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## Predictors associated with studies and lifestyle and subjective feeling of depressive symptoms among Polish medical students

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### Abstract

**Introduction and objective.** Depression is a disorder that medical students are subjected to. The aim of the research was to investigate the occurrence of subjective feeling of depressive symptoms among Polish medical students during the course of medical studies and to determine predictors of this phenomenon that are associated with studies and lifestyle. **Material and method.** The research tool was author's questionnaire. 1023 medical students from each year of medical education and different Polish universities took part in the study. **Results.** 52.79% of the respondents had noticed symptoms that might had pointed to depression during the course of their medical studies.

The research suggests that predictors of subjective feeling of depressive symptoms among medical students are: repeating a university subject, repeating a year in university, low self-assessment of academic performance during studying, considering dropping out of university, low satisfaction from the choice of studying medicine, reaching for alcohol in order to de-stress or discharge negative emotions, not having interests that enable to relax, not doing sports regularly, not participating in social gatherings often enough, not sleeping enough, having problems with maintaining stable body weight and not being religious.

**Conclusions.** There are many lifestyle and studies connected factors associated with depressive symptoms among Polish medical students. The study suggests that it is important for students and their communities to pay attention to the emergence of them in order to improve the well-being of students.

**Key words:** medical students; depression

## Introduction

Data from 2017 shows that globally, depression affects over 264 million people each age [1]. A group subjected to this disorder are medical students. According to research by Rosal et al., the prevalence of depression among people at the beginning their medical studies is similar to that of general population, but among people studying medicine, the percentage of those with depressive symptoms increases much more relatively to general population [2]. An analysis carried out in 43 countries showed that depression or depressive symptoms are present among 27.2% of medical students [3]. According to Malhi and Mann, the occurrence of depression differs in various countries, but in general concerns 6% of population [4]. Thus, data shows that medical students can be even 4 times more susceptible to depression than general population. Factors associated with high prevalence of depression among medical students can be: distress in relation to studies, workload and academic burnout [5]. More susceptible to depression are: 1<sup>st</sup> year medical students and religious individuals [6,7]. Depression is also often connected with drugs [5]. Additionally, a fear of stigmatization from environment and self-stigmatization are problems associated with not undertaking a treatment [8]. Fahrenkopf et al. proved that depression is not only a problem among medical students, but also resident doctors suffering from depression commit medical errors six time more often than their non-depressed colleagues [9].

## Objective

The aim of the research was to investigate the prevalence of subjective feeling of depressive symptoms among Polish medical students and to determine predictors of this phenomenon that are related to studies and student's lifestyle.

## Material and method

A total of 1023 medical students (773 females and 250 males) took part in the study. Among respondents there were students enrolled in each of the 18 universities in Poland that offer medical education. Students of each year of medical education took part in the study: 34.41% (n = 352) respondents studied in the 1<sup>st</sup> year, 25.51% (n = 261) – in the 2<sup>nd</sup> year, 18.77% (n = 192) – in the 3<sup>rd</sup> year, 10.36% (n = 106) – in the 4<sup>th</sup> year, 7.04% (n = 72) – in the 5<sup>th</sup> year and 3.91% (n = 40) – in the 6<sup>th</sup> year. Mean age of participants was 21.55 years. Author's questionnaire containing closed one-choice questions with Likert scale was used. Questions concerned the sociodemographic characteristics of the investigated group and analyzed factors. Answers were collected in April of 2020 through placing the research tool on groups dedicated to different classes of medical students of different Polish universities on Facebook social networking service. The questionnaire was anonymous, and participation in the research was voluntary. Obtained data was subjected to a statistical analysis. To assess the relationship between two variables, the chi-square test of independence was used. The level of significance was set at  $p < 0.05$ .

## Results

Results indicate that to the question „During your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?” a little over majority of participants (52.79%; n = 540) answered positively: 26.98% (n = 276) definitely yes and 25.81% (n = 264) rather yes. 19.16% (n = 196) of respondents indicated their answer to this question as hard to tell. Whereas 28.05% (n = 287) of respondents answered negatively: 19.55% (n = 200) – rather not and 8.50% (n = 87) – definitely not. Among participants who had noticed symptoms that might had pointed to depression during the course of their medical studies, 41.00% (n = 221) sought professional help and 66.01% (n = 371) turned to a trusted person with this problem.

The analysis of the results showed a link between repeating a university subject and noticing symptoms that might had pointed to depression during the course of medical studies ( $\chi^2 = 19.9118$ ;  $p = 0.0005$ ). Among those who had repeated a subject, the percentage of those who definitely had noticed in themselves symptoms that might had suggested depression equaled 25.05% (n=43), whereas among those who rather had noticed such symptoms, this percentage equaled 26.67% (n=16). Among those who hadn't repeated a subject, 25.05% (n=233) definitely had noticed and 26.67% (n=248) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. [Table 1.]

Table 1. Link between noticing symptoms that might had pointed to depression during the course of medical studies and repeating a university subject.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 19.9118;</b> <b>df = 4;</b> <b>p = 0.0005</b>		During the course of your medical studies, have you repeated a university subject?				
		Yes		No		Total
		n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	43	25,05%	233	25,05%	276
	Rather yes	16	26,67%	248	26,67%	264
	Hard to tell	15	19,46%	181	19,46%	196
	Rather not	12	20,22%	188	20,22%	200
	Definitely not	7	8,60%	80	8,60%	87
	Total	93	100,00%	930	100,00%	1023

The research showed a relationship between repeating a year in university and subjective feeling of symptoms that might suggested depression during the course of medical studies. The percentage of those who had repeated a year in university and definitely had noticed in themselves symptoms that might had pointed to depression equaled 54.29% (n=38) and those who rather had noticed such symptoms equaled 17.14% (n=12). Among respondents who hadn't repeated a year, 24.97% (n=238) definitely had noticed in themselves symptoms that might had pointed to depression and 26.44% (n=252) had rather noticed such symptoms. The established differences were statistically significant (Chi<sup>2</sup> = 28.9657; p = 0.000008). [Table 2.]

Table 2. Link between noticing symptoms that might had pointed to depression during the course of medical studies and repeating a year in university.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 28.9657;</b> <b>df = 4;</b> <b>p = 0.000008</b>		During the course of your medical studies, have you repeated a year?				
		Yes		Not		Total
		n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	38	54,29%	238	24,97%	276
	Rather yes	12	17,14%	252	26,44%	264
	Hard to tell	8	11,43%	188	19,73%	196
	Rather not	7	10,00%	193	20,25%	200
	Definitely not	5	7,14%	82	8,60%	87
	Total	70	100,00%	953	100,00%	1023

Another investigated factor was self-assessment of academic performance during studying. The research showed the above-mentioned factor and noticing symptoms that might had pointed to depression during the course of medical studies. The percentage of those who assessed their academic performance as very good or good and had noticed in themselves symptoms that might had pointed to depression equaled 44.63% (n=212). Among those who rated their academic performance as average, 55.45% (n=239) had noticed in themselves symptoms that might had suggested depression. Whereas among those who assessed their academic performance as bad or very bad, such percentage was the highest and equaled 76.07% (n=89). The established differences were statistically significant (Chi<sup>2</sup> = 53.9023; p = 0). [Table 3.]

Table 3. Link between noticing symptoms that might had pointed to depression during the course of medical studies and self-assessment of academic achievements.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 53.9023;</b> <b>df = 4;</b> <b>p = 0</b>		How do you assess your academic performance?						
		Very good or Good		Average		Bad or Very bad		Total
		n	%	n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes or Rather yes	212	44,63%	239	55,45%	89	76,07%	540
	Hard to tell	87	18,32%	90	20,88%	19	16,24%	196
	Rather not or Definitely not	176	37,05%	102	23,67%	9	7,69%	287
	Total	475	100,00%	431	100,00%	117	100,00%	1023

Among those who had definitely considered dropping out of studies, the percentage of those who had definitely noticed in themselves symptoms that might had pointed to depression during the course of medical studies was the highest and equaled 46.03% (n=110), whereas among those who rather had noticed the above-mentioned symptoms, such percentage equaled 29.29% (n=70). Among respondents who had rather considered dropping out of university, the percentage of those who definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies was the highest and equaled 27.13% (n=67), whereas among those who rather had noticed the above-mentioned symptoms, such percentage equaled 30.77% (n=76). Another group are respondents for whom it was hard to tell whether they had wanted to resign from medical university education. In this group, 21.05% (n=20) of the participants definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies and 28.42% (n=27) of the respondents rather had noticed such symptoms. Whereas for students who rather hadn't considered dropping out of medical studies, 19.42% (n=40) definitely had noticed symptoms that might had pointed to depression during the course of medical studies and 23.79% (n=49) rather had noticed such symptoms. The last possible answer to the question concerning considering dropping out of university was "definitely not". Among respondents who provided this answer, the percentage of those who definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies was the lowest and equaled 16.53% (n=39). For those who rather had noticed the above-mentioned symptoms such percentage equaled 17.80% (n=42). [Table 4.]

Table 4. Link between noticing symptoms that might had pointed to depression during the course of medical studies and considering dropping out of studies.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 145.599;</b> <b>df = 16;</b> <b>p = 0</b>		Have you ever considered dropping out of medical studies?					
		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	110 (46,03%)	67 (27,13%)	20 (21,05%)	40 (19,42%)	39 (16,53%)	276
	Rather yes	70 (29,29%)	76 (30,77%)	27 (28,42%)	49 (23,79%)	42 (17,80%)	264
	Hard to tell	36 (15,06%)	53 (21,46%)	23 (24,21%)	45 (21,84%)	39 (16,53%)	196
	Rather not	17 (7,11%)	38 (15,38%)	20 (21,05%)	53 (25,73%)	72 (30,51%)	200
	Definitely not	6 (2,51%)	13 (5,26%)	5 (5,26%)	19 (9,22%)	44 (18,64%)	87
	Total	239 (100,00%)	247 (100,00%)	95 (100,00%)	206 (100,00%)	236 (100,00%)	1023

The analysis showed that among students who claimed that they definitely or rather had chosen medical studies rightly, the percentage of those who had noticed in themselves symptoms that might had pointed to depression during the course of medical studies was the lowest and equaled 47.79% (n=367). Whereas for respondents for whom it was hard to tell whether they had chosen medical studies rightly, the percentage of those who had noticed in themselves symptoms that might had pointed to depression equaled 67.84% (n=135). Such symptoms were present in 67.86% (n=38) of the respondents who claimed that they rather or definitely hadn't chosen medical studies rightly. The established differences were statistically significant (Chi<sup>2</sup> = 38.331, p= 9.575 × 10<sup>-8</sup>). [Table 5.]

Table 5. Link between noticing symptoms that might had pointed to depression during the course of medical studies and subjective feeling whether one chose medical studies rightly.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 38.331;</b> <b>df = 4;</b> <b>p = 9.575 × 10<sup>-8</sup></b>		Do you think that you have chosen medical studies rightly?						
		Definitely yes or Rather yes		Hard to tell		Rather not or Definitely not		Total
		n	%	n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes or Rather yes	367	47,79%	135	67,84%	38	67,86%	540
	Hard to tell	150	19,53%	36	18,09%	10	17,86%	196
	Definitely not or Rather not	251	32,68%	28	14,07%	8	14,29%	287
	Total	768	100,00%	199	100,00%	56	100,00%	1023

The research showed a link between not having interests that enable to relax and noticing symptoms that might had pointed to depression during the course of medical studies. The percentage of those who had noticed the above-mentioned symptoms and had such interests equaled 50.11% (n=442) and was lower compared to the one noted among those who didn't have such interests (69.50%; n=98). The established differences were statistically significant (Chi<sup>2</sup>= 23.6224; p= 0.000007). [Table 6.]

Table 6. Link between noticing symptoms that might had pointed to depression during the course of medical studies and whether one has interests that enable to relax.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 23.6224;</b> <b>df = 2;</b> <b>p = 0.000007</b>		Do you have interests that enable you to relax?				
		Yes		No		Total
		n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes or Rather yes	442	50,11%	98	69,50%	540
	Hard to tell	170	19,27%	26	18,44%	196
	Rather not or definitely not	270	30,61%	17	12,06%	287
	Total	882	100,00%	141	100,00%	1023

The analysis showed that there exists a link between doing sports regularly and absence of subjective feeling of depressive symptoms during medical studies (Chi<sup>2</sup>= 39.124; p= 0.001). Among respondents who definitely or rather did sports regularly, 27.15% (n=41) definitely

had noticed in themselves symptoms that might had pointed to depression during the course of medical studies and 21.19% (n=57) rather had noticed such symptoms. Among respondents who rather did sports regularly, 21.19% (n=57) definitely had noticed in themselves symptoms that might had pointed to depression and 23.05% (n=62) rather had noticed such symptoms. Among students for whom it was hard to tell whether they did sports regularly, 24.26% (n=33) definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies and 25.00% (n=34) rather had noticed such symptoms. Among respondents who provided the answer “rather not” to the question whether they did sports regularly, the percentage of those who definitely had noticed in themselves symptoms that might had pointed to depression equaled 28.22% (n=92) and 29.45% (n=96) among those who rather had noticed such symptoms. Whereas among respondents who definitely didn’t do sports regularly, 37.59% (n=53) definitely and 25.53% (n=36) rather had noticed symptoms that might had pointed to depression. [Table 7.]

Table 7. Link between noticing symptoms that might had pointed to depression during the course of medical studies and subjective feeling of doing sports regularly.

<b>Statistical analysis:</b> <b>Chi<sup>2</sup> = 39.124;</b> <b>df = 16;</b> <b>p = 0.001</b>		Do you do sports regularly?					
		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	41 (27,15%)	57 (21,19%)	33 (24,26%)	92 (28,22%)	53 (37,59%)	276
	Rather yes	36 (23,84%)	62 (23,05%)	34 (25,00%)	96 (29,45%)	36 (25,53%)	264
	Hard to tell	18 (11,92%)	60 (22,30%)	35 (25,74%)	60 (18,40%)	23 (16,31%)	196
	Rather not	34 (22,52%)	61 (22,68%)	27 (19,85%)	56 (17,18%)	22 (15,60%)	200
	Definitely not	22 (14,57%)	29 (10,78%)	7 (5,15%)	22 (6,75%)	7 (4,96%)	87
	Total	151 (100,00%)	269 (100,00%)	136 (100,00%)	326 (100,00%)	141 (100,00%)	1023

Another factor which correlates with noticing symptoms that might had pointed to depression during the course of medical studies was not participating in social gatherings often enough. Among respondents who definitely took part in such gatherings often enough, 47.93% (n=58) definitely had noticed in themselves symptoms that might had pointed to depression during

the course of medical studies. Whereas among those who rather participated in the above-mentioned gatherings often enough, 45.03% (n=145) had noticed in themselves symptoms that might had pointed to depression. Among participants who claimed their answer as hard to tell whether they took part in such meetings often enough, 55.39% (n=113) had noticed in themselves symptoms that might had pointed to depression. Taking into account respondents who provided the answer that they rather didn't participate in social gatherings often enough, subjective feeling of depressive symptoms occurred in 55.77% (n=145) of them, whereas such symptoms were present in 68.10% (n=79) of those who definitely didn't participate in social gatherings often enough. The established differences were statistically significant ( $\chi^2 = 30.2479$ ;  $p = 0.0002$ ). [Table 8.]

Table 8. Link between subjective feeling of depressive symptoms during the course of medical studies and subjective feeling of participation in social gatherings often enough.

Statistical analysis: $\chi^2 = 30.2479$ ; $df = 8$ ; $p = 0.0002$		Do you participate in social gatherings often enough?					
		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes or Rather yes	58 (47,93%)	145 (45,03%)	113 (55,39%)	145 (55,77%)	79 (68,10%)	540
	Hard to tell	19 (15,70%)	65 (20,19%)	37 (18,14%)	54 (20,77%)	21 (18,10%)	196
	Rather not or Definitely not	44 (36,36%)	112 (34,78%)	54 (26,47%)	61 (23,46%)	16 (13,79%)	287
	Total	121 (100,00%)	322 (100,00%)	204 (100,00%)	260 (100,00%)	116 (100,00%)	1023

The analysis showed a link between sleeping habits and noticing symptoms that might had pointed to depression during the course of medical studies. Among participants who claimed that they definitely slept enough, 26.88% (n=25) definitely had noticed and 22.58% (n=21) rather had noticed in themselves symptoms that might had pointed to depression. Whereas among those who claimed that they rather slept enough, 21.17% (n=69) definitely had noticed and 23.93% (n=78) rather had noticed in themselves symptoms that might had suggested depression during the course of medical studies. Among respondents for whom it was hard to tell whether they slept enough, 30.36% (n=51) definitely had noticed and 26.19% (n=44) rather had noticed in themselves symptoms that might had suggested depression during the course of medical studies.

Taking into account participants who rather didn't sleep enough, 26.42% (n=79) of them definitely had noticed and 27.42% (n=82) rather had noticed symptoms that might had pointed to depression during the course of medical studies. Whereas among students who claimed that they didn't sleep enough, 37.96% (n=52) definitely had noticed and 28.47%

rather had noticed in themselves symptoms that might had suggested depression during the course of medical studies. The established differences were statistically significant ( $\chi^2 = 41.7702$ ;  $p = 0.0004$ ). [Table 9.]

Table 9. Link between noticing symptoms that might had pointed to depression and subjective feeling of sleeping enough.

<b>Statistical analysis:</b> <b><math>\chi^2 = 41.7702</math>;</b> <b>df = 16;</b> <b>p = 0.0004</b>		Do you sleep enough?					
		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	25 (26,88%)	69 (21,17%)	51 (30,36%)	79 (26,42%)	52 (37,96%)	276
	Rather yes	21 (22,58%)	78 (23,93%)	44 (26,19%)	82 (27,42%)	39 (28,47%)	264
	Hard to tell	10 (10,75%)	61 (18,71%)	32 (19,05%)	70 (23,41%)	23 (16,79%)	196
	Rather not	25 (26,88%)	81 (24,85%)	29 (17,26%)	49 (16,39%)	16 (11,68%)	200
	Definitely not	12 (12,90%)	37 (11,35%)	12 (7,14%)	19 (6,35%)	7 (5,11%)	87
	Total	93 (100,00%)	326 (100,00%)	168 (100,00%)	299 (100,00%)	137 (100,00%)	1023

The research showed a link between having problems with maintaining stable body weight and noticing symptoms that might had suggested depression during the course of medical studies. The analysis showed that the highest percentage of students who had noticed in themselves symptoms that might had pointed to depression occurred among those who definitely or rather had problems with maintaining stable body weight (66.88%;  $n=210$ ). Among participants for whom it was hard to tell whether they had problems with maintaining stable body weight, 48.84% ( $n=42$ ) had noticed in themselves symptoms that might had suggested depression during the course of medical studies. Whereas among those who definitely or rather didn't have problems with maintaining stable body weight, 46.23% ( $n=288$ ) had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. The established differences were statistically significant ( $\chi^2 = 47.9312$ ;  $p = 0$ ). [Table 10.]

Table 10. Link between noticing symptoms that might had pointed to depression during the course of medical studies and subjective problems with maintaining body weight at a stable point.

<b>Statistical analysis:</b> <b><math>\chi^2 = 114.323</math>;</b>	Do you have problems with maintaining body weight at a stable point?
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df = 4; p = 0		Definitely yes or Rather yes		Hard to tell		Rather not or Definitely not		Total
		n	%	n	%	n	%	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes or Rather yes	210	66,88%	42	48,84%	288	46,23%	540
	Hard to tell	56	17,83%	22	25,58%	118	18,94%	196
	Rather not or Definitely not	48	15,29%	22	25,58%	217	34,83%	287
	Total	314	100,00%	86	100,00%	623	100,00%	1023

The research also showed a link between reaching for alcohol in order to de-stress or discharge negative emotions and noticing symptoms that might had suggested depression during the course of medical studies. The analysis showed that among those who definitely had happened to reach for alcohol in the above-mentioned situation, 38.50% (n=82) definitely had noticed and 27.23% (n=58) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. Whereas among those who declared that they rather had happened to reach for alcohol in order to de-stress or discharge negative emotions, 29.08% (n=73) definitely had noticed and 29.48% (n=74) rather had noticed in themselves symptoms that might had suggested depression during the course of medical studies. Among students for whom it was hard to tell whether they had happened to reach for alcohol in order to de-stress or discharge negative emotions, 10.00% (n=5) definitely had noticed and 20.00% (n=10) rather had noticed in themselves symptoms that might had pointed to depression. Among those who rather hadn't happened to reach for alcohol in the above-mentioned situation, 25.57% (n=56) declared that they definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies, whereas 23.74% (n=52) claimed that they rather had noticed such symptoms. The last possible answer to the question concerning reaching for alcohol in order to de-stress or discharge negative emotions was "Definitely not". Here, students who definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies constituted of 20.69% (n=60) of the respondents, whereas those who rather had noticed such symptoms constituted of 24.14% (n=70) of the respondents. The established differences were statistically significant ( $\chi^2 = 57.4472$ ;  $p = 0.000001$ ). [Table 11.]

Table 11. Link between noticing symptoms that might had pointed to depression during the course of medical studies and having reached for alcohol in order to de-stress or discharge negative emotions.

<b>Statistical analysis:</b> <b><math>\chi^2 = 57.4472</math>;</b>	Have you ever reached for alcohol in order to de-stress or discharge negative emotions?
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<b>df = 16; p = 0.000001</b>		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	82 (38,50%)	73 (29,08%)	5 (10,00%)	56 (25,57%)	60 (20,69%)	276
	Rather yes	58 (27,23%)	74 (29,48%)	10 (20,00%)	52 (23,74%)	70 (24,14%)	264
	Hard to tell	29 (13,62%)	54 (21,51%)	17 (34,00%)	45 (20,55%)	51 (17,59%)	196
	Rather not	34 (15,96%)	36 (14,34%)	12 (24,00%)	47 (21,46%)	71 (24,48%)	200
	Definitely not	10 (4,69%)	14 (5,58%)	6 (12,00%)	19 (8,68%)	38 (13,10%)	87
	Total	213 (100,00%)	251 (100,00%)	50 (100,00%)	219 (100,00%)	290 (100,00%)	1023

The analysis showed a link between lack of religiosity and noticing symptoms that might had pointed to depression during the course of medical studies. Among students who claimed themselves as religious, 19.91% (n=43) definitely had noticed and 22.22% (n=48) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. Whereas among participants who declared themselves as rather religious, 21.43% (n=51) definitely had noticed and 28.15% (n=67) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. Among respondents for whom it was hard to tell whether they were religious or not, 24.58% (n=29) definitely had noticed and 24.58% (n=29) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. Taking into account those who defined themselves as rather not religious, 35.00% (n=56) of them definitely had noticed in themselves symptoms that might had pointed to depression during the course of medical studies and 21.88% (n=35) of them rather had noticed such symptoms. Whereas among individuals who declared themselves as definitely not religious, 33.33% (n=97) definitely had noticed and 29.21% (n=85) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. The established differences were statistically significant ( $\chi^2 = 50.4847$ ;  $p = 0.00002$ ). [Table 12.]

Table 12. Link between noticing symptoms that might had pointed to depression during the course of medical studies and religiosity.

<b>Statistical analysis:</b>	Are you a religious person?
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<b>Chi<sup>2</sup> = 50.4847; df = 16 ; p = 0.00002</b>		Definitely yes	Rather yes	Hard to tell	Rather not	Definitely not	Total
		n (%)	n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	43 (19,91%)	51 (21,43%)	29 (24,58%)	56 (35,00%)	97 (33,33%)	276
	Rather yes	48 (22,22%)	67 (28,15%)	29 (24,58%)	35 (21,88%)	85 (29,21%)	264
	Hard to tell	40 (18,52%)	54 (22,69%)	28 (23,73%)	30 (18,75%)	44 (15,12%)	196
	Rather not	50 (23,15%)	49 (20,59%)	26 (22,03%)	32 (20,00%)	43 (14,78%)	200
	Definitely not	35 (16,20%)	17 (7,14%)	6 (5,08%)	7 (4,38%)	22 (7,56%)	87
	Total	216 (100,00%)	238 (100,00%)	118 (100,00%)	160 (100,00%)	291 (100%)	1023

The last investigated predictive factor was number of years after finishing middle school, when the respondent began medical studies. Among participants who had begun medical studies right after finishing middle school, 27.04% (n= 172) definitely and 25.94% (n= 165) rather had noticed in themselves symptoms that might had suggested depression. Among participants who had begun medical studies right after middle school, 24.72% (n=66) definitely and 26.59% (n=71) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. Whereas among participants who had begun their medical education 2 years after finishing middle school, 27.27% (n=18) definitely and 21.21% (n=18) rather had noticed in themselves symptoms that might had pointed to depression during the course of medical studies. The highest percentages of respondents who definitely or rather had noticed in themselves symptoms that might had suggested depression, occurred among those who had entered medical school 3 or more years after finishing middle school and equaled 34.00% (n=17) and 26.00% (n=13), respectively. The established differences weren't statistically significant (Chi<sup>2</sup> = 6.98298; p= 0.86). [Table 13.]

Table 13. Link between subjective feeling of depressive symptoms during the course of medical studies and when after middle school

<b>Statistical analysis: Chi<sup>2</sup> = 6.98298;</b>	How many years after middle school did you begin your medical studies?
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<b>df = 12; p = 0.86</b>		Right after middle school	1 year	2 years	3 or more years	Total
		n (%)	n (%)	n (%)	n (%)	n
During the course of your medical studies, have you ever noticed symptoms in yourself that might had pointed to depression?	Definitely yes	172 (27,04%)	66 (24,72%)	18 (27,27%)	17 (34,00%)	273
	Rather yes	165 (25,94%)	71 (26,59%)	14 (21,21%)	13 (26,00%)	263
	Hard to tell	113 (17,77%)	59 (22,10%)	15 (22,73%)	9 (18,00%)	196
	Rather not	130 (20,44%)	51 (19,10%)	11 (16,67%)	8 (16,00%)	200
	Definitely not	56 (8,81%)	20 (7,49%)	8 (12,12%)	3 (6,00%)	87
	Total	636 (100,00%)	267 (100,00%)	66 (100,00%)	50 (100,00%)	1019*

\* In this question, the analysis included 1019 answers (instead of 1023), because 4 of the given answers couldn't be assigned to any of the categories.

## Discussion

Our research showed a link between repeating a university subject and noticing symptoms that might had pointed to depression during the course of medical studies. Analogical relationship was described by Moreira de Sousa J et al. among 521 Portuguese medicine students [10]. Similar link was found in case of repeating a year.

Our research found a link between low self-assessment of academic performance and noticing symptoms that might had suggested depression during the course of medical studies. Similar results were obtained by Moreira de Sousa J et al. who found a link between occurrence of depressive symptoms and lower curricular average grade among medical students [10]. Analogical link was described by Çelik N et al. in a research conducted among 445 Turkish medical students [11].

Our research found a link between considering dropping out of medical studies and noticing symptoms that might had suggested depression during the course of medical studies. In a study carried out by Fongleman B Y et al. among 818 students of University of Tennessee College of Medicine, bad state of mental health was second most frequently given reason for

temporal or complete resignation from studies [12]. Dyrbye LN et al. found that 13.2% of medical students whose mental health was described as languishing seriously considered resigning from studies, which was higher percentage compared to students who were moderately mentally healthy (2.7%) and to those with flourishing state of mental health (1.0%) [13].

Our research found a link between not doing sports regularly and noticing symptoms that might had pointed to depression during the course of medical studies. Similar results were obtained by Bert et al. who investigated the occurrence of depressive symptoms among medical students in Italy and showed that one of the main risk factors for depression is less than 90 minutes of physical activity weekly [14]. Additionally, lack of time was listed as the main reason for lack of physical activity among medical and nursing students [15].

Our research showed a link between not having interests that enable one to relax and noticing symptoms that might had suggested depression during the course of medical studies. Similarly, Bert et al. listed having a hobby as a protective factor against depression [14].

Our analysis found that there exists a link between not participating in social gatherings often enough and subjective feeling of depressive symptoms during the course of medical studies. According to research conducted in Turkey, social factors are substantial during formation of mental health disturbances among students, whereas creating convenient conditions for forming relationships and friendships between students could foster their mental state [16]. Research shows that non-depressed students show higher satisfaction from social activity compared to depressed students [5].

Our research showed a link between not sleeping enough and noticing symptoms that might had pointed to depression during the course of medical studies. Analogical link was described among medical students in a research by Pan X F et al. [17]. Çelik N et al. showed that among medical students, poor quality of sleep increases the risk of depressive symptoms by up to 3.28 times [11]. Newbury D et al. indicated a link between sleep deficiency and higher level of stress [18]. Whereas Wolf MR et al. didn't find a link between sleep time measured in hours and depressive symptoms. The author stated also that patients suffering from sleep deprivation are more likely to develop depression and that sleep deprivation may be an early symptom of mental disorders such as depression and alcohol addiction [19].

Our research showed a statistically significant link between problems with maintaining body weight and subjective feeling of depressive symptoms during the course of medical studies. In a meta-analysis carried out by Puccio F et al., eating disorders were found to be a substantial predictor of depression, whereas depression contributes to the occurrence of eating disorders [20]. An analysis by Vijayalakshmi et al. carried out on a group of medical and nursing students from India didn't find a link between depressive symptoms and BMI, but a link between depressive symptoms and disturbed eating behaviors was found [21]. In a research carried out by Tajik E et al. among growing up youth, a statistically significant link was found between BMI values indicating underweightness or obesity and occurrence of severe or very severe depressive symptoms [22].

Our research showed a link between reaching for alcohol in order to de-stress or discharge negative emotions and noticing symptoms that might had suggested depression. Similar conclusions were made by Pan X F who found a link between occurrence of depressive symptoms among medical students and habitual alcohol drinking [17].

BO James et al. pointed that reaching for alcohol in the order to relieve depressive symptoms was linked to higher stress level among Nigerian medical students [23]. Whereas Newbury D et al. didn't find a link between drinking alcohol and depressive symptoms [18].

Our research found a link between lack of religiosity and noticing symptoms that might had pointed to depression during the course of medical studies. Similar link was described by Vasegh S as being close to statistical significance ( $p= 0.058$ ) in a research carried out on a group of 285 medical students from Iran [24]. Francis B et al. indicated that negative religious coping was linked to occurrence of depressive symptoms among 622 Malaysian medial students [25].

Our research didn't find a link between number of years after middle school after which one had entered medical studies and noticing symptoms that might had suggested depression during the course of medical studies. Whereas Pan X F et al. found a link between repeating college entrance exams and occurrence of depressive symptoms [17].

## Conclusion

1. The study suggests that predictors of subjective feeling of depressive symptoms among medical students are: repeating a university subject, repeating a year in university, subjective negative self-assessment of academic performance, considering dropping out of medical studies, subjective feeling of not choosing medical studies rightly, lack of interests that enable to relax, not doing sports regularly, not sleeping enough, not participating in social gatherings often enough, problems with maintaining stable body weight, reaching for alcohol in order to de-stress or discharge negative emotions and not being religious.
2. There are many factors associated with depression that increase the probability of its occurrence. It is important to take actions that aim to quick recognition and then elimination of these factors or, if elimination is impossible, the reduction of students' exposure to them should be done. The above-mentioned actions should be taken by students, their communities and universities.

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