A TEN-YEAR STUDY OF DEPRESSIVE SYMPTOMS IN SERBIAN MEDICAL STUDENTS

Dragana Ristić-Ignjatović[1], Darko Hinić[2], Mihajlo Jakovljević[1], Kostas Fountoulakis[3], Marianna Siepera[3] and Nemanja Rančić[1]

[1]School of Medicine, University of Kragujevac, Kragujevac; [2]Department of Psychology, University of Novi Pazar, Novi Pazar, Serbia; [3]Department of Psychiatry, Aristotle University of Thessaloniki, Thessaloniki, Greece

SUMMARY – The main objective of this study was to examine the rate of three dimensions of depressive symptoms in medical student population in Serbia, and to find out whether this rate had changed over the period of ten years. This cross-sectional study included 615 medical students (F=61% and M=39%), mean age = 23.60 (SD=1.541), who were tested in five non-consecutive surveys between 2002 and 2012. Depressive symptoms were measured by the Beck Depression Inventory (BDI). The mean BDI score for the entire sample was 6.26±6.175. There was no significant difference in total BDI score among the values obtained during the ten years of testing. The greatest portion of the examined sample (77.24%) had no signs of depressive symptoms, and there was no difference in symptom intensity between medical students and other educational profiles. Similar to previous results, females had higher scores on all depressive dimensions except for one tested year, whereas a weak correlation was found between BDI scores and student age (r=0.104; p=0.010). Since there are still discrepancies among studies that do (not) report that medical students have typical depressive symptoms, potential explanations for the mentioned discrepancies may be found in individual characteristics of the members of the student population. Our suggestions for future studies are that they should include the stress factor, stress coping strategies, estimated life satisfaction, and the impact of these factors on the potential mental disorders.

Key words: *Beck Depression Inventory scale; Depression – diagnosis; Behavioral symptoms; Medical students*

Introduction

Although there is a popular perception that the days of being a student are the happiest in one's life, a closer review shows that students throughout the world are exposed to stress symptoms, depression, alcohol abuse and suicidal ideation[1-5]. There is a lot of evidence supporting the idea that medical students are particularly susceptible to developing depression symptoms during academic years due to the exposure to increased stress associated with the profession itself, and the fear of

making a mistake in the course of clinical practice[3,6-8]. The rates of anxiety and depression are significantly increased in medical students compared to students of other disciplines[4,5,8-11]. In the studies that used the Beck's Depression Inventory (BDI), also employed in the present study, the measured prevalence of depression among medical students ranges from 14% to 24%, which is significantly higher in comparison with 3%-4% of the general population[9,12,13]. However, there are findings reporting the lack of significant differences, which additionally complicates the situation[14-16].

Unrecognized depressive disorders in medical students represent not only a problem for themselves but also for their relationships with patients[17,18]. Depressive symptoms often appear in early academic years,

and since medical students establish a contact with patients rather early in their curriculum, unrecognized depressive reactions can directly affect relations with the patient and patient's recovery[4,5,9,19-21]. The situation is getting even more complicated with the fact that doctors do not normally seek help from psychiatrists when experiencing such disorders, which also appears to be characteristic of medical students[22-25].

Subjects and Methods

The main objective of our work was to examine the rate of depressive symptoms in medical student population in Serbia, and to find out whether this rate had changed over the period of ten years. The subsidiary aim was to determine whether there were differences between the three dimensions of depressive symptoms (cognitive, affective and somatic).

Research of depressive symptoms in the student population was conducted as part of a larger project, with the aim to validate the BDI-IA scale in the Serbian student sample. In this work, we present the results on the potential existence of depressive symptoms in medical students from 2002, when the scale was applied for the first time, until 2012, when it was applied for the fifth time. Having obtained the Ethics Committee approval, the participants from the School of Medicine, University in Kragujevac, voluntarily and anonymously completed a brief sociodemographic questionnaire and the BDI-IA. In order to avoid the possible influence of specific stress periods (such as the examination period), the questionnaires were administered at least a month before the examination period. In order to avoid the influence of physical illness on the BDI somatic score, the study recruited only those students who currently or during the previous week had not suffered from a physical condition.

Sample

This ten-year study included 615 medical students, 61% of females and 39% of males, which is similar to the samples in other studies where female students represented 55%-70%[21,26]. Their mean age was 23.60±1.541 (ranging from 21 to 30), with no significant difference throughout the testing years (Table 1). A significantly higher age of students compared to similar research in student populations[14,21] can be explained by longer duration of medical studies, as well as the fact that studying in Serbia has no binding criteria to be fulfilled to enroll the next academic year.

Most studies show the highest rate of depression in medical students during the second and third academic years[19,20,26], although there are findings suggesting that medical students show elevated scores on stress and depressed mood inventories at the transition from basic-to-clinical training and during the later years of studying[5]. This is the reason why we wanted to examine the extent of depressive symptoms during the fourth academic year, which is the period when students are already beginning to do their practical work with patients more seriously (medical studies in Serbia last for six years).

Instruments

Symptoms of depression were measured with the Beck Depression Inventory (BDI-IA). The BDI-IA version was long used as an efficient tool in the clinical setting and for the general population[27-29]. In 2001, at the beginning of research, BDI-IA was still widely used in all mental health institutions of the region, which was the reason why BDI-IA was chosen over BDI-II in this longitudinal study.

BDI-IA consists of 21 questions that measure various symptoms of depression such as sadness, pes-

Table 1. Sample size and distribution of Beck Depression Inventory (BDI) scores according to years of testing

Year		2002	2006	2008	2010	2012	Total
N		95	82	129	135	174	615
Sex	Male	31	33	60	49	66	239
	Female	64	49	69	86	108	376
Age	Mean	23.97	23.79	22.83	23.79	23.74	23.60
BDI score	Mean	5.85	7.27	7.00	5.80	5.94	6.26

simism, self-criticalness, agitation, guilt, irritability, loss of appetite, changes in appetite, fatigue, change in sleep patterns, and loss of interest in sex. Each question has four-answer choices on a scale from 0 to 3, with higher scores indicating an increasing level of symptom intensity. The rating scale is as follows: 0-9 no symptoms; 10-15 mild mood change or mild depression state; 16-19 mild to moderate depression; 20-29 moderate depression; and 30-63 severe or clinical depression[29]. The internal consistency for the BDI-IA has the mean alpha coefficient of 0.81 for nonclinical samples[28,30].

For the purposes of this study, the scores on factors included in the BDI scale (cognitive, affective and somatic) were also calculated. Although there is evidence supporting the two-factor structure (cognitive, affective and somatic) of the BDI[31], the standardized Serbian version of the scale confirms the three-factor structure[32]. In addition, we believe such a structure to be more extensive and more appropriate for our specific goals.

Statistical analysis

The data were analyzed by means of standard statistical methods in SPSS 16.0 for Windows. The difference in variables was analyzed by means of unpaired t-tests and ANOVA, and the correlation with Pearson's coefficient. All tests were 2-tailed, with p considered statistically significant at the level of 0.05.

Results

Cronbach's coefficient of the scale was α=0.861 (the lowest in 2001 – 8.48 and the highest in 2006 – 8.78), suggesting a high internal consistency. The item intercorrelation matrix showed a low correlation for the items Change in Body Image and Somatic Preoccupation, which is consistent with previous results[28,32]. Factor analysis confirmed the three-factor structure of the Serbian version, which gave further support to calculating scores on three dimensions of the BDI.

The mean BDI score for the entire sample was 6.26±6.175. The distribution was significantly biased towards lower values, which is expected due to the nonclinical nature of the sample.

There was no statistically significant difference in the total BDI score among the values obtained during the ten years of testing ($F(4)=2.137$; $p=0.075$). Moreover, there was no significant difference in cognitive (M=0.25; SD=0.304), affective (M=0.40; SD=0.434) and somatic factors (M=0.31; SD=0.369), which were analyzed separately.

The greatest portion of the examined sample (77.24%) had no signs of depressive symptoms. There were 16.26% of students within the group that scored 10-18 (mild depression) and 6.18% with a score 19-29 (moderate depression). Only 0.33% of students scored 30 and more on BDI.

There was a significant sex difference in total BDI score ($t(615)=2.687$ $p=0.007$), as well as in somatic ($t(576)=2.352$; $p=0.019$), cognitive ($t(558)=2.557$; $p=0.011$) and affective dimensions ($t(613)=1.969$; $p=0.047$) except for 2008, when no such difference was reported. There was a significant but weak correlation of BDI score with student age ($r=0.104$; $p=0.010$), as well as with somatic ($r=0.124$; $p=0.002$), affective ($r=0.094$; $p=0.020$) and cognitive ($r=0.155$; $p<0.001$) subfactors. Socioeconomic status had not been examined from the start; however, in the last two surveys, it showed no significant relation to BDI scores.

Finally, a higher level of depression was identified in the medical student population in comparison to other educational profiles in the last two surveys; nonetheless, this difference did not exceed the border of significance ($p=0.077$).

Discussion

The greatest portion of the study sample showed no signs of depressive symptoms (77.24%), as expected from other research on the subject[14-16,20,26]. The mean BDI score for our sample was lower than those for medical students from Macedonia (8.3), Turkey (from 11.1 to 10.57), and Brazil (9.1)[6,15,21,26]. However, the mean BDI score for Dublin students was 5.0[16]. The frequency of depressive symptoms (score higher than 9) in our sample (22.76%) was lower than the one recorded among students in San Francisco (24%), Dubai (27.18%), and Brazil (38.2%)[13,14,21]. In view of similar research in some countries of former Yugoslavia, medical students from Macedonia had a greater frequency of BDI scores above 17 points (10.4%) compared to our score of 8.5%[26]. Similarly, 9.7% of the general student population from the University of

Ljubljana, Slovenia, showed depressive symptoms[33]. In Mostar (Bosnia and Herzegovina), a very high rate of depression was found among medical students and medical doctors, with 41.4% of the participants falling into the category of mild and 17.9% into the category of moderate depression[34]. Therefore, we may notice that differences did exist but were not significant in most cases, which could be the result of methodological differences rather than cultural or other differences among the countries of the same region.

According to previous results, females mostly had higher levels of depressive symptoms, which was also confirmed by our study[4,9,15,19,21,26]. This finding may probably be interpreted as a different pattern of stress response and different manners of coping with stress and depressive life events[35], as well as developmental and cultural characteristics of sex role identification[36].

Although the results showed only a weak correlation with student age, it is worth closer inspection. Namely, since the sample referred to the same year of study throughout the test period, greater differences in student age mainly occurred as a result of the fact that some students had lost a year, some of them even more than once. Findings of previous studies indicate that losing a year is a significant predictor of a decrease in life quality in medical students[37]. Despite the fact that no variable recorded year losing, these findings lead us to a logical conclusion that older students (who most likely attended the same lectures more than once) showed a higher rate of depression because they found that they had not successfully completed their academic years. Medical studies frequently require from students to learn a considerable amount of information within a limited time. The overload of information seems to create feelings of academic inadequacy, and therefore, many students question their ability to meet the demands of medical education[38,39]. Causes of academic failure in respective environment are widespread, from change of habits during the first year, competitive environment, home, social and emotional problems, to financial issues or problems with deficient study skills[40,41]. These feelings of academic inadequacy, and cognitive symptoms of depression, in our opinion, may be particularly salient for those students who have weaker academic records[41]. All these factors should be examined thoroughly in more controlled conditions.

This study was part of a broader research investigating the levels of depressive symptoms in different student populations; therefore, it would also be essential to compare these findings with the results of other education profiles. Some recent studies in the region show that there are no significant differences in the quality of life of students from different educational fields[37], some of them even suggesting that students of educational profiles other than medicine (such as pharmacy) might show a higher rate of depressive symptoms[42]. Our results show higher scores in medical students, but they did not exceed the borderline statistical significance in comparison to other educational profiles.

Conclusion

Nowadays, ever more attention is being paid to different medical, ethical, legal and economic standards regulating the complex relations between medical staff and patients. Medical expertise has gradually grown into an interdisciplinary and multidisciplinary field that requires professional and ethical approach, continuous training and close collaboration with different professions[43]. One essential area is mental health care of medical staff, since only a healthy doctor can adequately look after patient health.

There has recently been a growing concern about the increasing rate of anxiety and stress among medical students[44]. However, as expected, the majority of medical students in Serbia showed no signs of depressive symptoms. Moreover, there have been no significant differences reported in depressive symptom levels in university students during the last ten years. Despite the fact that there must have been a great change in external circumstances, these findings pinpoint the stability of this phenomenon in university student population and, most likely, indicate satisfactory coping strategies of our students. The previously mentioned may also suggest the importance of investigating this aspect of psychological functioning.

What is then the reason for higher depressive scores obtained in medical student population in some studies? It is quite plausible that a problem with distinguishing temporary stress symptoms, which are very common during academic years, occurred in similar studies; hence we maintain that future research

into university student population should include the stress factor, as well as individual mechanisms of dealing with stress.

The next important finding is that female students had higher levels of depressive symptoms than male; therefore, we completely agree with the suggestions of other authors[21] that further investigation into sex differences among medical and other students is required so as to develop a sex-specific program to prevent stress-related mental disorders.

A limitation of our study was that we did not measure other factors that could influence depression scores. Some well-known risk factors for developing affective disorders are the lack of family support, personal history of depressive disorders, and personal beliefs towards medical profession[21,23]. Based on the review of the existent findings, we propose that future research be focused primarily upon basic individual differences, such as temperament, quality of life and estimated life satisfaction, causes of academic failure, and the impact of these factors on depressive disorders.

References

1. GARLOW SJ, ROSENBERG J, MOORE JD, HAAS AP, KOESTNER B, HENDIN H, NEMEROFF CB. Depression, desperation, and suicidal ideation in college students: results from the American Foundation for Suicide Prevention College Screening Project at Emory University. Depression Anxiety 2008;25:482-8.

2. MIKOLAJCZYK RT, MAXWELL AE, El ANSARI W, NAYDENOVA V, STOCK C, ILIEVA S, DUDZIAK U, NAGYOVA I. Prevalence of depressive symptoms in university students from Germany, Denmark, Poland and Bulgaria. Soc Psychiatry Psychiatr Epidemiol 2008;43:105-12.

3. GUTHRIE E, BLACK D, BAGALKOTE H, SHAW C, CAMPBELL M, CREED F. Psychological stress and burnout in medical students: a five-year prospective longitudinal study. J R Soc Med 1998;91:237-43.

4. ZOCCOLILLO M, MURPHY GE, WETZEL RD. Depression among medical students. J Affect Disord 1986;11:91-6.

5. HELMERS KF, DANOFF D, STEINERT Y, LEYTON M, YOUNG SN. Stress and depressed mood in medical students, law students, and graduate students at McGill University. Acad Med 1997;72:708-14.

6. AKTEKIN M, KARAMAN T, SENOL YY, ERDEM S, ERENGIN H, AKAYDIN M. Anxiety, depression and stressful life events among medical students: a prospective study in Antalya, Turkey. Med Educ 2001;35:12-7.

7. FIRTH-COZENS J. Stress in medical undergraduates and house officers. Br J Hosp Med 1989;41:161-4.

8. DAHLIN ME, RUNESON B. Burnout and psychiatric morbidity among medical students entering clinical training: a three-year prospective questionnaire and interview-based study. BMC Med Educ 2007;7:6.

9. CLARK DC, ZELDOW PB. Vicissitudes of depressed mood during four years of medical school. JAMA 1988;260:2521-8.

10. LEVINE RE, BRYANT SG. The depressed physician: a different kind of impairment. Hosp Physician 2000;36:67-73.

11. WOLF TM, SCURRIA PL, WEBSTER M. A four-year study of anxiety, depression, loneliness, social support and perceived mistreatment in medical student. J Health Psychol 1998;3:125-36.

12. TJIA J, GIVENS JL, SHEA JA. Factors associated with undertreatment of medical student depression. J Am Coll Health 2005;53:219-24.

13. GIVENS JL, TJIA J. Depressed medical students' use of mental health services and barriers to use. Acad Med 2002;77:918-21.

14. AHMADI J, KAMEL M, AHMED MG, BAYOUMI FA, MONEENUM AA. Dubai Medical College students' scores on the Beck Depression Inventory. Iran Red Crescent Med J 2008;10:169-72.

15. KAYA M, GENÇ M, KAYA B, PEHLIVAN E. Prevalence of depressive symptoms, ways of coping, and related factors among medical school and health services higher education students. Turk J Psychiatry 2007;18:137-46.

16. CURRAN TA, GAWLEY E, CASEY P, GILL M, CRUMLISH N. Depression, suicidality and alcohol abuse among medical and business students. Irish Med J 2009;102:249-52.

17. TYSSEN R, VAGLUM P, GRONVOLD NT, EKEBERG O. Factors in medical school that predict postgraduate mental health problems in need of treatment. A nationwide and longitudinal study. Med Educ 2001;35:110-20.

18. FIRTH-COZENS J, GREENHALGH J. Doctors' perceptions of the links between stress and lowered clinical care. Soc Sci Med 1997;44:1017-22.

19. DYRBYE LN, THOMAS MR, SHANAFELT TD. Systematic review of depression, anxiety and other indicators of psychological distress among U.S. and Canadian medical students. Acad Med 2006;81:354-73.

20. LEVINE RE, LITWINS BA, FRYE AW. An evaluation of depressed mood in two classes of medical students. Acad Psychiatry 2006;30:235-7.

21. BALDASSIN S, ALVES TC, de ANDRADE AG, NOGUEIRA MARTINS LA. The characteristics of depressive symptoms in medical students during medical education and training: a cross-sectional study. BMC Med Educ 2008;8:60.

22. ROSVOLD EO, BJERTNESS E. Illness behavior among Norwegian physicians. Scand J Public Health 2002;30:125-32.

23. TYSSEN R, ROVIK JO, VAGLUM P, GRONVOLD NT, EKEBERG O. Helpseeking for mental health problems among young physicians: is it the most ill that seeks help? – a longitudinal and nationwide study. Soc Psychiatry Psychiatr Epidemiol 2004;39:989-93.

24. CHEW-GRAHAM CA, ROGERS A, YASSIN N. 'I wouldn't want it on my CV or their records': medical students' experiences of help-seeking for mental health problems. Med Educ 2003;37:873-80.

25. HOOPER C, MEAKIN R, JONES M. Where students go when they are ill: how medical students access health care. Med Educ 2005;39:588-93.

26. MANCEVSKA S, BOZINOVSKA L, TECCE J, PLUNCEVIK-GLIGOROSKA J, SIVEVSKA-SMI-LEVSKA E. Depression, anxiety and substance use in medical students in the Republic of Macedonia. Bratisl Lek Listy 2008;109:568-72.

27. BECK A, STEER R. Beck Depression Inventory Manual. San Antonio, TX: Psychological Corporation, 1993.

28. BECK AT, STEER RA, BALL R, RANIERI W. Comparison of Beck Depression Inventories -IA and -II in psychiatric outpatients. J Pers Assess 1996;67:588-97.

29. TIMOTIJEVIĆ I, PAUNOVIĆ VR. Instrumenti kliničke procene u psihijatriji. Beograd: Institut za mentalno zdravlje, 2003.

30. BECK AT, STEER RA, GARBIN MG. Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation. Clin Psychol Rev 1988;8:77-100.

31. BECK AT, STEER RA, BROWN GK. Manual for the Beck Depression Inventory-II. San Antonio, TX: Psychological Corporation, 1996.

32. RISTIĆ-IGNJATOVIĆ D, HINIĆ D, JOVIĆ J. Evaluation of the Beck Depression Inventory in nonclinical student sample. West Indian Med J 2012;61:491-5.

33. KLEMENC-KETIS Z, KERSNIK J, EDER K, COLARIC D. Factors associated with health-related quality of life among university students. Serb Arch Med 2011;139:197-202.

34. SAKIĆ M, MARTINAC M, SKOBIĆ H, JAKOVLJEVIĆ M. Depression among students of the Medical Faculty and doctors in Mostar. Med Arch 2005;59:19-22.

35. HOJAT M, GLASER K, XU G, VELOSKI JJ, CHRISTIAN EB. Gender comparisons of medical students' psychosocial profiles. Med Educ 1999;33:342-9.

36. WICHSTRØM L. The emergence of gender difference in depressed mood during adolescence: the role of intensified gender socialization. Dev Psychol 1999;35:232-45.

37. STOJKOVIĆ T, RALIĆ T, LATAS M. Quality of life among medical students. Engrami 2010;32:43-51.

38. LEE J, GRAHAM AV. Students' perception of medical school stress and their evaluation of a wellness elective. Med Educ 2001;35:652-9.

39. WOLF TM, FAUCETT JM, RANDALL HM, BALSON PM. Graduating medical students' ratings of stresses, pleasures, and coping strategies. J Med Educ 1988;63:636-42.

40. SAYER M, De SAINTONGE CM, EVANS D, WOOD D. Support for students with academic difficulties. Med Educ 2002;36:643-50.

41. STEWART SM, LAM TH, BETSON CL, WONG CM, WONG AMP. A prospective analysis of stress and academic performance in the first two years of medical school. Med Educ 1999;33:243-50.

42. OBRADOVIĆ D, PANTIĆ M, LATAS M. Evaluation of the psychical state of medical students. Engrami 2009;31:47-55.

43. GNJIDIĆ Ž, FATOVIĆ-FERENČIĆ S. Medical expertise as a historical phenomenon and academic discipline. Acta Clin Croat 2010;49:89-97.

44. ADAMS J. Straining to describe and tackle stress in medical students. Med Educ 2004;38:463-4.

Sažetak

DESETOGODIŠNJE ISPITIVANJE DEPRESIVNIH SIMPTOMA KOD STUDENATA MEDICINE U SRBIJI

D. Ristić-Ignjatović, D. Hinić, M. Jakovljević, K. Fountoulakis, M. Siepera i *N. Rančić*

Osnovni cilj studije bio je utvrditi razine triju dimenzija depresivnih simptoma kod studenata medicine u Srbiji, te mijenjaju li se te razine tijekom razdoblja od deset godina. Ova populacijska studija obuhvatila je 615 studenata medicine (M=61%; Ž=39%) srednje dobi od 23,60 (SD=1,541) godina, koji su testirani u pet odvojenih ispitivanja od 2002. do 2012. godine. Depresivni simptomi procjenjivani su pomoću Beckova inventara depresivnosti (BDI). Srednji zbir BDI za cjelokupni uzorak iznosio je 6,26±6,175. Nije utvrđena značajna razlika u zbiru BDI tijekom deset godina testiranja. Najveći dio ispitanog uzorka (77,24%) nije pokazao depresivne simptome, a također nije utvrđena ni značajna razlika između studenata medicine i ostalih obrazovnih profila prema intenzitetu ovih simptoma. Slično ostalim studijama, žene su bilježile više vrijednosti na svim dimenzijama depresivnosti (osim jedne ispitivane godine), dok je slaba korelacija utvrđena između zbira BDI i dobi (r=0,104; p=0,010). Pošto i dalje postoje neslaganja između studija koje (ne) pokazuju da studenti medicine imaju izražene simptome depresivnosti, potencijalna objašnjenja ovih nalaza trebalo bi tražiti u individualnim karakteristikama pripadnika ove populacije. Prijedlog za buduća istraživanja je da bi u analizu trebalo uključiti i čimbenik stresa, strategije prevladavanja stresa, zadovoljstvo životom, uzroke akademskog neuspjeha i njihov potencijalni utjecaj na razvoj mentalnih poremećaja.

Ključne riječi: *Ljestvica Beckova inventara depresivnosti; Depresija – dijagnostika; Ponašajni simptomi; Studenti medicine*