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R E V I E W

Depression among medical students in Saudi medical colleges: a cross-sectional study

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Introduction: Major depressive disorder is a common mental disorder worldwide that has many clinical presentations and is associated with many diseases. The aim of this study is to assess the levels of depression among medical students in Saudi medical colleges.

Methods: A cross-sectional study with a convenience sample conducted in Saudi medical colleges. Patient Health Questionnaire-9 (PHQ-9) was used for screening and associated with sociodemographic characteristics.

Results: A total of 2,562 medical students from 20 universities were recruited into this study, and 1,572 (61.4%) of the participants were females and 990 (38.6%) were males. Depression symptoms are found to be associated with college years, living conditions and smoking status ($P<0.05$).

Conclusion: High levels of depression symptoms were found among Saudi medical students (83.4%). Students in the first years of college should be screened for depression, while education and support for medical students in these years are essential.

Keywords: depression, medical students, Saudi Arabia, medical education

Introduction

Depression is a normal physiological effect that can be experienced after an emotional, pathological, or even physical problem, but if it remains for a long time and affects the function of a person, it will develop into a mental disorder or more specifically depression, which is a cause of death worldwide.[1] Major depressive disorder is a common mental disorder worldwide, which has many clinical presentations and is associated with many diseases. Physicians often fail to diagnose it, and it is usually missed.[2] Approximately 300 million people worldwide are suffering from depression, and women are affected more than men. Disability and impairment of a person's ability to function normally at work, home, or taking part in community activities appear to be some of the symptoms of depression.[3] People who live in poverty are two and half times more prone to develop major depressive disorder than people above the poverty level. Major depressive disorder is associated with an increased rate of chronic disease and the burden on health care services.[4] Visits to a physician's office for depression estimated to be 10.4% of all visits.[5] Patient Health Questionnaire-9 (PHQ-9) is a screening tool for establishing major depressive disorder based on the diagnostic criteria from the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV). It is a questionnaire with nine items; each item scores 0–3, and the total score is from 0 to 27 points. However, the outcomes of PHQ-9 do not diagnose depression. The

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questionnaire is a useful and reliable tool in terms of data validity. Gender is not identified or differentiated to avoid any bias to be established.[6]

Prevalence of depression among residents' physicians was 28%. A systematic review included studies between 1963 and 2015, involving 17,560 physicians.[7] A cross-sectional study in 2009 showed a prevalence of 12% among physicians.[4] The lifetime prevalence of depression is 19% for female physicians and 12% for male physicians. The suicide rates were investigated by a systematic review of 14 studies from 1963 to 1991, which showed higher rates of suicide among physicians compared to the general population.[8]

Medical students are known to experience stress during their 6 years of medical education, and stress was shown to decrease the quality of life and academic achievement. The stress that the medical students experience was determined to be associated with depressive symptoms, and 30% of the students reported depressive symptoms.[9] Medical students are at high risk of developing depression or depressive symptoms, and there was approximately 17% increase in the number of students developing depressive symptoms from the first year to the third year, indicating that depression in a medical student is accumulative and the disease or symptoms increase over time if not diagnosed and treated effectively.[10] Saudi medical students have a higher risk of developing depressive symptoms than other specialties because of personal, family, and social pressure that the doctors must be the best at everything. According to the results of the study, the data showed that medical students had a 25% higher depression rate than the people in other specialties.[11] Prevalence of stress was 57% among Saudi medical students.[12] Another study carried out in King Faisal University, Saudi Arabia, found that the prevalence of depression was 16% among Saudi medical students.[13]

The objective of this study was to assess the prevalence of depression among medical students in Saudi Arabia since no large samples have been acquired through research so far to measure the effect of depression in the country.

Methods

This is a cross-sectional study with a convenience sample conducted in Saudi medical colleges using a multi-item questionnaire over a 2-month period (April and May 2018).

PHQ-9 was used, which contained nine questions based on DSM-IV. The questions are arranged as Likert items and graded from 0 to 3 (not at all, several days, more than half the days, and nearly every day). The Likert items are computed in a total score out of 27 categorized in a diagnostic algorithm where a score of 5–9 is considered mild,

10–14 moderate, 15–19 moderately severe and ≥20 is severe depression. The sociodemographic questions are related to gender, age, marital status, college year, nationality, smoking status, and living conditions. The reliability and validity of the Arabic version have been tested in a previous study conducted in Saudi Arabia.[14]

A team of 27 data collectors from 20 universities have been recruited to collect the data from the medical students in their universities. Initially, we aimed for two data collectors per university to cover both male and female students, but the number of volunteers for data collection was low. Later on, each data collector had a hard copy of the questionnaire to collect the responses and submitted it through the electronic form for data analysis. The participation in this study is voluntary, and completion of the questionnaire is considered as an informed consent.

Medical students who missed to answers the questions were excluded from this study.

Data analysis was performed using SPSS V23.0. Descriptive statistics were expressed as mean±SD. Chi-squared test was used to determine P-values associated with sociodemographic factors. The institutional review board approval was obtained from Al-Imam Muhammad Ibn Saud Islamic University by research ethics committee, and the research was conducted in accordance with the Declaration of Helsinki.

Results

Demographic data

A total of 2,562 medical students from 20 universities were recruited into this study, and 1,572 (61.4%) of the participants were females and 990 (38.6%) were males, of whom 52 students excluded because of missing answers. The mean age was 22.05 years, and majority of them are from Saudi and single (96.1% and 92.4%, respectively). A total of 85.2% of medical students never smoked and 84.2% of students live with their families. Students from all the years participated in this study: year 1, 19.5%; year 2, 21.8%; year 3, 19.3%; year 4, 21%; and year 5, 18.4 (Table 1).

Twenty of 27 universities from all geographical regions of Saudi Arabia were involved in this study, and Jazan University shared the biggest number of contributions with 227 participants (8.9%), and the least involvement was from Princess Nora bint Abdul Rahman University with 51 participants (2%; Table 2).

Depression scores

A total of 66.6% of the males and 87.6% of the females showed various levels of depression, starting from mild to

Table 1 Demographic data of the participants

Sociodemographic characteristics	n (%)
Gender	2,562
Male	990 (38.6)
Female	1,572 (61.4)
Age, years (±SD)	22.05±1.98
Marital status	
Single	2,367 (92.4)
Married	195 (7.6)
College year	
Year 1	499 (19.5)
Year 2	559 (21.8)
Year 3	494 (19.3)
Year 4	539 (21)
Year 5	471 (18.4)
Nationality	
Saudi	2,463 (96.1)
Non-Saudi	99 (3.9)
Living conditions	
With family	2,518 (84.2)
With relatives	111 (4.3)
Alone	241 (9.4)
Undetermined	52 (2)
Smoking	
Never smoked	2,182 (85.2)
Previously smoked	160 (6.2)
Smoking	220 (8.6)

Table 2 Universities included in the study

University	n (%)
Tabuk University	165 (6.4)
Jazan University	227 (8.9)
Al-Rayan Colleges	53 (2.1)
Batterjee Medical College	100 (3.9)
Imam Abdulrahman Bin Faisal University	223 (8.7)
Princess Nora bint Abdul Rahman University	51 (2.0)
Najran University	202 (7.9)
Prince Sattam Bin Abdulaziz University	65 (2.5)
Taif University	100 (3.9)
Al Maarefa Colleges	101 (3.9)
Al-Imam Muhammad Ibn Saud Islamic University	100 (3.9)
King Khalid University	100 (3.9)
King Faisal University	171 (6.7)
Qassim University	184 (7.2)
University of Hail	109 (4.3)
King Saud bin Abdulaziz University for Health Sciences	113 (4.4)
Taibah University	86 (3.4)
Ibn Sina National College for Medical Studies	149 (5.8)
King Abdulaziz University	183 (7.1)
Northern Borders University	80 (3.1)
Total	2,562 (100)

severe stage of depression (total score, >4). Of both genders, 53.7% of them showed moderate severity and above levels of depression (total score >9). *P*-value of 0.001 is considered statistically significant (Table 3).

Depression symptoms are found to be associated with college years, living conditions and smoking status (*P*-value <0.05), while there was no association in gender or nationality (*P*-value >0.05; Table 4)

Discussion

Our aim was to determine the prevalence of depression among medical students in Saudi Arabia. The prevalence of depression in our sample was high. The high frequency of mild–moderate depression (55.9%) was similar to that of other studies among medical students.[15] Most of the medical students reported depressive symptoms (83.4%). In another study that was carried out in Poland showed that medical students with depression did not reach 60%, which is different from our data since the depressive symptoms in Saudi Arabia are high.[16] This peak of depression in Saudi Arabia could be attributed to many factors such as competency for limited seats of residency programs among graduated students, yearly updating requirements for residency application, and family and social pressure. Also, in Oman, the severe level of depression in medical students was 13.8%, whereas it was 11.6% in our study, which is quite similar between the two studies since the two countries share the same environment for medical students.[17] We did not find any difference in depression severity among male and female medical students, which is a difference in comparison to other studies that found that female students are more vulnerable to depressive symptoms.[18] This could be a plausible research sample since females in Saudi Arabia have a different sociodemographic morphology than Western countries. A study that was published in Croatia showed that depression level in females was 54.9% and in males was 59.3%, and in our study, there was very little difference, which was not even 2%.[16] We found that there was no difference in frequency of reporting depressive symptoms and the state of the marital status of the student (single or married).

The frequency of reporting depressive symptoms gradually decreased with advancing toward the fifth year (*P*=0.034). Another study carried out in India showed the same pattern as found in our study in decreasing depressive symptoms from first year to the fifth year, but there was a surprising increase in the third year in depressive symptoms, unlike our data where the numbers decreased starting from year 1 to year 5.[19] This could be explained by confidence in the level of knowledge or even by the fact that they are in their final years of medicine, in comparison with those who just started college especially when a high grade point average is a major goal.

Table 3 Depression severity in relation with gender

Gender	Depression severity					P-value[a]
	None–minimal (0–4), n (%)	Mild (5–9)	Moderate (10–14)	Moderately severe (15–19)	Severe (20–27)	
Male	233 (23.4)	299 (30.4)	242 (24.5)	128 (12.9)	88 (8.8)	0.001
Female	196 (12.4)	461 (29.3)	429 (27.3)	277 (17.6)	209 (13.2)	
Total	429 (16.7)	760 (29.7)	671 (26.2)	405 (15.9)	297 (11.6)	

Note: [a]Based on chi-squared test.

Table 4 Presence of depression symptoms associated with sociodemographic factors

Sociodemographic characteristics	Presence of depression symptoms		P-value[a]
	Yes	No	
Marital status			
Single	1,309 (83.3)	396 (16.7)	0.233
Married	122 (83.1)	33 (16.9)	
College years			
Year 1	439 (88)	60 (12)	0.034
Year 2	480 (85.9)	79 (14.1)	
Year 3	418 (84.6)	76 (15.4)	
Year 4	441 (81.8)	98 (18.2)	
Year 5	355 (75.4)	116 (24.6)	
Nationality			
Saudi	2,043 (82.9)	420 (17.1)	0.097
Non-Saudi	99 (90.9)	9 (9.1)	
Living condition			
With family	1,792 (83)	366 (17)	0.004
With relatives	91 (82)	20 (18)	
Alone	241 (88.8)	27 (11.2)	
Undetermined	36 (69.2)	16 (30.8)	
Smoking status			
Never smoked	1,804 (82.7)	378 (17.3)	0.008
Previously smoked	140 (87.8)	20 (12.5)	
Smoking	178 (80.9)	42 (19.1)	

Note: [a]Based on chi-squared test.

Students who live alone were found to have a slightly higher frequency of reporting depressive symptoms in comparison to students living with their families or relatives. Being alone is a factor that differs in social life as well as in having depressive symptoms. This was demonstrated in the results of our study, which showed that 88% of participants who lived alone developed depression, but nearly half of this percentage was written in another study which shared the main idea in regards to depression in medical students, which raised a question "does the region differ that much?".[20] There was no significant difference between the students who smoke and those who never smoked and ex-smoker students in the frequency of reporting depressive symptoms. Smoking did not play a role in the equation as in a different study that was carried out in 2015, which found that the difference is nearly 3% while in the data we collected the smoking student and ex-smoker difference was between 7% higher in ex-smokers but in relation to the non-smoking students the difference was only 2%.[19]

Conclusion

High levels of depression symptoms were found among medical students (83.4%) in Saudi medical colleges. Students in the first year of college should be screened for depression, while education and support for them at these years are essential.

This study was limited to measure the prevalence of depression with sociodemographic factors. Further studies should include possible contributory factors for depression, particularly the infrastructure of the educational system and any other comorbid illnesses.

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Disclosure

The authors report no conflicts of interest in this work.

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