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Medical Youth

ORIGINAL ARTICLE

FREQUENCY OF DISTRESS SYMPTOMS IN THE POPULATION OF MEDICAL STUDENTS AND THEIR RELATIONSHIP WITH SYMPTOMS OF ATTENTION DEFICIT HYPERACTIVITY DISORDER

UČESTALOST SIMPTOMA DISTRESA U POPULACIJI STUDENATA MEDICINE I NJIHOVA POVEZANOST SA SIMPTOMIMA POREMEĆAJA PAŽNJE I HIPERAKTIVNOSTI

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Abstract

Introduction: Studies have indicated that symptoms of distress are more prevalent in students than in the general population, and even more prevalent among students with pronounced symptoms of attention deficit hyperactivity disorder (ADHD). ADHD is most commonly diagnosed in childhood, with cumulative evidence of its presence in adults as well. Based on the literature knowledge, similar studies haven't been conducted on the student population in the Republic of Serbia thus far.

Aim: The aims of this study are to examine the connection between distress symptoms and the presence of ADHD symptoms in the studied population of students, and to examine the characteristics of the most pronounced distress symptoms in the group of ADHD-screening positive students.

Material and methods: The study was conducted on 404 students of the Faculty of Medicine, University of Belgrade, with an average age of 21.8 ± 1.9 years, of which 78.7% were female. The assessment included the Adult ADHD Self-Report Scale (ASRS v1.1), Patient Health Questionnare-9 (PHQ-9), General Anxiety Disorder-6 (GAD-6) and Patient Health Questionnare-4 (PHQ-4) self-report scales and a questionnaire for socio-demographic, psychotropic drug use, and heredity of ADHD.

Results: All ADHD-screening positive students had significantly more pronounced symptoms of distress compared to other students ($p < 0.001$). All symptoms, except suicidal tendencies, are more pronounced in the group of screening-positive students ($p < 0.001$). No statistically significant difference was observed in the use of psychotropic drugs or heredity between the two groups ($p < 0.05$).

Conclusion: A high frequency of distress symptoms was shown in our sample of students. The ADHD-screening positive group of students had more pronounced distress symptoms, and the most pronounced symptom was the feeling of fatigue and lack of energy. Recognising the symptoms of ADHD in the youth population can be significant in terms of preventing symptoms of distress, primarily affecting the will and mood, which can positively affect the functionality of these persons.

Keywords:
ADHD,
students,
distress,
psychotropic drugs

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Sažetak

Uvod: Podaci iz literature pokazuju da su simptomi distresa izraženiji kod studenata u odnosu na opštu populaciju, kao i da su zastupljeniji među studentima sa izraženim simptomima poremećaja pažnje sa hiperaktivnošću (ADHD). Poremećaj pažnje sa hiperaktivnošću je karakterističan za dečiji uzrast, ali postoji i u populaciji odraslih i često je neprepoznat. Ovo je, prema dostupnim podacima iz literature, prva studija koja je ispitivala povezanost simptoma distresa i simptoma ADHD u studentskoj populaciji u Republici Srbiji.

Cilj: Ciljevi ovog istraživanja uključuju ispitivanje povezanosti simptoma distresa i prisustva simptoma ADHD u ispitivanoj populaciji studenata, kao i ispitivanje karakteristika najizraženijih simptoma distresa u grupi studenata pozitivnih na ADHD na osnovu skrininga.

Materijal i metode: . Ispitivanje je obavljeno na populaciji studenata Medicinskog fakulteta Univerziteta u Beogradu. Uključeno je 404 ispitanika, prosečne starosti 21,8 ± 1,9 godina, od čega 78,7% ispitanika ženskog pola. Primenjeni su upitnici samoprocene, kao što su Skala za samoprocenu ADHD kod odraslih (engl. *Adult ADHD Self-Report Scale* - ASRS v1.1), Upitnik za procenu zdravlja pacijenata–9 (engl. *Patient Health Questionnare-9* - PHQ-9), Upitnik za generalizovani anksiozni poremećaj–6 (engl. *General Anxiety Disorder-6* - GAD-6) i Upitnik za procenu zdravlja pacijenata–4 (engl. *Patient Health Questionnare*-4 - PHQ-4), kao i upitnik o sociodemografskim podacima, upotrebi psihofarmaka i naslednom faktoru ADHD napravljen za potrebe ovog istraživanja.

Rezultati: U našem uzorku, 6,4% studenata imalo je teške depresivne simptome, a 9,6% simptome teške anksioznosti. Studenti pozitivni na ADHD na osnovu skrininga imali su značajno izraženije simptome depresivnosti, anksioznosti i distresa u odnosu na ostale studente ($p < 0,001$). Svi pojedinačni simptomi negativnih afektivnih stanja, osim suicidnih tendencija, izraženiji su u grupi skrining pozitivnih studenata ($p < 0,001$). Nije uočena statistički značajna razlika u upotrebi psihofarmaka ili naslednom faktoru među ispitivanim grupama studenata ($p < 0,05$).

Zaključak: U našem uzorku studenata pokazana je visoka učestalost simptoma distresa. Grupa studenata pozitivna na ADHD na skriningu ima izraženije simptome distresa, a najizraženiji simptom bio je osećaj umora i nedostatka energije. Prepoznavanje simptoma ADHD u populaciji mladih može biti značajno u smislu prevencije simptoma distresa, pre svega uticaja na volju i raspoloženje, što može pozitivno uticati na funkcionalnost ovih osoba.

Ključne reči:
ADHD,
studenti,
distres,
psihofarmaci

Introduction

The student population is at risk of experiencing depression and anxiety, which cause psychological distress and may impact their academic performance and overall functionality (1). Depression is defined by the ICD-10 as an affective disorder with lowering of mood, reduction of energy, and decrease in activity (2). Anxiety is defined as an emotional state of irrational feeling of impending danger, followed by feelings of tension, unpleasantness and fear (2). Psychological distress is an indicator of mental health used in epidemiological and clinical studies and is defined as a state of emotional suffering characterised by symptoms of anxiety and depression (3). It is estimated that 12 – 50% of college students present at least one diagnostic criterion for one or more mental disorders (4). Studies have shown that the prevalence of depression and anxiety symptoms among students was as high as 33.6% and 39% respectively (1). Systematic reviews on the general population estimate the prevalence of depression in the range of 4.4 - 5% (5), and anxiety in 3.8 - 25% (6), which makes it clear that the student population is vulnerable to the group of depressive-anxious symptoms and disorders. On the other hand, authors have also shown a high prevalence of these symptoms in medical students specifically. Medical school is often stressful due to the length of education, academic pressure, the stress of obtaining clinical practice and experience (7), and in some countries, the uncertainty of employment.

Studies have also aimed to define the factors that might be associated with depression and anxiety in the student population. We hypothesise that the different prevalence of distress symptoms between the student and the general population is in part due to a higher prevalence of ADHD symptoms. Anastopulos et al. (8) found that mood and anxiety disorders are present in 10.6% to 11.9% of the general student population and that students with more pronounced ADHD symptoms are more prone to these comorbidities. As many as 80% of adults with ADHD have at least one other psychiatric disorder, most commonly mood disorders, anxiety disorders, or addiction (9). Literature reviews indicate that the mentioned psychiatric comorbidities are also present in the population of students with a diagnosis or

pronounced symptoms of ADHD (10, 11).

Attention deficit hyperactivity disorder (ADHD) is typically diagnosed in childhood, but there is rising evidence of its presence in adults as well (12). Symptoms usually appear before adolescence, but significant clinical manifestations may also become evident in late adolescence or early adulthood. More precisely, it is possible that compensation mechanisms, derived from high intellectual capacities and a supportive environment, lead to consequences of symptoms becoming recognisable only when the demands become greater and more complex later in life (13). According to the only available study in Serbia (14), by using an appropriate screening scale (Adult ADHD Self Report Scale - ASRS v1.1), there were 11% screening positive respondents of the general population (adults, n = 226, 43.8% male), indicating an increased risk for a clinical diagnosis of ADHD. The diagnosis can only be made when a complete clinical interview is performed. Gray et al.(15) showed that the ASRS v1.1 scale can also be used on the student population.

In the context of the possible later recognition of ADHD, it is essential to focus on the student population. The beginning of college/university is a new phase of functioning, with multiple and complex everyday tasks, not only related to education but also everyday life, organising and self-care. It requires great self-regulatory abilities, and ADHD is characterised by impairment of self-regulation (16). Therefore, it is not only important to provide persons with ADHD additional support in this period of life, but also to establish the effect of unrecognised ADHD symptoms in this population.

The first aim of this study is to determine the prevalence of distress symptoms in the studied population of students. The second aim is to examine the connection between distress symptoms and the presence of ADHD symptoms, as well as to examine the characteristics of the most pronounced distress symptoms in the group of ADHD-screening-positive students.

Material and methods

The respondents were students of the Faculty of Medicine, University of Belgrade (FMUB) from all six years of study. The questionnaire was made using Google Forms and distributed through social media. Data collection lasted from December 2022 to January 2023. Before accessing the questionnaire, the respondents were given information about the research. They could access the questionnaire only if they indicated that they agreed to participate. The questionnaire was anonymous, and respondents could withdraw at any time without explanation. Permission for this study was given by the Ethics Committee of the Faculty of Medicine of the University of Belgrade (17/I-28). The research was carried out as part of a wider study titled „Symptoms of attention deficit and hyperactivity disorder in medical students - frequency and association with distress".

Question group A of the ASRS v1.1 self-report scale (17) was used to screen ADHD symptoms. On a scale from 0 to 6, respondents with a score of 4 and above are labelled as screening positive, and the rest as screening positive. The PHQ-9 (Patient Health Questionnaire-9) self-report scale was used to assess symptoms of depression (18). On a scale from 0 to 27, scores of 20 and above are marked as „severe depression", from 15 to 19 „moderately severe depression", from 10 to 14 „moderate depression", from 5 to 9 „mild depression", and less than 5 as „none-minimal depression" (18). The GAD-6 scale (General Anxiety Disorder-6) was used to assess symptoms of anxiety. This scale contains items from the GAD-7 scale (19), except „Becoming easily annoyed or irritable" due to an error in distribution. Therefore, the internal validity of the questionnaire was evaluated using Cronbach's alpha. Cronbach's alpha is 0.908, making the GAD-6 valid for assessing anxiety. The scale results were multiplied by 1.17 (7/6) to scale the results with the ranking of results on the GAD-7 scale according to the recommendation of the Department of Medical Statistics and Informatics of the FMUB. On a scale of 0 to 21, scores of 15 and above are designated as „severe anxiety", 10 and above as „moderate anxiety", 5 and above as „mild anxiety", and the rest as „minimal anxiety" (19). General distress can be expressed by the PHQ-4 self-assessment scale (20), which consists of the first two questions from the PHQ-9 scale and the first two questions from the GAD-7 scale. On a scale of 0 to 12, scores of 9 and above are marked as „severe distress", from 6 to 8 „moderate distress", from 3 to 5 „mild distress", and the rest as „minimal distress" (20). The most pronounced symptoms were determined by the frequency of „Nearly every day" answers on the PHQ-9 and GAD-6 questionnaires.

Respondents were given a socio-demographic questionnaire (gender, age, year of study), and a questionnaire about the use of psychotropic drugs and the existence of psychiatric heredity. Questions about the use of psychotropic drugs include questions about the use of antidepressants and anxiolytics, as well as „Do you use any other psychotropic drugs?" where the respondents could name the drugs they used that did not fall in the first two categories. In the subsequent data processing, drug names were replaced by their class and entries with non-psychotropic drugs were removed. In cases where multiple medications were listed, priority is given to ADHD-targeted therapy or a class of medication that does not fall into the first two categories. To facilitate statistical processing, all entries in which the drug class is specified are marked with „Yes" and the others with „No", and the drug classes are listed in the results.

Statistical analysis was performed in the EZR program. Percentages from the studied population were used to assess the prevalence of distress symptoms and the use of psychotropic drugs. The chi-square test was used to examine the differences between the screening-positive and screening-negative student groups in the use of psychotropic drugs and ADHD heredity. The chi-square test was also used to analyse the difference between the severity of symptoms stated in PHQ-9 and GAD-6 scales (answers

marked with 0 and 3 – „Never“ and „Nearly every day“) between the student groups. The Mann-Whitney U test was used to examine the differences in the PHQ-9, GAD-6, and PHQ-4 scales in these groups.

The screening positive group of students was singled out for further data processing. The Mann-Whitney U test was used to assess the differences between gender and age in the studied parameters (distress, psychotropic drug use, and heredity), while the Kruskal-Wallis test was used to determine the differences in years of study. Spearman's rank correlation test was used to assess the relationship between socio-demographic factors, the expression of ADHD symptoms, and the expression of distress symptoms.

Results

The study included 404 respondents from all years of study at the Faculty of Medicine, with an average age of 21.8 ± 1.9 years, of which 78.7% were female. On the depression scale, 6.4% of students have „severe depression“ (n = 26), and 10.9% have „moderately severe depression“ (n = 44) (**figure 1**). On the anxiety scale, 9.6% of students have „severe anxiety“ (n = 39), and 11.4% have „moderate anxiety“ (n = 46) (**figure 2**). On the distress scale, 10.4% of students show „severe distress“ (n = 42), and 17.8% have „moderate distress“ (n = 72) (**figure 3**).

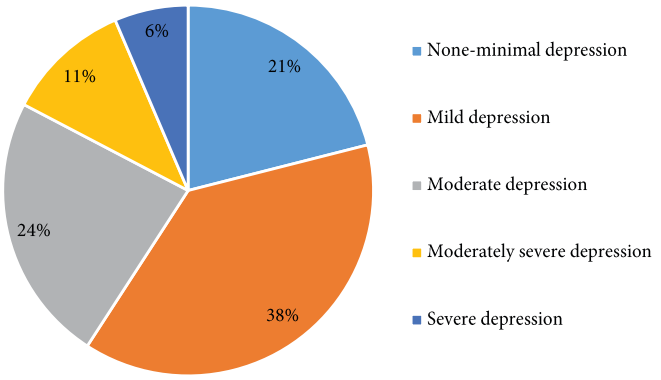

Figure 1. Levels of depression severity in medical students (frequencies), measured by the PHQ-9 detection scale.

The questionnaire on the use of psychotropic drugs shows that 12.3% (n = 50) of students in our sample use at least one drug (**table 1**), 4% use antidepressants (n = 16), and 10.4% use anxiolytics (n = 42). There are a total of five entries for the question related to the use of other psychotropic drugs (100% in the group of screening-positive students), which is why no statistical analysis was performed there. Two entries are labelled as „Stabilizer“ and three as „ADHD therapy“.

Statistically significant differences were observed in the scales PHQ-9 ($W = 5672.5$, $p < 0.001$), GAD-6 ($W = 8341.5$, $p < 0.001$), and PHQ-4 ($W = 7368.5$, $p < 0.001$) in the examined groups. The screening positive group has higher values on the PHQ-9 (13.8 ± 5.7), GAD-6 (9.2 ± 6), and PHQ-4 (6.3 ± 3.2) scales compared to the screening

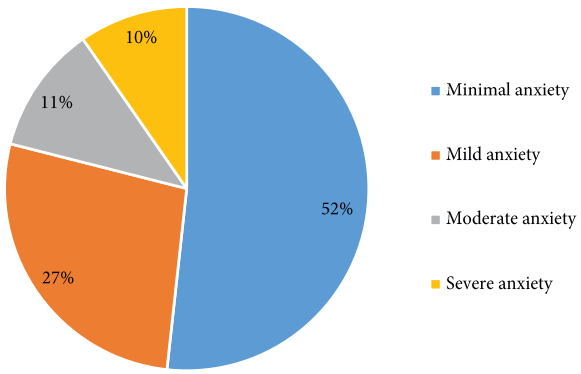

Figure 2. Levels of anxiety severity in medical students (frequencies), measured by the GAD-6 detection scale (n = 404).

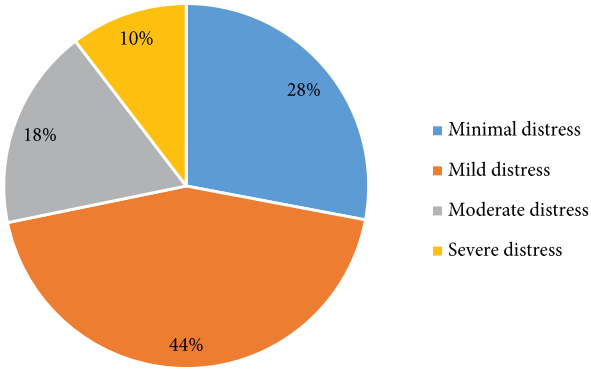

Figure 3. Levels of distress severity in medical students (frequencies), measured by the PHQ-4 detection scale (n = 404).

positive group (**table 1**). No statistically significant difference was observed in the use of psychotropic drugs and heredity between the studied groups ($p > 0.05$).

The analysis of the most manifest symptoms in both groups separately (answers marked with 3 – „Nearly every day“) showed that every symptom, except suicidal tendencies, is more pronounced ($p < 0.01$) in the ADHD-screening positive group. Even though they are more pronounced, there is no single or group of symptoms that can point to the presence of ADHD symptoms. The frequency of „Nearly every day“ responses for the PHQ-9 and GAD-6 scales for both student groups is shown in **figures 4** and **5**.

The most frequent symptom in the screening positive group of students was „Feeling tired or having little energy“, where 42% of respondents answered „Nearly every day“. Among the symptoms where the percentage of this answer was above 30% are „Worrying too much about different things“, „Little interest or pleasure in doing things“, „Trouble falling or staying asleep, or sleeping too much“, „Feeling bad about yourself – or that you are a failure or have let yourself or your family down“ and „Trouble concentrating on things, such as reading the newspaper or watching television“.

Table 1. Psychopathological and other characteristics of students in relation to the presence of ADHD symptoms.

	All students (n = 404)	ADHD-screening positive group (n = 88)	ADHD-screening negative group (n = 316)	Statistical significance
PHQ-9 score (X ± SD)	9.1 ± 5.6	13.8 ± 5.7	7.9 ± 4.9	$p < 0.001$
GAD-6 score (X ± SD)	6.2 ± 2.9	9.2 ± 6	5.3 ± 4.7	$p < 0.001$
PHQ-4 score (X ± SD)	4.4 ± 2.9	6.3 ± 3.2	3.8 ± 2.6	$p < 0.001$
Frequency of use of psychotropic drugs (n)	12.3% (50)	17% (15)	11.1% (35)	$p > 0.05$
Heredity (%)	1%	0%	1%	$p > 0.05$

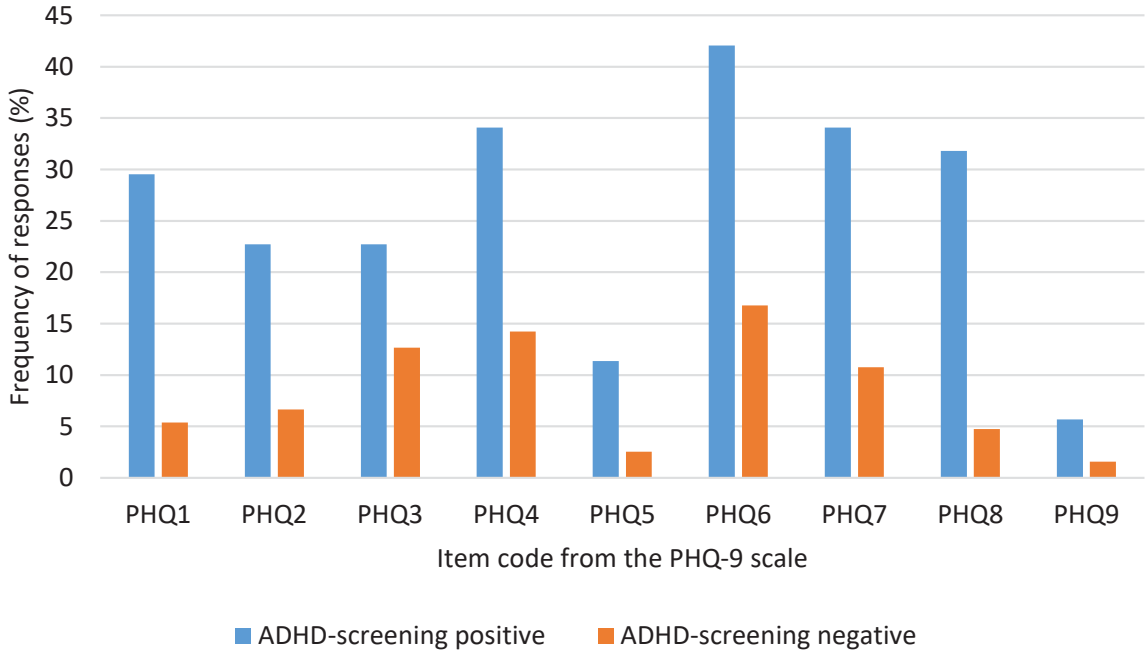

Figure 4. Frequency of responses "Nearly every day" to items in the PHQ-9 self-report scale.

Legend: PHQ1 – Loss of interest, PHQ2 – Feeling of emptiness, PHQ3 – Apetite disorder, PHQ4 – Sleep disorder, PHQ5 – Movement and speech disorder, PHQ6 – Feeling of tiredness, PHQ7 – Negative thoughts about yourself, PHQ8 – Trouble concentrating, PHQ9 – Suicidal thoughts.

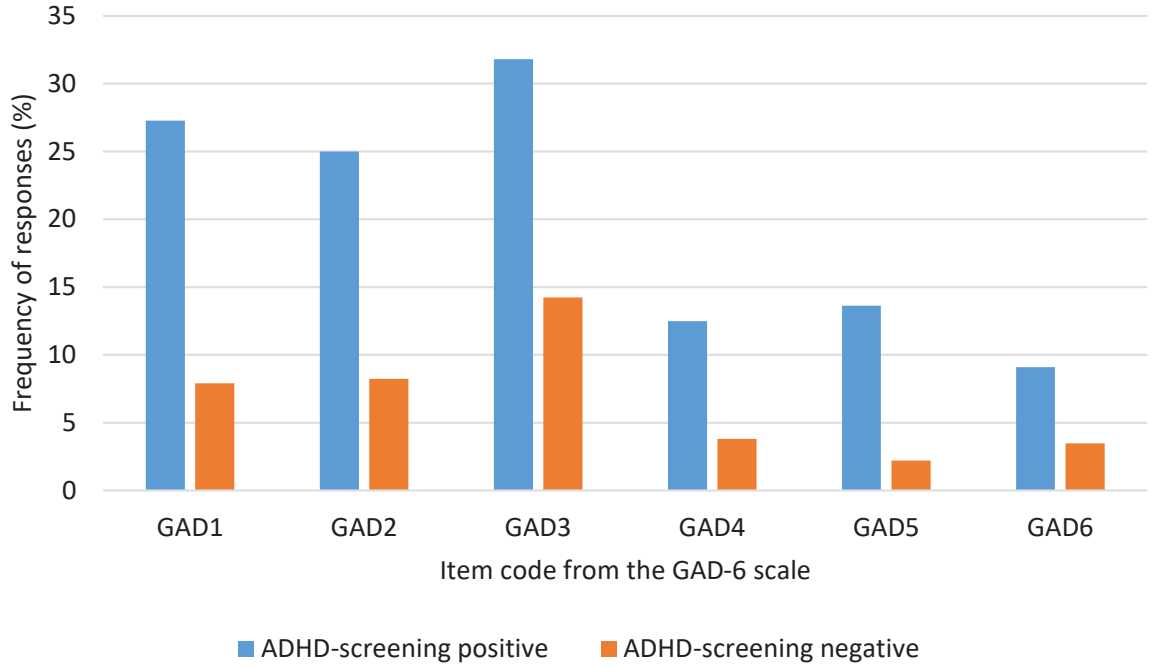

Figure 5. Frequency of responses "Nearly every day" to items from the GAD-6 self-report scale.

Legend: GAD1 – Feeling of nervousness, GAD2 – Uncontrollable worrying , GAD3 – Excessive worrying, GAD4 – Trouble relaxing, GAD5 – Feeling of restlessness, GAD6 – Anticipatory fear.

Further analyses refer to the screening positive group. No statistically significant differences or correlations of socio-demographic factors with GAD-6 and PHQ-4 scales were observed ($p > 0.05$). A statistically significant difference ($W = 460.5$, $p = 0.048$) and a positive correlation ($r = 0.21$, $p = 0.047$) were observed between gender and the PHQ-9 scale, as well as a statistically significant negative correlation ($r = -0,22$, $p = 0.039$) between years of study and PHQ-9 scale. No statistically significant differences or correlations were observed between socio-demographic parameters and the use of psychotropic drugs or heredity. Statistically significant positive correlations were observed between the presence of ADHD symptoms and the total score of PHQ-9 ($r = 0.31$, $p = 0.003$), GAD-6 ($r = 0.37$, $p < 0.001$), and PHQ-4 scale ($r = 0.24$, $p = 0.025$). A higher score in group B questions of the ASRS v1.1 scale is associated with higher scores on the distress questionnaires.

Discussion

Prevalence of distress symptoms was high in the entire sample, but significantly higher in the screening-positive group. A study on the adult population of Serbia (21) showed that high levels of depression on the PHQ-9 scale are exhibited by 1.9%, high levels of anxiety on the GAD-7 scale by 3%, and high levels of distress on the PHQ-4 scale by 4.5% of the surveyed population. In comparison, the student population in our study shows a higher expression of mentioned symptoms. A study on the student population in Spain found that 19.3% exhibited symptoms of depression and 23.6% symptoms of anxiety, which is above the normal range in the general population of students. A meta-analysis from 2016 (22) showed an increase in the occurrence of symptoms of depression by 13.5% among respondents before and during studies of medicine. The authors hypothesise that this increase in depressive symptoms is not related to medical studies, but the beginning of university studies itself, as the students' environment changes and expectations from them become greater.

The degree of use of psychotropic drugs (12.3% of respondents, $n = 50$, of which 32% use antidepressants and 84% anxiolytics) is higher than in the references. Bojanic et al. (23) showed that among the student population of Norway (18 - 35 years, $n = 49836$, 69% women), 3.5% use antidepressants, and 4.2% anxiolytics. Balayssac et al. (24) found that among students of pharmacy in France (22 ± 2.3 years, $n = 2575$, 65.9% women), 9.4% take some form of psychotropic therapy. The higher degree of use of psychotropic drugs, especially anxiolytics, in our sample could be attributed to more frequent and „looser" prescriptions of such medicine in Serbia (25).

The research shows no difference in ADHD heredity between the screening positive and screening negative groups. As these students have high ADHD scores and don't have diagnoses even though they are young adults, this result is in agreement with the results shown in the study stating that ADHD heredity is much rarer in those diagnosed during adulthood compared to those diagnosed in childhood (26).

Screening-positive students exhibit a significantly higher degree of symptoms of depression and anxiety compared to the screening-negative group. This is in agreement with other studies examining these symptoms in the student population (6, 25–27). Among the screening positive students, women had significantly higher scores on the PHQ-9 scale. That is in accord with epidemiological studies on the general population (30).

In the screening positive group, PHQ-9 scores display a trend of decreasing with the year of study, even though there is no statistically significant decrease in ADHD symptoms. A study in Portugal (31) showed that there is a decrease in depression scores on the BDI (Beck Depression Inventory) scale with the year of study. However, it also showed that low anxiety at the beginning of studies and satisfaction with department selection were protective factors, which weren't examined in this study.

The most frequently expressed symptom in the ADHD-screening positive group of students referred to the feeling of tiredness or having little energy. This symptom could be explained by the symptoms of ADHD in adults, in this case, behavioural dysregulation (32).

The following most frequently expressed symptoms were excessive concern about different things and negative thinking about oneself. This might be a significant finding since it was shown that poor self-efficacy and maladaptive beliefs about worry are indeed factors that increase vulnerability to anxiety disorders in the college population with ADHD (16).

One of the most prominent symptoms was decreased interest and satisfaction, which could be explained by emotional dysregulation (32), a possibly important mediator/psychological risk factor for the comorbidity of ADHD and depression in young people (33).

In addition, in young adults with ADHD, avoidant behaviour in terms of social isolation and procrastination are frequent maladaptive strategies that repeatedly maintain and worsen depressive symptoms (31). Sleep problems could be explained by hyperactivity and difficulty concentrating due to attention deficit disorder (32). Considering this research did not include a detailed questionnaire on the factors mentioned in the previous paragraphs, such conclusions cannot be made with certainty.

Other limitations of this study include the fact that it was conducted by distributing online questionnaires through social networks, which may have created sampling bias. Self-assessment questionnaires can lead respondents to overstate or understate the severity of their symptoms, and it is necessary to apply structured interviews for a more objective assessment of symptoms. An error during the administration of the GAD-7 questionnaire probably caused lower-than-real values to be shown due to a missing item. There is an uneven gender distribution among respondents, where there are four times more women than men (although, according to data from the student service, there are approximately twice as many women as men),

which is in agreement with current research on factors that influence an individual's tendency to fill out online questionnaires (34). Since only symptoms of anxiety and depression were examined, that could explain the low degree of correlation with other examined parameters. That also gives an insufficiently clear picture of the subject due to the possible existence of other unexamined psychiatric comorbidities.

Conclusion

The presence of depressive and anxious symptoms in students is very significant since they are more prevalent than in the general population. This period of life is shown to be followed by significant distress, making the student population vulnerable. It is crucial to recognise the factors that might contribute to the development of depression and anxiety in students. Recognising the symptoms of ADHD in the adult population is very important, considering the negative impact they have on the health and quality of life of the individual, even for those who have only a few symptoms (35).

This research showed that the screening positive group of students has more pronounced symptoms of distress. However, no significant difference was demonstrated between the screening positive and screening negative groups regarding the use of psychotropic drugs.

That finding confirms the importance of symptom recognition, as it shows that the students in need of medical attention are not getting the proper care or therapy, probably due to their symptoms remaining unrecognized. Directing attention to the specific needs of vulnerable students with ADHD symptoms and applying timely and personalised treatment and support could improve functionality, both by acting on primary symptoms and by preventing the development of distress symptoms that can further reduce the quality of life of these individuals. In addition, more detailed research that would include other individual characteristics of people with ADHD symptoms and their impact on functionality would help define additional protective and risk factors that should be addressed in treatment.

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