

ANXIETY AND DEPRESSION SYMPTOMS AMONG FIRST-YEAR MEDICAL STUDENTS IN UKRAINE: A CROSS-SECTIONAL STUDY

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Abstract: Aim: To assess the prevalence and severity of symptoms of anxiety and depression among 18-year-old students according to the results of the Hospital Anxiety and Depression Scale (HADS), and to analyze sex differences, the relationship between subscales, and the internal consistency of the questionnaire in the study sample.

Materials and Methods: Sixty-eight respondents aged 18 years were assessed using the HADS questionnaire, including 47 women (69.1%), 18 men (26.5%), and 3 participants with unspecified sex (4.4%).

Results: The mean HADS-A score was 7.79 ± 3.28 points, and the mean HADS-D score was 4.81 ± 3.90 points. An increased level of anxiety (> 7 points) was found in 51.5% of respondents, while depressive manifestations of varying severity were observed in 25.0%. According to the results of the comparison of sex groups, anxiety scores were significantly higher in women than in men ($p = 0.022$), while no statistically significant difference was found for depression ($p = 0.207$). A positive correlation between anxiety and depression levels was found (Spearman's $r = 0.496$; $p < 0.001$).

Conclusions: Our findings indicate that symptoms of anxiety and depression are common among university students, confirming the relevance of assessing psycho-emotional health in the academic environment in Ukraine during wartime. A substantial proportion of students exhibited elevated levels of anxiety and/or depression, highlighting the need for early identification and preventive interventions. The findings support the implementation of regular mental health monitoring programs within higher education institutions, particularly in contexts characterized by heightened academic, social, and environmental stressors.

Keywords: HADS, anxiety, depression, students, mental health screening.

INTRODUCTION

The mental health of young people is a priority area in modern medicine, public health, and medical education. According to the World Health Organization, emotional disorders are common among adolescents and young adults, and anxiety disorders are among the most common mental health problems in this age group (1). It is emphasized that a significant proportion of mental disorders begins before the end of adolescence; therefore, early detection and preventive support are essential for preserving the educational, social, and professional potential of young people (2, 3).

University students are a particularly vulnerable group. Entering higher education is associated with changes in the usual social environment, an increased academic workload, the need for rapid adaptation to new forms of education, a high level of responsibility for academic performance, and uncertainty about future professional activity. Even in the absence of a clinically established mental disorder, these factors can be accompanied by increased levels of anxiety, emotional exhaustion, sleep disturbances, decreased motivation, and difficulty concentrating.

Global epidemiological studies in recent years indicate an increase in the prevalence of depressive and anxiety disorders. The study by Santomauro et al. showed that the COVID-19 pandemic was associated with a significant increase in the burden of major depressive disorder and anxiety disorders worldwide, with young people and women being among the most vulnerable groups (4). This conclusion is also important for interpreting local student samples, as modern students have been shaped by long-term social restrictions, distance learning, information overload, and instability.

In Ukraine, the problem of the psycho-emotional state of students has additional specific features due to

the long-term impact of war-related stress. Studies of Ukrainian students during the full-scale war indicate a significant mental health burden, including symptoms of anxiety, depression, post-traumatic stress, and sleep disturbances (5, 6). Even if a specific study does not directly assess exposure to combat or trauma, the broader social context may contribute to psychological distress.

Screening questionnaires are not a substitute for clinical diagnosis, but they allow for the rapid identification of individuals at increased risk, assessment of symptom prevalence within a population, and justification of preventive measures. One such tool is the Hospital Anxiety and Depression Scale (HADS), developed by A. S. Zigmond and R. P. Snaith in 1983 (7). The scale contains two seven-item subscales: HADS-A for anxiety and HADS-D for depression. The advantages of HADS include its brevity, ease of administration, ability to differentiate emotional symptoms from somatic manifestations, and applicability in clinical, population-based, and educational settings.

This study addresses the need for local data on anxiety and depressive symptoms among students in the same age group. Such information may inform educators, academic advisors, university counseling services, and healthcare professionals working with young adults. Detecting subclinical manifestations is particularly valuable, as this is the stage at which preventive interventions can be most effective.

AIM OF THE STUDY

To assess the prevalence and severity of anxiety and depression symptoms among 18-year-old students based on the results of the Hospital Anxiety and Depression Scale (HADS), and to analyze sex differences, the relationship between the subscales, and the internal consistency of the questionnaire in the study sample.

MATERIALS AND METHODS

The study was designed as a cross-sectional, questionnaire-based survey. The target population comprised first-year students enrolled in the Bachelor's program in Medicine (three academic groups) at the university during the study period. All 76 eligible students were invited to participate in the survey. Participation was voluntary and anonymous, and informed consent was obtained from all participants before completing the questionnaire. A total of 68 students completed the survey, yielding a response rate of 89.5%, and were included in the analysis. The sample comprised 47 women (69.1%), 18 men (26.5%), and 3 respondents (4.4%) who did not specify their gender

or selected "none." All participants completed both the HADS-A and HADS-D questionnaires. Because participation was voluntary and the study was limited to students from a single educational program at one university, the possibility of self-selection bias cannot be excluded. Therefore, the findings should be interpreted with caution and may not be generalizable to all first-year medical students in Ukraine.

The main assessment tool was the Hospital Anxiety and Depression Scale (HADS), a widely used and validated self-report instrument developed by Zigmond and Snaith to screen for symptoms of anxiety and depression in patients with medical conditions while minimizing the influence of somatic symptoms that may be related to physical illness rather than psychological distress. The questionnaire consists of 14 items, each scored on a 4-point Likert scale from 0 to 3, reflecting symptom severity or frequency during the previous week. Seven odd-numbered items form the anxiety subscale (HADS-A), and seven even-numbered items form the depression subscale (HADS-D). Scores for each subscale range from 0 to 21, with higher scores indicating greater symptom severity. The commonly accepted cut-off values were used for interpretation: 0–7 points indicate normal levels of anxiety or depression, 8–10 points indicate borderline (subclinical) symptoms, and ≥ 11 points indicate clinically significant anxiety or depression requiring further clinical evaluation (8, 9, 10).

Statistical analysis

Statistical analysis was performed using methods of mathematical statistics implemented in Microsoft® Excel® for Microsoft 365 (Microsoft Corp., Redmond, WA, USA). Quantitative variables were summarized using the mean (M), standard deviation (SD), median (Me), interquartile range (IQR; Q1–Q3), and minimum and maximum values. Categorical variables were presented as frequencies and percentages. The normality of data distribution was assessed using the Shapiro–Wilk test. Because the depression scores were not normally distributed and the male subgroup was relatively small, comparisons between women and men were performed using the non-parametric Mann–Whitney U test. Correlations between anxiety and depression scores were evaluated using Spearman's rank correlation coefficient and Pearson's correlation coefficient, as appropriate. Differences in categorical variables were analyzed using the χ^2 test with Yates' continuity correction. The internal consistency of the HADS anxiety and depression subscales was assessed using Cronbach's α coefficient. A two-sided p-value < 0.05 was considered statistically significant.

The study was approved by the Commission on Bioethics of Dnipro State Medical University (excerpt of meeting No. 40, July 3, 2026) and conducted with the written consent of the participants and in accordance with the principles of bioethics set forth in the Helsinki Declaration, “Ethical Principles for Medical Research with Human Participants,” and the “Universal Declaration on Bioethics and Human Rights (UNESCO).” All participants provided written informed consent before participation.

RESULTS

The general characteristics of the sample are presented in Table 1. All respondents were the same age (18 years), which reduces age heterogeneity and allows the results to be interpreted as characteristic of this age group. At the same time, the sample was gender-imbalanced: women accounted for 69.1%, men for 26.5%, and 4.4% of respondents did not indicate their gender.

The mean total HADS-A score was 7.79 ± 3.28 points; the median was 8 [Q1 = 6.00; Q3 = 10.00];

the minimum value was 0; and the maximum value was 15. The results are shown in Table 2. The distribution of the anxiety score did not deviate significantly from normality according to the Shapiro–Wilk test ($p = 0.667$).

The mean total HADS-D score was 4.81 ± 3.90 points; the median was 4 [Q1 = 2.00; Q3 = 7.25]; the minimum value was 0; and the maximum value was 16. In contrast to anxiety, the distribution of the depression score was statistically significantly different from normality ($p < 0.001$), which justifies the use of non-parametric tests for intergroup comparisons.

The distribution of respondents by HADS categories is shown in Table 3. For depression, normal values were found in 51 respondents (75.0%), a subclinical level in 12 (17.6%), and a clinically significant level in 5 (7.4%). For anxiety, 33 respondents (48.5%) had normal values, a subclinical level in 22 (32.4%), and a clinically significant level in 13 (19.1%). Thus, increased levels of anxiety were more common than increased levels of depression, as shown in Figure 1.

Table 1. General characteristics of the sample

Parameter	Value
Number of respondents, n	68
Age, years	18
Women, n (%)	47 (69.1%)
Men, n (%)	18 (26.5%)
Gender not specified, n (%)	3 (4.4%)

Table 2. Descriptive statistics of total HADS scores

Parameter	HADS-A (anxiety)	HADS-D (depression)
M $\pm$ SD	7.79 ± 3.28	4.81 ± 3.90
Me [Q1; Q3]	8 [6.00; 10.00]	4 [2.00; 7.25]
Min–Max	0–15	0–16
Shapiro–Wilk, p	0.667	< 0.001

Abbreviations: HADS-A: Hospital Anxiety and Depression Scale–Anxiety subscale; HADS-D: Hospital Anxiety and Depression Scale–Depression subscale; M: mean; SD: standard deviation; Me: median; Q1: first quartile; Q3: third quartile; Min, minimum; Max, maximum.

Table 3. Distribution of respondents by HADS categories

Scale	Category	n	%
HADS-A (anxiety)	Normal	33	48.5
HADS-A (anxiety)	Subclinical level	22	32.4
HADS-A (anxiety)	Clinically significant level	13	19.1
HADS-D (depression)	Normal	51	75.0
HADS-D (depression)	Subclinical level	12	17.6
HADS-D (depression)	Clinically significant level	5	7.4

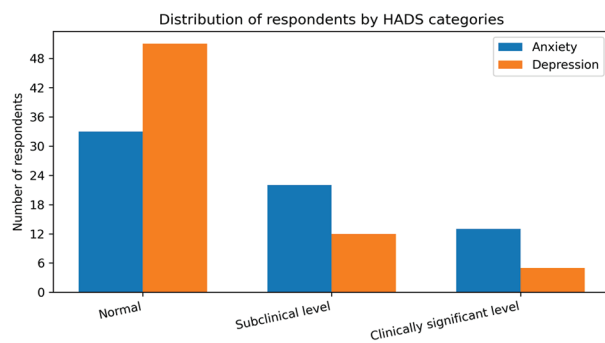


Figure 1. Distribution of respondents by HADS categories

The sex differences shown in Table 4 were analyzed among 65 respondents who indicated their gender as “W” or “M”. In women, the mean anxiety score was 8.38 ± 3.40 points; the median was 9 [6; 11], while in men, it was 6.28 ± 2.67 points; the median was 7 [4.25; 8]. The difference was statistically significant according to the Mann–Whitney U test ($p = 0.022$).

For depression, the mean score in women was 4.62 ± 3.97 points, compared with 5.67 ± 3.88 points in men. The medians were 4 and 4.5 points, respectively. No statistically significant difference between the sex groups for HADS-D was found ($p = 0.207$).

As shown in Figure 2, an increased level of anxiety (> 7 points) was present in 28 out of 47 women (59.6%) and in 6 out of 18 men (33.3%). According to the χ^2 test with Yates’ correction, this difference did not reach statistical significance ($p = 0.106$), pos-

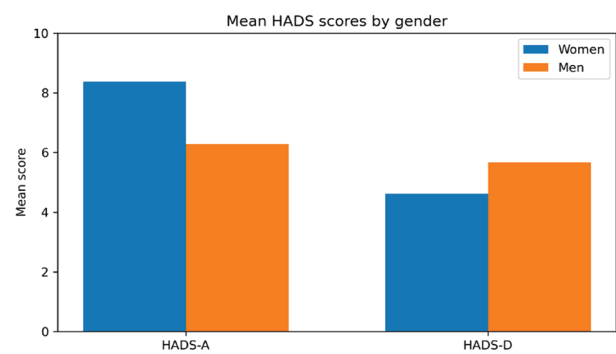


Figure 2. Average HADS scores based on gender

sibly due to the small size of the male subgroup. An increased level of depression (> 7 points) was found in 10 women (21.3%) and 7 men (38.9%). The difference was also not statistically significant ($p = 0.258$).

Correlation analysis demonstrated a positive relationship between the combined HADS-A and HADS-D scores. For Spearman’s $r = 0.496$, $p < 0.001$; for Pearson’s $r = 0.401$, $p = 0.0007$. Therefore, respondents with higher anxiety scores were more likely to have higher levels of depressive manifestations. This represents a moderate correlation.

The internal consistency of the HADS-A subscale in the study sample was Cronbach’s $\alpha = 0.714$, which is considered acceptable. For HADS-D, Cronbach’s $\alpha = 0.810$, indicating good internal consistency. For the entire scale, $\alpha = 0.814$. The obtained values are consistent with literature data on the reliability of HADS across different samples [10–12], as presented in Table 5.

Table 4. Comparison of HADS metrics based on gender

Gender	n	HADS-A M $\pm$ SD	HADS-A Me [Q1; Q3]	HADS-D M $\pm$ SD	HADS-D Me [Q1; Q3]
Women	47	8.38 ± 3.40	9.0 [6.00; 11.00]	4.62 ± 3.97	4.0 [2.00; 6.00]
Men	18	6.28 ± 2.67	7.0 [4.25; 8.00]	5.67 ± 3.88	4.5 [2.25; 8.00]
p Mann–Whitney	—	0.022	—	0.207	—

Table 5. Average values of individual HADS items

Subscale	Item	Summary of the paragraph	M $\pm$ SD
HADS-A	1	I’m in a state of tension or in a “wound up” state	1.31 ± 0.58
HADS-A	3	I have a feeling of fright, like “butterflies in my stomach” (internal anxiety)	0.97 ± 0.60
HADS-A	5	I’ve got a kind of scary feeling, like something’s going to happen	1.40 ± 0.95
HADS-A	7	I feel restless and restless like I need to move all the time	1.06 ± 0.84
HADS-A	9	Restless thoughts running through my head	1.18 ± 0.98
HADS-A	11	A sudden sense of panic comes over me	0.96 ± 0.70
HADS-A	13	I can just sit back and feel relaxed	0.93 ± 0.65
HADS-D	2	I’m feeling inhibited, and I’m taking things slow	0.94 ± 0.71
HADS-D	4	I can enjoy the same thing as before	0.60 ± 0.67
HADS-D	6	I’ve lost interest in my appearance (and don’t follow it)	0.49 ± 0.89
HADS-D	8	I can laugh and perceive funny things	0.35 ± 0.64
HADS-D	10	I look to the future, expecting that I can have joy and pleasure	0.62 ± 0.93
HADS-D	12	I’m feeling refreshed	0.76 ± 0.81
HADS-D	14	I can enjoy a good book, radio or TV program	1.04 ± 0.98

DISCUSSION

The results suggest that symptoms of anxiety were substantially more common than symptoms of depression among medical students. More than half of the participants had subclinical or clinically significant anxiety according to the HADS-A scale, whereas elevated HADS-D scores were identified in only one-quarter of the respondents. These findings suggest that anxiety represents the predominant form of psychological distress in this population and emphasize the importance of regular mental health screening among university students.

The predominance of anxiety over depressive symptoms is consistent with the specific characteristics of medical education. Medical students are exposed to continuous academic pressure, frequent examinations, large volumes of information, clinical responsibilities, uncertainty regarding academic performance, and concerns about future professional competence. Unlike depression, which is generally associated with more persistent disturbances of mood and motivation, anxiety often reflects an adaptive response to ongoing stressors and uncertainty. Consequently, anxiety symptoms may be expected to predominate in student populations, particularly during periods of intensive academic training (1, 9-14).

Our findings are generally consistent with previous studies reporting high levels of psychological distress among university students worldwide. Although direct comparison of prevalence rates is difficult because different studies use various screening instruments, cut-off values, and sampling strategies, anxiety has consistently been reported as one of the most common mental health problems among students (2, 7, 15). Recent systematic reviews and meta-analyses have shown that psychological distress remains highly prevalent among university students even after the COVID-19 pandemic, suggesting that academic and psychosocial stressors continue to affect student well-being (3, 5, 16).

An important finding of the present study was the significantly higher anxiety scores observed among female students. This result agrees with numerous epidemiological studies demonstrating a greater prevalence of anxiety symptoms among women across different age groups and populations. Several explanations have been proposed for these differences, including biological factors, hormonal influences, differences in stress perception, coping strategies, and greater willingness among women to recognize and report emotional symptoms (14, 15, 16). However, the unequal gender distribution in our sample should be considered when interpreting these findings, as the relatively small num-

ber of male participants may have limited the precision of between-group comparisons.

In contrast, depressive symptoms did not differ significantly between male and female students. Although the median HADS-D score was slightly higher among men, the observed difference was small and statistically non-significant. This finding should not be interpreted as evidence of a higher prevalence of depression in male students. Rather, it is likely explained by random variation, the limited sample size, and the relatively small male subgroup. Furthermore, HADS-D primarily evaluates anhedonia and reduced positive affect and does not encompass the entire spectrum of depressive symptoms, which may also influence the observed results (6, 10, 12).

The moderate positive correlation between anxiety and depression scores confirms the close relationship between these psychological constructs. Anxiety and depressive symptoms frequently coexist and share common psychological, behavioral, and neurobiological mechanisms (14). From a practical perspective, this finding emphasizes that students presenting with elevated anxiety should also be assessed for depressive symptoms and vice versa. Simultaneous evaluation of both conditions may facilitate earlier identification of students at risk for more severe psychological impairment and improve the effectiveness of preventive interventions (13).

The assessment of internal consistency demonstrated acceptable reliability of the HADS anxiety subscale and good reliability of the depression subscale. These results support previous validation studies indicating that HADS remains a reliable screening instrument for measuring symptoms of anxiety and depression in both clinical and non-clinical populations, including university students (16). The satisfactory psychometric characteristics observed in the present study further support the applicability of HADS in educational settings.

The findings have several practical implications. Elevated HADS scores should not be interpreted as evidence of clinically diagnosed anxiety or depressive disorders. Rather, they identify students experiencing increased psychological distress who may benefit from preventive support. Universities should therefore consider implementing comprehensive mental health promotion strategies, including routine psychological screening, psychoeducational programs, stress-management workshops, resilience training, peer-support initiatives, and improved access to psychological counseling services (13). Early identification of students with elevated anxiety or depression scores may facilitate early intervention before more severe mental health disorders develop.

The strengths of this study include the use of a well-validated screening instrument, standardized data collection procedures, and the assessment of both anxiety and depression within the same student population. In addition, the evaluation of the internal consistency of the HADS subscales confirmed the reliability of the data obtained in the sample studied.

Several limitations should also be acknowledged. First, the relatively small sample size and unequal gender distribution reduce the generalizability of the findings. Second, the cross-sectional design precludes conclusions regarding causal relationships or temporal changes in psychological status. Third, important determinants of mental health—including socioeconomic status, sleep quality, academic achievement, physical activity, chronic diseases, previous psychiatric history, and exposure to stressful life events—were not evaluated and therefore could not be included in the analysis. Finally, HADS is a screening rather than a diagnostic instrument; consequently, elevated scores indicate an increased likelihood of anxiety or depressive symptoms but cannot establish psychiatric diagnoses. Future multicentre longitudinal studies involving larger, more representative student populations are needed to identify predictors of psychological distress and evaluate the effectiveness of preventive mental health programs in higher education institutions (14).

CONCLUSIONS

1. The study showed that symptoms of anxiety and depression are common among university students, confirming the relevance of psycho-emotional health assessment in the academic environment in Ukraine during wartime.

2. Female students showed significantly higher levels of anxiety than male students ($p = 0.022$), whereas no statistically significant sex-related differences were identified in depression scores.

3. A moderate positive correlation was found between anxiety and depression scores (Spearman's $r = 0.496$, $p < 0.001$), indicating the frequent coexistence of these psychological manifestations and emphasizing their interconnected nature.

4. The Hospital Anxiety and Depression Scale (HADS) demonstrated acceptable reliability and appears suitable for screening anxiety and depressive symptoms in student populations.

5. Although most participants demonstrated normal or borderline scores, a substantial proportion of

students exhibited elevated levels of anxiety and/or depression, highlighting the need for early identification and preventive interventions.

6. The findings support the implementation of regular mental health monitoring programs within higher education institutions, particularly in contexts characterized by increased academic, social, and environmental stressors.

7. Further multicenter studies involving larger and more diverse student populations are warranted to identify additional risk factors and to evaluate the effectiveness of targeted preventive and supportive interventions.

Abbreviations

HADS - Hospital Anxiety and Depression Scale

HADS-A - Hospital Anxiety and Depression Scale - Anxiety

HADS-D - Hospital Anxiety and Depression Scale - Depression

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Note: The authors claim that artificial intelligence was not used in this study.

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Sažetak

SIMPTOMI ANKSIOZNOSTI I DEPRESIJE KOD STUDENATA MEDICINE
PRVE GODINE U UKRAJINI: STUDIJA PRESEKATurlyun Tamara,¹ Sanina Nataliia,¹ Myronenko Olena,¹ Huba Yuliia,¹ Yevtushenko Anastasiia²¹ Državni medicinski univerzitet Dnjepar, Odsek za internu medicinu 1, Dnjepar, Ukrajina² Student VI godine na Državnom medicinskom univerzitetu Dnjepar, Dnjepar, Ukrajina

Cilj: Ispitati učestalost i izraženost simptoma anksioznosti i depresije kod studenata uzrasta 18 godina na osnovu rezultata Hospital Anxiety and Depression Scale (HADS), kao i analizirati razlike u odnosu na pol, povezanost između podskala i internu konzistentnost upitnika u ispitivanoj grupi.

Materijal i metode: Ispitano je 68 ispitanika uzrasta 18 godina pomoću upitnika HADS, među kojima je bilo 47 žena (69,1%), 18 muškaraca (26,5%) i 3 ispitanika (4,4%) koji nisu naveli pol.

Rezultati. Prosečna vrednost HADS-A skora iznosila je $7,79 \pm 3,28$ poena, dok je prosečna vrednost HADS-D skora iznosila $4,81 \pm 3,90$ poena. Povišen nivo anksioznosti (> 7 poena) utvrđen je kod 51,5% ispitanika, dok su simptomi depresije različitog stepena izraženosti zabeleženi kod 25,0% ispitanika. Poređenjem grupa prema polu utvrđeno je da su skorovi anksioznosti bili statistički značajno viši

kod žena nego kod muškaraca ($p = 0,022$), dok za depresiju nije utvrđena statistički značajna razlika ($p = 0,207$). Utvrđena je pozitivna korelacija između nivoa anksioznosti i depresije (Spearmanov $r = 0,496$; $p < 0,001$).

Zaključak: Naši rezultati ukazuju na to da su simptomi anksioznosti i depresije česti među studentima, što potvrđuje značaj procene psihoemocionalnog zdravlja u akademskom okruženju u Ukrajini u uslovima rata. Značajan broj studenata imao je povišen nivo anksioznosti i/ili depresije, što ukazuje na potrebu za ranom identifikacijom i preventivnim intervencijama. Rezultati ukazuju na opravdanost redovnog praćenja mentalnog zdravlja u ustanovama visokog obrazovanja, naročito u uslovima pojačanih akademskih, socijalnih i drugih stresora iz okruženja.

Cljučne reči: HADS, anksioznost, depresija, studenti, skrining mentalnog zdravlja.

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