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Observational Study

Depression among medical students in Tunisia: Prevalence and associated factors

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Abstract

BACKGROUND

Medical school is known for its lengthy process, which is both physically and emotionally draining. Students' mental balance would shrink as they progress in their medical training. A systematic review and meta-analysis reported that the prevalence of depressive symptoms among medical students remained relatively constant at 27.2%.

AIM

To assess the prevalence of depressive symptoms among Tunisian medical students and evaluate its associated factors.

METHODS

This is a descriptive cross-sectional study that was carried out in the second semester of the academic year 2017/2018, between April 2018 and July 2018 among 1138 medical students. Data were collected using a socio-demographic questionnaire and the Beck Depression Inventory-II (BDI-II).

RESULTS

Sixty-four percent ($n = 728$) of the participants had depressive symptoms, of which 266 (23.4%) met the criteria for mild, 271 (23.8%) for moderate, and 191 (16.8%) for severe depressive symptoms. Female gender, low socio-economic level, smoking habits and history of mental disorder, performing leisure and physical activities, satisfaction toward a career choice, and happiness perception were the main prognostic factors for depression among medical students. Although academic grades may not be considered a prognostic factor, final-year

students appeared to be less depressive than their colleagues.

CONCLUSION

These findings give insight into mental health issues and comorbidities among Tunisian medical students. It is a hopeful request for decision-makers and academic authorities to set serious measures and draw effective interventions to minimize the currency of psychological distress among this subpopulation.

Key Words: Depression; Psychiatry; Medical students; Mental health; Beck Depression Inventory; Tunisia

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Core Tip: This study aimed to assess the prevalence of depressive symptoms among Tunisian medical students and evaluate its associated factors. This is a descriptive cross-sectional study that was carried out in the second semester of the academic year 2017/2018, between April 2018 and July 2018 among 1138 medical students. Sixty four percent ($n = 728$) of the participants had depressive symptoms, of which 266 (23.4%) met the criteria for mild, 271 (23.8%) for moderate, and 191 (16.8%) for severe depressive symptoms. Female gender, low socio-economic level, smoking habits and history of mental disorder, performing leisure and physical activities, satisfaction toward career choice, and happiness perception were the main prognostic factors for depression among medical students. Although academic grade may not be considered as a prognostic factor, final year students appeared to be less depressive than their colleagues.

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INTRODUCTION

The Global Burden of Diseases, Injuries, and Risk Factors Study 2017 (GBD 2017), conducted between 1990 and 2017 in 195 countries and territories, concluded that more than 264 million people of all ages were depressed[1].

Depression can be long-lasting or recurrent, and standing still impairs an individual's ability to function in his daily life[2].

Psychological distress among university students has witnessed a considerable rise, becoming a concern for public health authorities around the globe. And among university students, medical students are particularly more vulnerable to psychological distress and morbidity since medical education is reputed for its long process and it is physically and emotionally consuming[3,4].

Rotenstein *et al*[5] reported in a systematic review and meta-analysis conducted in 2016 that between 1982 and 2015, depressive symptom prevalence remained relatively constant at 27.2% for medical students with no significant difference between preclinical and clinical students.

Even though it is crucial for an educational institution to assess the mental status of its students, only a few Tunisian studies surveyed the currency of depression among medical students.

Within this framework, this study aimed to assess the prevalence of depressive symptoms among medical students in Tunisia and to evaluate its associated factors.

MATERIALS AND METHODS

Study design and participants

The present study is a descriptive cross-sectional study that was carried out in the second semester of the academic year 2017/2018, between April 2018 and July 2018 (away from exams). We recruited students from the four medical faculties in Tunisia [Faculty of Medicine of Monastir (FMM), Sousse, Tunis, and Sfax].

The minimal sample size required for the study was 322694. It was calculated using the formula: $n = \mu\alpha^2 p (1-p)/\delta^2$, where " $\mu\alpha$ " is the one-sided magnitude of the confidence level ($\mu\alpha = 1.96$) and " p " is the expected proportion of the outcome of interest with an assumption of 30% depression among medical students.

Only enrolled medical students from the first year to the fifth year were invited to complete an online survey as a main tool of the study.

To retrieve an adequate sample for the present study, all candidates were invited to complete an anonymous nationwide web-based questionnaire *via* their student delegate who published the questionnaire in their Facebook group, mentioning the purpose of the study and assuring the confidentiality and anonymity of each answer. The questionnaire was sent with a description of the study. Every person could only answer the questionnaire once.

As the response rate is the number of completed and sent survey responses divided by the number of people who viewed the survey, the present study response rate was measured to be 16.45%, considering students who reached the link and viewed the survey content (Figure 1).

Study instruments

The self-report questionnaire employed in the French language (the second language and official language for medical studies in Tunisia) took approximately 15 min to answer and collected data on.

Students' general characteristics: It consists of personal (age, gender, origin, personal medical history, tobacco use, alcoholism, marital status, self-assessment of their financial status, and current residence) and academic characteristics: Faculty, academic level, satisfaction toward career choice, and dropping out thoughts, leisure and sporting activities, participation in a stress management workshop, and a precedent visit to a psychiatrist/psychologist.

Beck Depression Inventory-II (BDI-II): It is a self-administrated tool, used to screen for the presence of depressive symptoms[6,7]. The BDI-II timeframe extends for 2 wk to correspond with the DSM-IV criteria for diagnosing depressive disorders and includes items measuring cognitive, affective, somatic, and vegetative symptoms of depression. With a sensitivity of 87% and specificity of 79%, the BDI-II was validated using adult and adolescent psychiatric outpatients.

Each participant is asked to answer 21 items rated on a 4-point Linkert scale indicating the degree of severity from 0 (not at all) to 3 (extreme form of each symptom). Cumulative score is calculated. The provisional diagnosis of depression is made if the BDI-II score is greater than 13 and the presence of severe depressive symptoms if the score is greater than or equal to 29. The severity of depression was classified into three categories: Mild, moderate, and severe depression[7,8].

Statistical analysis

The data collected were keyed into Excel for Windows and statistical analyses were carried out using the software package SPSS version 24 (SPSS Inc.). Descriptive analysis (frequencies, prevalence, mean, and standard deviation) was applied to evaluate the characteristics of the samples. The Chi-square (χ^2) test was carried out to compare the prevalence of depression between different groups, while the Student's *t*-test was used to analyze quantitative data (age) with the presence of depression. Variables whose *P* value was < 0.2 were entered as independent variables in regression analysis. The 95% confidence intervals (95%CI) were calculated for prevalence rates. Binary logistic regression models were used to show the predictive model of BDI based on the values of the independent variables (predictors). The level of significance was set at *P* < 0.05.

Ethical considerations

We explained the purpose of the study to all participants. The confidentiality and anonymity of each answer were guaranteed. A completed questionnaire was considered as consent to participate in the study. The present study was approved by the ethics committee of the FMM (No. 3067).

RESULTS

Description of general characteristics

The sample consisted of 1138 medical students, including 888 (78%) females and 250 (22%) males, with ages ranging from 18 to 37 years (mean, 22.0 years \pm 2.3 years). There were 423 students (37.2%) who were enrolled in the Faculty of Medicine of Tunis (FMT), while 304 (26.7%), 248 (21.8%), and 163 (14.3%) were registered, respectively, in the FMM, Sousse (FMS) and Sfax (FMSF). Of the sample, there were 448 pre-clinical students (Year 1 and Year 2) (39.3%) and 690 clinical students (Year 3, Year 4, and Year 5) (60.6%).

Based on their financial status self-assessment, most of the students (921, 80.9%) were at a moderate socio-economic level while 146 (12.8%) were at a high level and 71 (6.2%) were at a low level. Fourteen percent of the participants were smokers and 16% revealed drinking habits. Almost 70% of the sample did not practice either leisure or physical activities. Only 158 (13.9%) had participated in a stress management workshop and 228 (20%) had sought psychiatric help.

Half of the sample were unsatisfied with their career choice and have thought, at least once, of dropping out of medical studies. Sixty-one percent of participants (699) admitted feeling unhappy. More personal and academically related details are illustrated in Table 1.

Depressive symptoms

The BDI-II total scores of participants ranged from 0 to 63 with a mean score of 18.73 \pm 10.60 as shown in Table 2. Sixty-four percent (*n* = 728) of the participants had depressive symptoms, of which 266 (23.4%) met the criteria for mild, 271 (23.8%) for moderate, and 191 (16.8%) for severe depressive symptoms. Among 728 depressive students, only 177 (24.3%) had sought psychiatric help.

Students' general characteristics as determinants of depression

Personal characteristics: Female students were more depressed than males. Neither students' residency nor marital status showed a significant effect on depressive symptoms. Depression was more prevalent among smokers and students with low socio-economic levels.

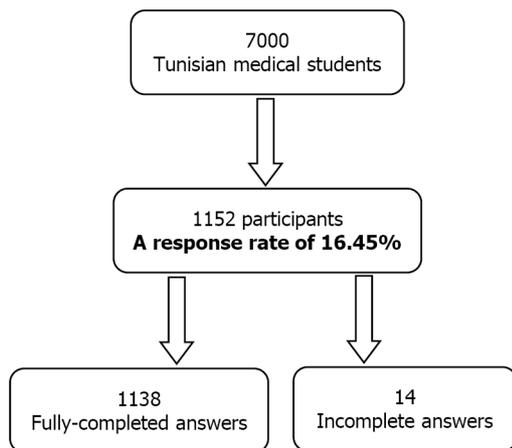
Table 1 Characteristics of study participants (n = 1138) (university year 2017/2018), n (%)

Characteristic		mean ± SD
Age, yr		22 (2.347) (min 18, max 37)
Gender	Female	888 (78)
	Male	250 (22)
Faculty	Monastir	304 (26.7)
	Sousse	248 (21.8)
	Sfax	163 (14.3)
	Tunis	423 (37.2)
Grade	Year 1	252 (22.1)
	Year 2	196 (17.2)
	Year 3	198 (17.4)
	Year 4	171 (15)
	Year 5	321 (28.2)
Marital status	Single	837 (73.6)
	Engaged	269 (23.6)
	Married	29 (2.5)
	Divorced	3 (0.3)
	Alone	193 (17)
	With friends/roommates	220 (19.3)
	Academic residency	127 (11.2)
Socio-economic level	Family home	598 (52.5)
	Low	71 (6.2)
	Moderate	921 (80.9)
Children	High	146 (12.8)
	Yes	23 (2)
	No	1115 (98)
History of medical illness	Yes	173 (15.2)
	No	965 (84.8)
History of mental illness	Yes	79 (6.9)
	No	1059 (93.1)
Leisure activities	Yes	349 (30.7)
	No	789 (69.3)
Physical activities	Yes	322 (28.3)
	No	816 (71.7)
Smoking habits	Yes	160 (14.1)
	No	978 (85.9)
Drinking habits	Yes	183 (16.1)
	No	955 (83.9)
Are you satisfied with your career choice?	Yes	619 (54.4)
	No	519 (45.6)
Have you ever thought of dropping out of medical studies?	Yes	664 (58.3)
	No	474 (41.7)

Stress management training	Yes	158 (13.9)
	No	980 (86.1)
Have you ever visited a psychiatrist?	Yes	228 (20)
	No	910 (80)
Why not?	No answer	261 (22.9)
	I feel fine. I don't need it	392 (34.4)
	I need it, but I am always busy	366 (23.2)
	I need it, but my circle of friends/family discouraged me	119 (10.5)
Are you happy?	Yes	439 (38.6)
	No	699 (61.4)

Table 2 Prevalence of depression among study participants (*n* = 1138)

BDI-II total score, mean ± SD		Min 0, max 63, 18.730 (10.654)
Depression level	Absence of depression	410 (36%)
	Low	266 (23.4%)
	Moderate	271 (23.8%)
	Severe	191 (16.8%)



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Figure 1 Flowchart of the study.

Depressive symptoms were associated with age ($P = 0.048$; the age difference was not meaningful), gender ($P = 0.038$), socio-economic level ($P < 10^{-3}$), history of medical illness ($P = 0.034$), history of mental illness ($P < 10^{-3}$), and smoking habits ($P = 0.025$).

Academic characteristics: With 70% depressed students, Sousse Faculty of Medicine was ranked as the most depressed faculty. There was no difference between pre-clinical and clinical students. The lack of leisure and physical activities was significantly associated with the presence of depressive symptoms.

The presence of depression was associated with faculty ($P = 0.042$), leisure activities ($P < 10^{-3}$), physical activities ($P < 10^{-3}$), satisfaction toward career choices ($P < 10^{-3}$), dropping out thoughts ($P < 10^{-3}$), a precedent visit of a psychiatrist/psychologist ($P < 10^{-3}$), and happiness perception ($P < 10^{-3}$). Different correlations are illustrated in [Table 3](#).

Association between depressive symptoms and sample characteristics: Regression analysis

Female gender, low socio-economic level, smoking habits, and history of mental disorders were identified to be the main prognostic factors for depression among medical students ([Table 4](#)).

Although academic grade and participation in a stress management workshop did not show a significant correlation in the univariate analysis, we added these two variables in the regression analysis as they were mentioned in the literature. Academic grade may not be considered a prognostic factor. However, as detailed in [Table 4](#), final-year students seemed

Table 3 Association between characteristics of participants and symptoms of depression, n (%)

Characteristic		D-	D+	P value
Age, yr, mean \pm SD		21.820 (2.059)	22.100 (2.492)	0.048
Gender	Female	306 (34.5)	582 (65.5)	0.038
	Male	104 (41.6)	146 (58.4)	
Faculty	Monastir	124 (40.8)	180 (59.2)	0.042
	Sousse	73 (29.4)	175 (70.6)	
	Sfax	63 (38.7)	100 (61.3)	
	Tunis	150 (35.5)	273 (64.5)	
Grade	Year 1	91 (36.1)	161 (63.9)	0.57
	Year 2	72 (36.7)	124 (63.3)	
	Year 3	74 (37.4)	124 (62.6)	
	Year 4	52 (30.4)	119 (69.6)	
	Year 5	121 (37.7)	200 (62.3)	
Accommodation	Alone	63 (32.6)	130 (67.4)	0.597
	With friends/roommates	79 (35.9)	141 (64.1)	
	Academic residency	43 (33.9)	84 (66.1)	
	Family home	225 (37.6)	373 (62.4)	
Marital status	Single	301 (36)	536 (64.0)	0.786
	Engaged	100 (37.2)	169 (62.8)	
	Married	8 (27.6)	21 (72.4)	
	Divorced	1 (33.3)	2 (66.7)	
Children	Yes	5 (21.7)	18 (78.3)	
	No	405 (36.3)	710 (63.7)	
Socio-economic level	Low	9 (12.7)	62 (87.3)	< 10 ⁻³
	Moderate	330 (35.8)	591 (64.2)	
	High	71 (48.6)	75 (51.4)	
History of medical illness	Yes	50 (28.9)	123 (71.1)	0.034
	No	360 (37.3)	605 (62.7)	
History of mental illness	Yes	14 (17.7)	65 (82.3)	< 10 ⁻³
	No	396 (37.4)	663 (62.6)	
Leisure activities	Yes	172 (49.3)	177 (50.7)	< 10 ⁻³
	No	238 (30.2)	551 (69.8)	
Physical activities	Yes	145 (45)	177 (55)	< 10 ⁻³
	No	265 (32.5)	551 (67.5)	
Smoking habits	Yes	45 (28.1)	115 (71.9)	0.025
	No	365 (37.3)	613 (62.7)	
Drinking habits	Yes	63 (34.4)	120 (65.6)	0.622
	No	347 (36.3)	608 (63.7)	
Are you satisfied with your career choice?	Yes	305 (49.3)	314 (50.7)	< 10 ⁻³
	No	105 (20.2)	414 (79.8)	
Have you ever thought of dropping out of medical studies?	Yes	167 (25.2)	497 (74.8)	< 10 ⁻³
	No	243 (51.3)	231 (48.7)	

Stress management training	Yes	49 (31.0)	109 (69.0)	0.157
	No	361 (36.8)	619 (63.2)	
Have you ever visited a psychiatrist?	Yes	51 (22.4)	177 (77.6)	< 10 ⁻³
	No	359 (39.5)	551 (60.5)	
	No			
Are you happy?	Yes	289 (65.8)	150 (34.2)	< 10 ⁻³
	No	121 (17.3)	578 (82.7)	

Table 4 Binary logistic regression analysis of association between the sample and depression symptoms

Characteristic	Exp (B)	95%CI	P value	
Gender	1.544	1.135-2.099	0.006	
Socio-economic level	High	1		
	Moderate	1.83	1.276-2.633	0.001
	Low	6.589	3.000-14.469	< 10 ⁻³
History of mental illness	2.693	1.470-4.932	0.001	
Smoking habits	1.669	1.123-2.481	0.011	
Grade	Year 1	1		
	Year 2	0.991	0.653-1.504	0.966
	Year 3	0.796	0.523-1.213	0.288
	Year 4	0.918	0.584-1.444	0.711
	Year 5	0.667	0.456-0.974	0.036
Leisure activities	0.459	0.344-0.613	< 10 ⁻³	
Physical activities	0.679	0.505-0.914	0.011	
Satisfaction toward career choice	0.238	0.179-0.316	< 10 ⁻³	
Stress management training	1.609	1.085-2.385	0.018	
Happiness perception	0.143	0.107-0.193	< 10 ⁻³	

to be less depressed than their colleagues.

Performing leisure and physical activities, satisfaction toward a career choice, happiness perception, and participation in a stress management workshop were considered prognostic factors for depression among participants.

DISCUSSION

Prevalence of depression among students

Sixty-four percent ($n = 728$) of the participants had depressive symptoms. These results seem to be higher than the aggregate prevalence of 27.2% (range, 9.3%-55.9%) reported by Rotenstein *et al*[5] in their systematic review and meta-analysis that covered 195 studies in 47 different countries, involving 129123 medical students. In a medical education journal, a meta-analysis that concerned a total of 62728 medical students pooled across 77 studies was published in March 2016[9], which reported similar results (28%).

The magnitude of depression found in our study closely resembled the findings from some neighboring countries: Egypt 60.2%[10], Bahrain 65.6%[11], *etc.* Lower prevalence were found in India[12] (18%), Thailand[13] (12.6%), Germany [14] (10.3%), *etc.*

Nationally, the proportion of depressed medical students was higher than what was reported in a previous Tunisian study[15] that was conducted at the University of Sfax and showed that out of 80 medical students, 31% were depressed. Similar results were found in another study that included Tunisian medical residents (30.5%)[16]. Both studies used the same screening tool (Hospital Anxiety and Depression scale)[15,16].

This variation worldwide can be explained to be due to sample size and data collection tools. Besides, diversity in cultural, religious, and spiritual peculiarities[17] in addition to dissimilarity in the healthcare system might also elucidate the disparity of findings between countries.

Association between characteristics of participants and symptoms of depression

Female gender: Globally, there were controverted issues given the impact of gender on depression symptoms. The significant correlation of poor mental health with female students found in the current study is supported by previous studies in Sweden[18], Nepal[19], Australia[20], *etc.* In contrast, no difference in depression between genders was disclosed in previous studies in Tunisia[16], Greece[21], Ethiopia[22], *etc.* Furthermore, regression analysis yielded mixed findings with some considering female gender as a risk factor for depression: South Africa[23], Turkey[24], South Korea [25], *etc.* Studies took a multitude of tracks to elucidate why female students were more prone to depression than their male peers, and they suggested social stigma, gender inequity, and cultural constraints as the main reasons[9,26,27].

Financial status: Based on their financial status self-assessment, students at a low socioeconomic level were more likely to get depressed than their peers. These outcomes are in harmony with those run in neighboring and foreign countries[3,10, 14,25,28]. The impact of financial status on the occurrence of depression was documented in numerous studies among general populations[29-32]. A large four-year study (The PATH Through Life Survey) was conducted by Butterworth and colleagues in the city of Canberra and the surrounding regions in south-east Australia, and it included 6715 participants from different cohorts (1975-1979; 1956-1960; and 1937-1941). The study proclaimed that the lack of financial resources was strongly associated with depression[33,34].

Mental problems: Out of 1138 participants, 79 (6.9%) reported having a history of mental illness. These results seem to be akin to those found in other studies[26,35]. Nineteen Saudi Arabian medical students (out of 398) reported having a psychological illness. Eighty-four percent of them met the BDI criteria for depression. The chi-square test detected a significant correlation ($P < 0.001$) and multiple linear regression inferred that the presence of psychological problems makes students 1.435 times more likely to get depressed [$P = 0.03$, $\exp(B)$ 4.200, 95%CI: 1.150-15.338][35]. These findings are congruous with those reported earlier by Asal *et al*[36], Pagnin *et al*[37], and Pillay *et al*[38], who found that depressive and anxiety features were related to students' history of poor mental health[36-38].

Smoking, drinking, and substance use: Out of 1138 participants, 160 (14.1%) had smoking habits while 183 (16.1%) had drinking habits. Smokers (115, 71.9%) and drinkers (120, 65.6%) met the BDI-II criteria for depression. The regression analysis considered smoking as a risk factor for depression. Many studies have looked for the link between substance use and the occurrence of depression[39]. On the other hand, Palestinian and Saudi Arabian studies that explored the impact of smoking only (but not drinking for cultural limitations) found no significant correlation with depression ($P = 0.08$)[26, 35]. Moreover, O. Coskun and colleagues[24] perceived no significant relationship between alcohol and the magnitude of depression. Correspondingly, studies among Ethiopian, Nepali, and Australian medical students found, also, no significant link between substance use and the development of depression[19,20,22]. Strikingly, a similar study was performed in the Netherlands. Authors noticed that first-year students who had drinking habits tended to be more balanced in their mental wellness than non-drinking students. Hence, drinking seems to be a coping tool wielded to ease the pressure but also to inflate social interactions and activities[40,41]. Even though drinking can be regarded as a relief from stress or a coping strategy, immoderate drinking may ruin liver and pancreas functioning, alter the cardiovascular system, and lead to tumoral issues as well as numerous psychiatric disorders[41-44].

Association between academic characteristics of participants and depression symptoms

Physical activities: Almost 70% of the sample did not practice any physical activity. Among them, 551 (67.5%) met the BDI-II criteria for depression. The regression analysis considered physical activity as a protective factor against depression[45].

A tiny number of studies had explored physical behavior among medical students. Abdelwahed and colleagues, for instance, observed that 210 out of 442 were performing physical activity at least three times a week. Yet, statistical analysis did not show any significant correlation between physical activity and depression ($P = 0.647$), anxiety ($P = 0.78$), or stress ($P = 0.76$)[10].

Worldwide, the impact of physical exercises was exemplified in numerous studies. A systematic review on the effects of physical activity on brain structure and function in youth related that physical activity can redesign white matter integrity and arousal of regions key to cognitive tasks[46]. Identically, Rebar and colleagues performed a meta-analysis of the impact of physical activity on depression and anxiety among the non-clinical population[47]. Authors concluded that physical activity was shown to decrease depression by a medium effect [standardized mean difference (SMD) = -0.50; 95%CI: -0.93 to -0.06] and anxiety by a small effect (SMD = -0.38; 95%CI: -0.66 to -0.11)[47].

Leisure activities and extracurricular involvement: More than half of the participants (69.3%) were not performing any leisure activity. Fifty hundred and fifty-one (69.8%) among them were found depressed. Statistical analysis proved a significant association between spare time ventures and the occurrence of depression: The odds of developing depression was reduced to half among socially active participants. These findings seem in line with a Nepalian study where 34% of students (221/651) were involved in extracurricular activities. While those who answered "Always" and "Often" as the frequency of their extra activities were 28.6% and 21.7% depressed, respectively, those who answered "Rarely" and "Never" were 42.4% and 41.7% depressed, respectively. Even though a strong correlation ($P < 10^{-3}$) was found in the chi-square test, having a spare schedule tends to be a protective factor against anxiety ($P = 0.012$, OR = 0.367, 95%CI: 0.165-0.799) but not depression[19]. The part taken by social life and social relationships turns out to be a key strand in the fight against depression and lessen stressful life pressures[22,40,48,49]. Dyrbye *et al*[28], who drove a longitudinal study among 3743 United States medical students from 2010 to 2014, noticed that students who avowed having low social support were more likely to manifest depressive features ($P < 10^{-3}$). Similarly, Turkish and Palestinian studies substantiated the strong correlation ($P < 10^{-3}$) that relates social interaction and social stand with the contingency of depression[24,35].

Satisfaction and dropping out ideas: Statistical analysis showed a strong correlation between students' dissatisfaction and depression ($P < 10^{-3}$). Unsatisfaction is, then, considered a risk factor for developing depression. These data closely resemble findings from other studies. Pokhrel *et al*[19] demonstrated that satisfied students in Nepal were less prone to depression (OR = 0.51, 95% CI: 0.33-0.80). Similarly, discontented KSA medical students tend to be more depressed than their peers ($P = 0.03$)[35]. Studies conducted in New Zealand[50] and Palestine[26] reported results in line with our study. The influence that satisfaction toward career choice has on students' mental health did not come out of anywhere. It arises from the reluctance to study medicine: Whether to please parents' desire to become a doctor or to go along with friends aiming to get higher social status. All of it ends by being hushed, knowing the reality of medicine[51].

Recommendations

As disclosed above, medical students are without a doubt prone to several mental afflictions. Therefore, preventing such distress among students should be a priority and a must.

Primary prevention is possible by supplying learners with seminars on time management, relaxation exercises, and mindfulness activities through counseling services such as the listening unit that has been established in our faculty. Finally, prioritizing students' welfare starts by providing space and needed materials to enhance students' physical exercises and group activities, delivering variable and healthy meals in university restaurants, and revising students' schedules to suit their academic, physical, and psychological needs.

Limitations

Overall, the authors acknowledge some limitations to this study. Being a descriptive cross-sectional study, causal links between the correlations could not be inaugurated. Preferably, further studies should be surveyed in longitudinal, prospective, and multicenter designs aiming to yield a greater overview of the circumstances. Even though the number of students who participated in this survey is much higher than those carried out in Tunisian and neighboring studies, a larger sample size would have risen the diligence and exactness of our study.

As our study was based on self-administrated questionnaires and all data employed were self-reported, it is possible that students could have understated or overstated their depressive symptoms. The choice, itself, of participating in the online survey may mirror some level of bias related to the personal traits and characteristics of the students. We have estimated the occurrence of depression among medical students using a self-reported inventory (BDI-II), there were no clinical assessments supervised by psychiatrists. Consequently, the diagnostic value may be restricted, and further psychiatric interviews are required to validate our results. Other students' characteristics that were correlated to the development of depressive symptoms were not explored among participants, such as emotional intelligence, coping skills, social support, religious beliefs, personality characteristics, and substance use disorders.

CONCLUSION

These findings give insight into Tunisian medical students' mental health issues and comorbidities. It is a hopeful request for decision-makers and academic authorities to take serious measures and offer effective interventions to minimize the currency of psychological distress among this subpopulation. To date, this is the largest study on depression among Tunisian and Maghrebian medical students. Yet, further research is recommended to explore other correlated factors and to evaluate the effectiveness of these measures on depression levels among medical students.

ARTICLE HIGHLIGHTS

Research background

Most medical schools in the world (including Tunisia) still recruit their students based solely on the university entrance exam score. Students' motivation, though being a crucial conjecture in their academic performance and well-being, has never been conventionally and structurally assessed in Tunisia. As a result, many students simply choose the medical field due to social codes, family influences, and cultural norms.

Research motivation

It is crucial for an educational institution to assess the mental status of students and its associated factors.

Research objectives

To assess the prevalence of depressive symptoms among Tunisian medical students and to evaluate its associated factors.

Research methods

This is an online survey of students from the four Tunisian medical faculties using Beck's depression questionnaire.

Research results

Sixty-four percent ($n = 728$) of the participants had depressive symptoms. Female gender, low socioeconomic level,

smoking habits and history of mental disorder, performing leisure and physical activities, satisfaction toward a career choice, and happiness perception were the main prognostic factors for depression among medical students.

Research conclusions

These findings give insight into mental health issues and comorbidity among Tunisian medical students. It is a hopeful request for decision-makers and academic authorities to take serious measures and offer effective interventions to minimize the currency of psychological distress among this subpopulation.

Research perspectives

Further studies are needed to explore other correlated factors (such as emotional intelligence, coping skills, social support, religious beliefs, and personality characteristics) and to evaluate the effectiveness of these measures on depression levels among Tunisian medical students.

FOOTNOTES

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