COMPARISON OF PREVALENCE OF DEPRESSION SYMPTOMS AND HISTORY OF SUICIDALITY IN STUDENTS OF MEDICAL SCHOOLS AND OTHER STUDY PROGRAMMES OF CHARLES UNIVERSITY

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SUMMARY

Objectives: Medical students represent a group of undergraduate students who are exposed to specific risk factors that may lead to the onset of depression and the occurrence of suicidal ideation. The aim of the article is to present information about the prevalence of symptoms of depression in medical students of different faculties at Charles University, Prague, compared to other students of this university.

Methods: We used a standardized Beck's Inventory scale II (BDI-II) with added specific questions electronically distributed to undergraduate students of the full-time forms of study of all faculties of Charles University. The data collection was anonymous and took place in December 2020. The data were statistically assessed in relation to the occurrence of moderate and severe depression using univariate and multivariable analysis.

Results: Moderate and severe depression rate (MSDR) was recorded in 19.6% of medical school students, who returned the questionnaire, compared to 23.4% of students of other faculties (p = 0.001) of Charles University in Prague. Differences in MSDR among students of different faculties of medicine of Charles University were not statistically significant. The total number of previous suicide attempts among respondents was 542, of which 115 were medical students, with the lifetime prevalence of suicide attempts among all students participating in the study 6.96% and in medical students of Charles University 5.73%.

Conclusions: The findings of our study highlight the need for systematic, accessible and timely assistance to university students, both in terms of prevention and early intervention, which can take place at the university level and within the mental healthcare system.

Key words: suicidality, depression, university students, medical students, prevalence

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INTRODUCTION

The increasing prevalence of mental illness in the population has been an important topic worldwide. The situation has become more manifested by the novel coronavirus disease 2019 (COVID-19) pandemic in recent years (1). Approximately one in five people meet the criteria for mental illness in the last twelve months, 29.0% of people will experience mental illness during their lifetime (2). Determining factors for mental health are not only biological, such as the presence of mental illness in the family, but also social – safe housing, stable employment, support for education, satisfactory leisure, self-development, etc. (3).

Among university students, mental health and its maintenance is associated with a higher probability of completion of studies, better results and overall satisfaction and self-esteem (4). In recent years, there has been increasing interest in research into the mental health of university students (5). It is important to note that in addition to the study stress alone, there are other risk factors, such as moving from the original home, disconnecting from family and friends, or lack of financial resources. Some students have to work part-time or full-time for economic reasons or start their family life (6).

These factors can lead to the onset, exacerbation or worsening of symptoms of mental disorders in university students, the same applies to the area of substance-use related disorders, the incidence of these phenomena has been increasing in the last five years (7). The age around 25 years is considered to be at risk, as 75.0% of those suffering from mental illness experience its onset during this period (6). Anxiety disorders, mood disorders, especially depression, substance use disorders, as well as eating disorders and others are the most common (8, 9). The increase in the prevalence of suicidal behaviour and self-harm is particularly alarming. In the United States 0.5% of students have committed suicide attempts in the past year, 6.7% have suicidal thoughts and 1.6% have a suicide plan (10, 11).

A significant part of a comprehensive approach to students' mental health is early identification of those at risk of or already suffering from mental illness, influencing stigma and lowering barriers to seeking appropriate care. This can be, for example, the availability of mental health consultancy services directly within the university (12).

Medical students are considered an at-risk group in terms of the risk of developing or exacerbating mental health problems (13, 14). Risk factors for medical school students for the onset of a mental disorder are the burden of hard study, lack of sleep, decreased physical activity, and fewer opportunities for social activity (15, 16).

According to two meta-analytic studies, the worldwide prevalence of depression among medical students is surprising, at 28.0%, with only 15.7% of these students seeking psychiatric treatment (13, 14). In the case of anxiety disorders, the prevalence is 33.8% (17). Suicidal thoughts have a prevalence of 11.1% (14).

In view of the aforementioned increasing prevalence of mental illness in the population worldwide, we decided to carry out our study to determine the prevalence rate of symptoms of depression among medical students at Charles University faculties and to compare it with students of other faculties of this university. There are five faculties of medicine at Charles University, three of which are in Prague.

MATERIALS AND METHODS

Students of full-time forms of studies at Charles University were included in the study. During December 2020 (in the period of COVID-19 pandemic and lockdown in the Czech Republic), students were contacted by email by the Centre of Scientific Information of Charles University with the electronic questionnaire and the cover letter in which it was stated that participation in the study is completely voluntary and the answers will be completely anonymous. The low response rate was a limitation of the study. Answers to the questionnaire were stored under an anonymous identifier. The record of the submission of the questionnaire was stored separately. It is not possible to determine the link between the respondent and the submitted questionnaire. The results of the study were presented at a meeting of vice-deans for studies of individual faculties of Charles University in Prague. In response to this, there was, for example, an increase in the capacity of the consultation centre of Charles University, or the opening of the Contact Point for Student Mental Health at the Third Faculty of Medicine of Charles University.

The questionnaire consisted of the Beck self-assessment scale of depression – Beck's Depression Inventory II (BDI-II) (18), which is commonly used to assess symptoms of depression. This instrument was supplemented by 39 questions focused on the circumstances of the study (difficulty of study, place of stay and others) The questionnaire is attached to the article as a supplementary material.

Moderate and severe depression (MSD) are diagnosed when a person scores positively 20 or more points in BDI-II, 29–63 points indicate severe depression. It is characterized by the presence of a depressed mood, low self-esteem, and loss of interest or pleasure in normally enjoyable activities, sometimes it is associated with a risk of suicide, and it requires medical treatment (19).

Variables were assessed in relation to the occurrence of moderate and severe depression using univariate analysis. For univariate analysis of categorical data, contingency table analysis using the chi-square test or Fisher's exact test was used. The Wilcoxon test was used to compare continuous variables between the two groups because the assumption of normality of the variables was not met. Logistic regression was used for multivariable analysis of the effect of multiple factors on moderate and severe depression in participants. The odds ratio (OR) was used as an indicator of the association of categorical variables.

Statistical tests were calculated at 5% significance level. Results are presented with 95% confidence intervals. Calculations were performed using the statistical program SPSS for Windows v. 24.

RESULTS

The questionnaire with the cover letter was electronically sent to the addresses of 35,871 students studying in Czech and English curricula using the study information system.

Basic socio-demographic characteristics of the sample of Charles University students participating in the study are presented in Table 1. The response rate for the questionnaire was 21.7% (n = 7,787), of which 67.1% (n = 5,223) were females, 31.8% (n = 2,474) were males, and 1.2% (n = 90) of respondents did not state their gender. Of the total number of students, there were 10,453 students of different medical faculties, there was a response rate of 19.2% (n = 2,007). For students of other faculties, the response rate was 22.7% ($p < 0.001$).

Moderate and severe depression rates (MSDR) – BDI-II of 20 points or more – were recorded in 19.6% of all medical school students who returned a questionnaire, compared to 23.4% of students of other faculties ($p = 0.001$), a total of 22.4% of all students at Charles University. The highest rate of MSD representation was in the 4th (23.4%, n = 56) and 6th (24.9%, n = 52) year of medical studies. The proportion of MSD in men and women was 16.9% and 24.4%, respectively, and the difference was statistically significant ($p < 0.001$). Levels of depression of Charles University students are presented in Table 2.

Differences in MSDR (BDI-II ≥ 20 points) among students of different faculties of medicine at Charles University were not statistically significant. The total number of previous suicide attempts among all respondents was 542, of which 115 were medical students ($p = 0.012$). The lifetime prevalence of suicide attempts among medical students was 5.73%, and among all students participating in the study 6.96%.

The questionnaire included specific questions related to the symptoms of depression. Factors that were associated with symptoms of depression are presented in Table 3, which contains the univariate analysis of factors associated with a higher risk of moderate and severe depression. All variables were analysed with the control variables of gender and year of study.

Factors associated with the risk of occurrence of moderate or severe depression are "frequent personal problems" (OR = 14.46, 95% CI: 13.36–16.92, $p < 0.001$), "diagnosed or possible mental illness" (OR = 8.71, 95% CI: 7.69–9.87, $p < 0.001$), "previous suicide attempt" (OR = 5.11, 95% CI: 4.25–6.14, $p < 0.001$),

and "significant impact on the participant associated with the COVID-19 (OR = 4.13, 95% CI: 3.68–4.62, p < 0.001). On the other hand, there were also protective factors identified: "I can easily handle failing exams or tests" (OR = 0.22, 95% CI: 0.19–0.27, p < 0.001), "satisfaction with the choice of field of study" (OR = 0.26, 95% CI: 0.22–0.30, p < 0.001), and "enough time for friends and interests" (OR = 0.33, 95% CI: 0.29–0.37, p < 0.001). The choice of studies other than medical faculty was statistically significant (OR = 0.76, 95% CI: 0.67–0.87, p = 0.001). All results are presented in Table 3.

The effects of the COVID-19 pandemic were cited as significant factors by 33.3% (n = 2,596, p < 0.001) of all respondents, with differences between medical students and other students being statistically significant (p < 0.001). For non-medical students it was 35.6% (n = 2,055), for medical students it was 27.0% (n = 541).

In multivariable analysis, we identified twelve independent predictors of moderate and severe depression. The predictors are shown in Table 4 and the OR values indicate whether there was an increase or decrease in the likelihood of moderate or severe depression occurrence. The most important risk factors are "frequent personal problems" and "diagnosed or possible mental illness" with OR = 5.26 and 3.72, respectively; "satisfaction with the choice of field of study", "enough time for friends and interests" and "I can easily handle failing exams or tests" are protective factors with OR = 0.36, 0.47 and 0.50, respectively. All ORs and their confidence intervals are shown in Table 4. The effect of choice of faculty, whether it was medical faculty or other faculty, was not statistically significant.

DISCUSSION

In our study, 22.4% of all Charles University students reported moderate and severe depression rate. Compared to similar studies

Table 1. *Basic socio-demographic characteristics of Charles University students participating in the study*

	Students of all faculties of medicine n (%)	Students of other faculties n (%)	Total n (%)
Gender			
Male	576 (28.7)	1,898 (32.8)	2,474 (31.8)
Female	1,418 (70.7)	3,805 (65.8)	5,223 (67.1)
Not specified	13 (0.6)	77 (1.3)	90 (1.2)
Year of study			
1	598 (29.8)	2,497 (43.2)	3,095 (39.7)
2	385 (19.2)	1,557 (26.9)	1,942 (24.9)
3	335 (16.7)	971 (16.8)	1,306 (16.8)
4	239 (11.9)	416 (7.2)	655 (8.4)
5	241 (12.0)	258 (4.5)	499 (6.4)
6	209 (10.4)	81 (1.4)	290 (3.7)
Language of curriculum			
Czech	1,661 (82.8)	5,534 (95.7)	7,195 (92.4)
English	346 (17.2)	246 (4.3)	592 (7.6)

Table 2. *Distribution of participants by faculty, gender and level of depression*

Level of depression	Minimal depression (0–13) n (%)	Mild depression (14–19) n (%)	Moderate depression (20–28) n (%)	Severe depression (29–63) n (%)	Total n (%)
Students of all faculties of medicine of Charles University					
Males	408 (70.8)	84 (14.6)	56 (9.7)	28 (4.9)	576 (100.0)
Females	870 (61.4)	249 (17.6)	220 (15.5)	79 (5.6)	1,418 (100.0)
Total	1,278 (64.1)	333 (16.7)	276 (13.8)	107 (5.4)	1,994 (100.0)
Students of other faculties of Charles University					
Males	1,221 (64.3)	344 (18.1)	231 (12.2)	102 (5.4)	1,898 (100.0)
Females	2,069 (54.4)	762 (20.0)	640 (16.8)	334 (8.8)	3,805 (100.0)
Total	3,290 (57.7)	1,106 (19.4)	871 (15.3)	436 (7.6)	5,703 (100.0)
All					
Males	1,629 (65.8)	428 (17.3)	287 (11.6)	130 (5.3)	2,474 (100.0)
Females	2,939 (56.3)	1,011 (19.4)	860 (16.5)	413 (7.9)	5,223 (100.0)
Total	4,568 (59.3)	1,439 (18.7)	1,147 (14.9)	543 (7.1)	7,697 (100.0)

Table 3. *Univariate analysis of factors associated with moderate and severe depression*

Factors	MSDR (BDI-II ≥ 20 points) n = 1,746	MSDR (BDI-II 0–19 points) n = 6,041	OR (95% CI)	p-value
Faculty: medical faculties[a] (ref.)	394 (22.6)	1,613 (26.7)	0.76 (0.67–0.87)	0.001
Other faculties[a]	1,352 (77.4)	4,428 (73.3)		
Size of the city (1–5)[b]	3.6/5	3.4/4	–	<0.001
Parents living together[a]	1,079 (61.8)	4,161 (68.9)	0.74 (0.66–0.82)	<0.001
Religion[a]	384 (22.0)	1,525 (25.2)	0.82 (0.72–0.93)	0.003
Introvert[a]	1,272 (72.9)	3,839 (63.5)	1.53 (1.36–1.72)	<0.001
More often ill[a]	488 (27.9)	927 (15.3)	2.31 (2.02–2.63)	<0.001
Mental disorders in family history[a]	591 (33.8)	1,362 (22.5)	1.69 (1.50–1.91)	<0.001
Diagnosed or possible mental illness[a]	1,318 (75.5)	1,538 (25.5)	8.71 (7.69–9.87)	<0.001
Previous suicide attempt[a]	307 (17.6)	235 (3.9)	5.11 (4.25–6.14)	<0.001
Alcohol[a]	515 (29.5)	1,589 (26.3)	1.23 (1.09–1.39)	0.001
Smoking tobacco[a]	764 (43.8)	1,784 (29.5)	1.88 (1.68–2.10)	<0.001
Cannabis user[a]	334 (19.1)	803 (13.3)	1.67 (1.45–1.93)	<0.001
Satisfaction with the choice of field of study[a]	994 (56.9)	4,941 (81.8)	0.26 (0.22–0.30)	<0.001
I can easily handle failing exams or tests[a]	196 (11.2)	1,917 (31.7)	0.22 (0.19–0.27)	<0.001
Enough time for friends and interests[a]	558 (32.0)	3,579 (59.2)	0.33 (0.29–0.37)	<0.001
Frequent personal problems[a]	1,269 (72.7)	1,470 (24.3)	14.46 (12.36–16.92)	<0.001
Significant impact associated with the COVID-19[a]	1,030 (59.0)	1,566 (25.9)	4.13 (3.68–4.62)	<0.001

OR – odds ratio; 95% CI – 95% confidence interval; MSDR – moderate and severe depression rate; BDI-II – Beck's Depression Inventory II
Control variables – gender and year of study, [b] for quantitative variables the mean/median is shown, [a] for categorical variables number (percentage) is shown, for categorical variables ref. = "No", unless otherwise specified.

Table 4. *Multivariate logistic regression analyses of predictors of moderate and severe depression*

Factors	OR	95% CI	p-value
Female	1.25	1.07–1.47	0.005
Introvert	1.27	1.09–1.48	0.002
More often ill	1.27	1.08–1.50	0.005
Diagnosed or possible mental illness	3.72	3.22–4.31	<0.001
Previous suicide attempt	2.15	1.71–2.71	<0.001
Smoking tobacco	1.25	1.08–1.46	0.003
Cannabis user	1.31	1.08–1.59	0.007
Satisfaction with the choice of field of study	0.36	0.29–0.44	<0.001
I can easily handle failing exams or tests	0.50	0.41–0.61	<0.001
Enough time for friends and interests	0.47	0.40–0.54	<0.001
Frequent personal problems	5.26	4.41–6.28	<0.001
Significant impact associated with the COVID-19	2.58	2.25–2.96	<0.001

OR – odds ratio; 95% CI – 95% confidence interval

published internationally, this is a significantly lower result (14). The response rate for all students was 21.7%, which is a limitation of our study, and it should be repeated in the future, also including the importance of the perspective of age of students, accompanying the year of study. Even so, this is an alarming finding, considering that the strategic materials underlying the current reform of psychiatric care in the Czech Republic point to a significant lack of mental healthcare professionals who could help students.

In relation to the above determinants of mental health, it can be stated that during the measures leading to the management of the COVID-19 pandemic, there were major social impacts and interventions due to various types of lockdowns, distance learning, restrictions on movement and contact with other people (20). During the pandemic, the following were identified as serious risk factors for outbreaks of mental illness – female gender, younger age, lower income, and student status (21, 22). All this led to an increase in the incidence of mental health problems among university students, mental illness was recorded in one of the studies at 61.0% on average, in Polish students it was 71.0%, in Turkish students in 70.0%, but in Czech students, the smallest percentage was found – 30.0% (23). It is necessary to respond to this situation in a comprehensive manner.

In the Czech Republic, a reform of the care system for people with mental illness is underway, with the aim of both influencing

the quality and safety of the services provided and, above all, increasing their availability and accessibility (24). However, for university students to benefit from such services, it is important to reduce the barriers that exist in their uptake – for example, to ensure more accurate and earlier diagnosis and to inform about possible ways to help.

Our study shows that medical students of Charles University do not report significantly higher rates of symptoms of depression than other university students, but the overall prevalence of MSD should be a background to preventive actions, as both moderate and severe depression require medical treatment. This is a large population of students that is at risk of possible complications, including suicide, in addition to depressive symptoms. The level of empathy in Czech medical school students decreases in the first two years of study and then remains constant until the sixth year (25). This, along with the prevalence of symptoms of depression, can further impact the lives of these students.

Although the COVID-19 pandemic had a lower impact on medical students than other students, it was a significant aggravating factor in more than a quarter of respondents. In the Czech Republic during the pandemic of COVID-19 medical students in contrast to other university students had face-to-face clinical teaching. They were also working as volunteers at several types of healthcare institutions, e.g., hospitals, nursing homes, vaccination centres, triage centres, etc. This could be a very powerful coping mechanism because it could provide medical students meaning (26). In general, however, it is not possible to conclude what overall impact the COVID-19 pandemic had on the results of our study. This will require further research in longer-term horizon.

A very disturbing finding was the lifetime prevalence of suicide attempts both among medical students (5.73%) and among all students participating in the study (6.96%). If we compare these results with the lifetime prevalence among university students, which is estimated at 3.10% (27) and 2.20% among medical students (28), the data we found are very high.

One explanation may be that despite the fact that the wording of the question clearly aimed to find out how many students attempted to take their own lives, some could answer this question in the affirmative, even if the act would objectively be classified as self-harm. Further study would be needed for deeper insight into this area.

CONCLUSIONS

We have shown that symptoms of moderate or severe depression were found in 22.4% of all university students. Among the medical students, the response rates of symptoms of depression were higher in the 4th and 6th year of study. There were no differences among students of different faculties of medicine at Charles University. These data indicate the necessity of early detection of psychiatric symptoms. Our study showed that most significant risk factors for moderate or severe depression are "frequent personal problems" (OR = 5.26) and "diagnosed or possible mental illness" (OR = 3.72); "satisfaction with the choice of field of study", "enough time for friends and interests" and "I can easily handle failing exams or tests" are protective factors with OR = 0.36, 0.47 and 0.50, respectively. The effect of choice of faculty, whether it was medical faculty or other faculty, was not statistically significant.

Medical students are people who prepare themselves for a demanding and burdensome profession. Students are being trained for a job that brings with it stress, therefore, the curriculum should include not only facts and abilities but also practical seminars aimed at preventing the effects of stress and managing it.

In a system where 22.4% of students show symptoms of moderate or severe depression, it is important to reflect this both in teaching and in the entire context of medical faculties. It can already be a prevention of future consequences, for example mood disorders, anxiety, burnout syndrome, substance abuse and suicidal behaviour.

Authors' Contributions

All authors contributed to the study conception and design. AZ – manuscript writing, literature search, preparing the submission; AF, KP, PH – statistics, critical reading; JH, DM – manuscript revision, critical reading.

Conflicts of Interest

None declared

Electronic Supplementary Material

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