

PREVALENCE OF STRESS, ANXIETY, DEPRESSION AND ASSOCIATED FACTORS IN MEDICAL STUDENTS: A REVIEW AND ANALYSIS

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Received: 10/12/2025

Revised: 19/12/2025; Accepted: 31/12/2025

ABSTRACT

Background: Depression constitutes a significant public-health burden worldwide, particularly among university students.

Objective: This study aimed to synthesize existing evidence on the prevalence of stress, anxiety, and depression among medical and pharmaceutical students in Vietnam and to identify associated factors through a literature review.

Methods: A total of 11 studies published up to July 2022 were retrieved from Google Scholar. The reviewed studies employed validated instruments, including the PHQ-9, DASS-21, and CES-D scales, to assess stress, anxiety, and depression either independently or in combination. The internal consistency and reliability of these instruments were evaluated using Cronbach's alpha coefficients.

Results: The findings demonstrated wide variability in prevalence estimates, largely attributable to differences in measurement scales and study designs.

Conclusion: The use of at least two standardized measurement instruments is recommended to enhance diagnostic accuracy and facilitate comparison across studies.

Keywords: Stress, anxiety, depression, measurement scales, medical students, pharmaceutical students

1. INTRODUCTION

According to the World Health Organization (WHO), depression is a common mental disorder characterized by persistent sadness, loss of interest or pleasure, and impaired ability to perform daily activities for a minimum duration of two weeks [1]. Similarly, the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), defines depression as a mood disorder marked by depressed mood, diminished interest and pleasure, reduced energy, increased fatigue, and decreased activity lasting at least two weeks [2].

Depression represents a substantial global public-health burden. Recent WHO estimates indicate that more than 280 million individuals worldwide—approximately 3.8% of the global population and 5% of adults—are affected by depression [3]. The prevalence of mental-health problems, particularly depression and anxiety, has risen markedly among university students in many countries [4]. Depression is increasingly common among medical students, adversely affecting academic performance

and productivity [1]. In Vietnam, a multicenter study by Tran Quynh Anh et al. involving 2,099 students from eight major medical universities reported that 43.2% exhibited depressive symptoms based on the CES-D scale [4,5].

Although numerous quantitative studies have examined the prevalence of depression and related factors among medical students in Vietnam, no comprehensive overview has systematically synthesized these findings. Therefore, the present study aims to provide an overview analysis of stress, anxiety, and depression among students in Vietnam and to identify associated factors.

2. PARTICIPANTS & METHODS

2.1 Methods: The review was conducted using retrospective studies extracted from the database of 1) Medical research journal 2) Vietnam Medical Journal 3) Google Scholar 4) Journal of Preventive Medicine 5) Journal of Social Sciences, Humanities and Education, until July 2022. We selected descriptive research and

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comparative analysis of the prevalence of stress, anxiety, depression and associated factors in Medical and Pharmacy students.

2.2. Scales for measuring stress, anxiety, and depression

2.2.1. PHQ-9 scale

Depressive symptoms among medical students were assessed using the Vietnamese version of the Patient Health Questionnaire-9 (PHQ-9), a standardized instrument widely applied in international studies. The PHQ-9 is based on DSM-IV criteria and consists of nine items assessing depressive symptoms over the preceding two weeks. Each item is scored from 0 (not at all) to 3 (nearly every day), yielding a total score ranging from 0 to 27. A cutoff score of ≥ 10 demonstrates a sensitivity and specificity of 88% for detecting major depression [5,6]. Depression severity is categorized as follows: 0–4 (normal), 5–9 (minimal), 10–14 (mild), 15–19 (moderate), and 20–27 (severe) [6–8].

2.2.2. DASS-21 scale

The Depression Anxiety Stress Scale-21 (DASS-21) was adapted and validated for the Vietnamese context by Tran Thach Duc et al. (2013). The instrument comprises 21 items assessing emotional states over the past week, rated on a four-point Likert scale from 0 (did not apply to me) to 3 (applied to me very much). Severity levels for

stress, anxiety, and depression are classified according to standardized cutoff scores. The DASS-21 demonstrated high internal consistency, with an overall Cronbach's alpha of 0.826 and subscale alphas of 0.882 (stress), 0.779 (anxiety), and 0.848 (depression), indicating good reliability for mental-health research among students [7,9]. Previous validation studies among medical students in Vietnam further confirmed strong internal consistency across all subscales [10].

2.2.3. CES-D scale

The Center for Epidemiological Studies Depression Scale (CES-D) was translated and culturally adapted for Vietnam following standardized procedures and tested among 12,447 adolescents and young adults in Hai Duong province. Exploratory factor analysis identified 16 items loading onto two distinct factors with acceptable item correlations (>0.3) [11]. The CES-D assesses depressive symptoms experienced during the past week using a four-point scale ranging from 0 (rarely) to 3 (most of the time). A total score <22 indicates no risk of depression, while a score ≥ 22 suggests depressive risk [12]. The scale demonstrated high reliability, with Cronbach's alpha values of 0.91 and 0.75 for the two factors and 0.82 for the overall scale, supporting its suitability for community-based mental-health research in Vietnam [11].

3. RESULTS

Table 1. Prevalence of depression and associated factors among medical and pharmacy students in selected Vietnamese studies.

Study	Objective	Sample size (n)	Screening tool	Prevalence of depression (%)	Associated factors
Nguyen Huu Minh Tri, et al. (2017) [1]	To assess the prevalence of depression and associated factors among students at CanTho University of Medicine and Pharmacy (2013)	Not reported	Cross-sectional study using CES-D	19.0% at risk of depression; 7.0% mild depression; 19.0% major depression	Medical major, academic pressure, family circumstances, parental loss, part-time employment
Nguyen Thi Bich Tuyen, et al (2020) [9]	To assess the prevalence of stress, anxiety, and depression among final-year pharmacy students (2019–2020) at two universities in Dong Nai	134	Cross-sectional study using DASS-21	Depression: 38.8% (severe: 0.7%); Anxiety: 29.8% (severe: 6.0%); Stress: 16.4%	Academic performance (significant differences between achievement groups)

Study	Objective	Sample size (n)	Screening tool	Prevalence of depression (%)	Associated factors
Tran Thi Hien et al. (2020–2021) [16]	To determine the prevalence of depression and associated factors among final-year students at Thai Nguyen University of Medicine and Pharmacy (2020–2021)	862	Descriptive cross-sectional study with multivariate logistic regression	Overall: 42.0%; Mild: 15.4%; Moderate: 14.6%; Severe: 5.8%; Very severe: 6.1%	Stress and anxiety, student status, limited sharing of problems with parents and friends
Nguyen Thi Minh Ngoc et al. (2016) [13]	To determine the prevalence of depressive symptoms and associated factors among students at Hai Phong University of Medicine and Pharmacy	511	Cross-sectional study	Overall depressive symptoms: 37.0%; by academic year: Y1 36.6%, Y2 34.0%, Y3 36.8%, Y4 40.4%, Y5 34.7%, Y6 38.7%	Stressful life events, personal factors, academic-related factors; higher prevalence among students living in campus hostels
Nguyen Thi Huyen Anh et al. (2014–2015) [15]	To determine the prevalence of depression and associated risk factors among sixth-year medical students at Hanoi Medical University	168	Cross-sectional descriptive study using PHQ-9	Overall prevalence: 20.2%	Academic motivation (OR = 2.99; p = 0.007), average number of night shifts per week (OR = 4.57; p < 0.001); no significant association with sex, housing type, overtime work, alcohol consumption, or smoking
Nguyen Thi Huyen Anh et al. (2015) [6]	To determine the prevalence of depressive symptoms and associated factors among Y4–Y6 general-practice students at Hanoi Medical University	627	Cross-sectional study	15.2%	Academic year (p = 0.039), perceived financial burden (OR = 0.45; p = 0.002), academic motivation (OR = 3.77; p = 0.002), average number of night shifts per week (OR = 1.95; p = 0.011); no association with sex, housing type, overtime work, alcohol consumption, or smoking
Nguyen Thi Huong, et al. [12]	To assess health behaviors and risk of depression among second-year students at the National Trade University	400	Cross-sectional study using self-administered questionnaires and CES-D	At risk of depression: 49.5%	Stress related to transition to university, increased responsibilities; health-risk behaviors including alcohol consumption (48.8%), smoking (8.8%), and drug use (3.2%)
Bui Mai Thi et al. (year not specified) [5]	To determine the prevalence of depressive disorders, suicidal ideation/behavior, and associated factors among first- and final-year students at Hanoi Medical University	1,723	Cross-sectional study using PHQ-9	Depressive disorders: 17.4% (95% CI: 15.6–19.4); Suicidal ideation/behavior: 26.2% (95% CI: 24.1–28.5)	Depression: financial burden (PR = 2.07; 95% CI: 1.53–2.93), chronic illness history (PR = 1.44; 95% CI: 1.09–1.89); Suicidal ideation: female sex (PR = 0.69; 95% CI: 0.55–0.84), financial burden (PR = 1.39; 95% CI: 1.09–1.78), chronic illness history (PR = 1.70; 95% CI: 1.39–2.09)

Study	Objective	Sample size (n)	Screening tool	Prevalence of depression (%)	Associated factors
Phung Quoc Diep et al. (2021) [14]	To compare the prevalence of depression, anxiety, and stress and to identify associated factors among full-time nursing students at Bach Mai Medical College	488	Cross-sectional descriptive study using DASS-21	Depression: 8.2%; Anxiety: 10.1%; Stress: 4.5%	First-year status, family economic difficulties, average/poor academic performance, dissatisfaction with major, alcohol use, smoking, recent relationship breakup, conflicts with parents

4. DISCUSSION

4.1. Sociodemographic characteristics of participants

The reviewed studies indicate a consistently high prevalence of depression among medical and pharmacy students in Vietnam, aligning with findings from both domestic and international research [12-14]. This trend may be attributed to the heavy academic workload, dense curricula, and the demanding nature of medical and pharmaceutical training. Previous studies have shown that students in these disciplines experience higher levels of stress, anxiety, and depression compared with students in other majors [3]. Notably, pharmacy students appear particularly vulnerable, with reported prevalence rates of stress, anxiety, and depression of 16.4%, 29.8%, and 38.8%, respectively, including severe anxiety (6.0%) and severe depression (0.7%) [9].

4.2. Characteristics of depression among students

Across the 11 reviewed studies, depressive symptoms were consistently prevalent among students throughout their academic years. Prevalence estimates obtained using the PHQ-9 were relatively lower, as reported by Nguyen Thi Huyen Anh et al. (15.2%) [11, 14], compared with substantially higher rates observed in studies employing the CES-D scale, such as those by Tran Quynh Anh (43.2% and 38.9%) and Nguyen Huu Minh Tri and Nguyen Tan Dat (2017) [11, 12]. These discrepancies are likely attributable to differences in the psychometric characteristics and cutoff thresholds of the assessment instruments.

Both the PHQ-9 [5, 6, 15] and CES-D [1, 11, 12] are primarily screening tools and lack definitive diagnostic value. At a CES-D cutoff ≥ 16 , sensitivity and specificity were reported as 87% and 70%, respectively, with improved balance at higher cutoffs (≥ 20). In contrast, the PHQ-9 demonstrates good cross-cultural validity and diagnostic performance at a cutoff score ≥ 10 , with sensitivity of 80% and specificity of 92% [5, 6, 15]. Studies using the DASS-21 reported variable prevalence rates across institutions, with anxiety being most prominent, followed by depression and stress [9, 14]. Such variability may reflect differences in cultural context, training programs, and academic pressure. However, the exclusive reliance on self-reported DASS-21 screening without clinical assessment represents a methodological limitation [9, 10, 16, 17].

4.3. Factors associated with depression

Research indicates a multifactorial etiology for depression in medical students, involving high academic pressure, family circumstances, social relationships, and overtime work. Financial stability is a particularly significant determinant; a study of 300 nursing students at Hai Phong Medical College identified family finances as the primary source of stress, followed by academic results, the clinical practice environment, and personal issues [17]. Statistical analysis confirms that students without financial difficulties have a significantly lower risk of depression (OR = 0.45; p = 0.002) [15]. Furthermore, findings using the Stressor in Nursing Students (SINS) scale by Nguyen Bich Ngoc and Nguyen Van Tuan reinforce that financial problems are a leading cause of stress, anxiety, and depression across multiple studies [1, 5, 6, 14]. The prevalence of depression varies by academic year, generally correlating with the increasing difficulty of the training program (sixth year > fourth year > fifth year). The elevated depression rate in the fourth year compared to the fifth is attributed to a heavy curriculum containing major subjects such as internal medicine, surgery, obstetrics, and pediatrics, alongside longer clinical study durations. However, the sixth-year cohort exhibits the highest depression rate, driven by the intense pressures of reviewing for boarding and graduation exams, as well as thesis defense [6].

Distinct challenges characterize each stage of medical education. Freshmen and sophomores often struggle with social adjustment and acclimating to the university environment, while third and fourth-year students face the physical demands of hospital duty schedules [18]. Conversely, a specific study on nursing students at Hai Phong Medical College observed the highest stress rates in sophomores (51%), followed by juniors (47%) and freshmen (41%). This peak in the second year is linked to the commencement of clinical internships alongside academic coursework, with the "fear of failing" and "exams and grades" cited as the most significant stressors. Furthermore, the frequency of hospital duty is a major risk factor; students on duty 2 sessions/week are nearly twice as likely to experience depression compared to those with fewer shifts, largely due to physical exhaustion and a lack of time for rest or social activities [6].

4.4. Methodological Limitations

Regarding measurement methodologies, limitations exist as diagnoses often rely solely on screening questionnaires without clinical confirmation [17]. Therefore, researchers recommend using at least two measurement scales, such as the SINS or the Academic Motivation Scale (AMS), where a Self-Determination Index (SDI) < 0 indicates a lack of learning motivation [6, 15].

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