences between genders suggests that depressive symptoms may be influenced more by academic pressures than by demographic variables. Furthermore, the heightened levels of depression among preclinical students point to the emotional challenges associated with the initial adaptation to medical training. These insights support the urgent need for integrated mental health services and proactive institutional strategies that promote emotional resilience throughout medical education. This study contributes to the development of psychological and educational sciences by expanding empirical understanding of depression in medical student populations, reinforcing the importance of psychosocial support frameworks within health education systems. Future research should employ longitudinal designs to track changes in depressive symptoms over time and include larger and more balanced samples across gender and educational phases. Investing in the mental well-being of medical students is not only an ethical obligation but also a strategic necessity for producing competent, compassionate, and resilient future healthcare providers.

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