

Prevalence of depressive symptoms and its predictive factors among male medical students in University of Bisha, Saudi Arabia

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Received: March 2023. Accepted: April 2023; Published: May 1, 2023.

Citation: Abdullah M. Alshahrani et al. Prevalence of depressive symptoms and its predictive factors among male medical students in University of Bisha, Saudi Arabia. World Family Medicine. May 2023; 21(4): 6-16

DOI: 10.5742/MEWFM.2023.95256086

Abstract

Background: Identifying the potential factors of depression among medical students is the first step towards academic excellence and future safe medical practice.

Methods: A cross-sectional study was conducted during a period from December 2019 to February 2020 at the University of Bisha, College of Medicine (UBCOM), Bisha province, Saudi Arabia. Male medical students from year one to year six were involved. A self-administered questionnaire was used to collect data about the socio-demographic and academic characteristics of students. The Arabic version of the PHQ-9 scale with a score of ≥ 10 was used to diagnose depression. Logistic regression analysis was used to assess the prevalence and risk of depression.

Results: Of the 190 male students enrolled, 26.8% had depressive symptoms, of whom 45.1% were having moderate to severe symptoms. The significantly highest depression rate was found among the second-year students, at 43.8% (OR=2.544; 95% CI 1.178-5.714; $p=0.018$), and the lowest rate was found among year one students, at 8.9% (OR=0.203; 95% CI 0.075-0.560; $p=0.002$). Univariate regression

revealed a significant correlation between depression and dissatisfaction of family income, loss of family members, having psychological illness, difficulties in personal relationships, regretted studying medicine, failure in an academic year, a lower grade than expected, conflict with tutors, lack of college facilities and heavy academic load. In multivariate analysis, loss of family members (AOR=0.077; 95% CI 0.013-0.451), difficulties in personal relationships (AOR=2.371; 95% CI 1.009-5.575), regret study medicine (AOR=3.764; 95% CI 1.657-8.550), failed in an academic year (AOR=2.559; 95% CI 1.112-5.887) were independently correlated with depression.

Conclusion: The study concluded that medical students at UBCOM also experience depressive symptoms associated with various risk indicators. Optimizing the educational and social environment coupled with infrastructure facilities at UBCOM might promote students' mental health and well-being.

Keywords: Depression, predictive factors, medical students, Saudi Arabia

Introduction

Depression is a common mental disorder expressed by loss of interest and pleasure, persistent sadness, decreased energy, inability to carry out daily activities and low concentration[1,2]. This disorder can affect all health aspects of the individual, including physical condition, mental, academic performance and social life[3]. Globally, about 350 million individuals suffer from depression and almost 3.2% of them express having an episode of depression at least once in their lives [4]. Medical students are seen at a higher degree of psychological morbidity ranging from stress, interpersonal problems and suicidal ideation to psychiatric disorders, compared with other populations[1,5]. The potential effects of depression on medical students include impairment of functioning in classroom and patient care settings that would negatively reflect community health[1,6].

Worldwide studies have reported high rates of depressive disorders among medical students, which affect their health and academic achievements[4,5,7]. A recent systematic review determined that the pooled prevalence of depression was 24.2% among male medical students around the globe [8]. For example, a study conducted in Al-Qassim University in the central region of Saudi Arabia showed that 44.4% of male medical students had depressive symptoms[9]. A recent investigation indicated that depressive symptoms are common among male medical students and interns in Al-Baha University, in the south of Saudi Arabia[10]. Some studies in Saudi Arabia have identified a high frequency of depressive symptoms among medical students [2,9,11–13]. Despite there being more than 30 medical schools across Saudi Arabia[14], no available data estimates the rates of depression among students in many medical schools. Continuous screening of depressive symptoms among medical students could help to take further appropriate interventional measures to prevent the complication of depression among these future medical professionals[8,15].

It is widely accepted that medical students are at risk of depression due to frequent academic demands, poor learning environments, and inability to cope with stressful situations in clinical practice[1,10]. Also, many social life indicators, physical health, history of psychological illness, and financial concerns make medical students more susceptible to depression[2,16]. The early onset of depression keeps medical students at higher risk for problems such as substance abuse and suicidal behavior[17]. Therefore, medical students at extreme risk of depression need serious attention to identify and tackle the possible factors that impair their academic path and future professional career[1]. Substantially identifying depressive symptoms and their potential factors among medical students is the first step towards academic excellence and safe medical practice[18]. The present study aimed to determine the prevalence of depression and its potential factors among male medical students at the University of Bisha, Bisha province, southwest of Saudi Arabia.

Methods

Study design and setting

A cross-sectional study was conducted during a period from December 2019 to February 2020 at the University of Bisha, College of Medicine (UBCOM) in Bisha province, southwest of Saudi Arabia. Male medical students at different academic levels from year one to year six were enrolled in the study.

The UBCOM is a new medical school in Saudi Arabia, which was established in 2014 to contribute in improving the health care status in the country. The educational program in UBCOM is an integrated curriculum that is utilizing problem-based learning strategies blended with various student centered activities. The medical curriculum in UBCOM is implemented from year two to six, whereas the first year is a preparatory phase[19].

Procedures of sampling collection

The data was collected using a self-administered questionnaire consisting of two forms: The first part of the questionnaire contains data about participants' demographic characteristics, academic information, medical history and socio-psychological status. These factors were obtained after an extensive review of the related literature and have been found to contribute to depression symptoms among medical students. The second part contains the Patient Health Questionnaire-9 (PHQ-9) to evaluate depression among the participants. The participants fully completed the questionnaire forms during class time, where full attendance was expected. Cover letters described the purpose of the survey distributed with questionnaires in the presence of the researchers to clarify any queries or doubts. Participating in the study was anonymous and voluntary, with no influence on the progress of their education. Students who were absent during the survey or not registered for the current academic year were excluded from the study.

Description of PHQ-9 instrument

A translated Arabic version of the PHQ-9 scale was used for the study. This version has been previously tested for its validity and reliability as a suitable tool for detecting depressive symptoms in the Saudi Arabian context[20]. The PHQ-9 is a self-administered instrument consisting of nine items (from 1 to 9), each based on a four-point Likert-type scale that scores for the presence of depression symptoms from zero to three as follow: "not at all", "several days", "more than half the days", and "nearly every day", respectively. Participants were diagnosed with depression if their responses to the following depressive symptoms criteria were met and existed for two weeks. Therefore, major depression was accounted for if the answer to items number 1 or 2 and four or more of the remaining PHQ-9 items recorded at least "more than half the days". Based on these criteria, a PHQ-9 score of ≥ 10 was used as a diagnostic cutoff point for depressive symptoms, as previously recommended in the literature[20,21].

Statistical analysis

Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS version 22)(Armonk, NY: IBM Corp.). A descriptive analysis was used to summarize data in terms of distributions, frequencies and proportions. Chi-square test was used to compare the proportion of depressive symptoms between students at different academic levels. Univariate logistic regression was performed to identify the predictive factors of depression and presented as crude odds ratios (COR) with 95% confidence intervals (CI). Then all independent variables with $p < 0.05$ values were retained for multivariate analysis. Multivariate logistic regression was used to identify independent associations with depressive symptoms and presented as adjusted odds ratios (AOR) with 95% CI. The AOR with 95% CI and a p-value of 0.05 was used to determine the final model. Prism version 7 (GraphPad Software, La Jolla, California, USA) was used for plot graphs.

Results

Socio-demographic characteristics of participants

Of the 201 medical students registered in UBCOM, 190 participated in the study, giving an estimated response rate of 94.5%. Of these participants, 45(23.7%) were from year one, 32 (16.8%) from year two, 41(21.6%) from year three, 25(13.2%) from year four, 30 (15.8%) from year five and 17 (8.9%) were from year six. The age of participants ranged from 18 to 25 years, with a mean of 21.1 ± 2.0 .

Of the total number of students (n=190) enrolled, 118 (62.1%) were from Bisha province and the majority (75.3%) were living with their families or friends. Most of the participants were satisfied with their family income (86.3%) and reported a stable parental relationship (88.9%). The minority of students were recorded as having /or a family member has a psychological illness (11.6%) and losing family members during the last month (12.1%). Students perceived limited time for social activities, recorded as 77.4%, whereas 23.7% reported difficulties in personal relationships and 24.2% were using a stimulant (tobacco, khat, alcohol and drug addiction). With regards to educational aspects, 25.8% of the students regretted studying medicine, 30.0 % failed in an academic year, 69.5 % suggested having a lower grade than expected, 80.5% reported lack of college facilities, 65.5% complained of the heavy academic load and 14.2% had a conflict with tutors. The detailed demographic characteristics of the participants are shown in Table 1.

Prevalence of depression

The prevalence of depressive symptoms using PHQ-9 (score ≥ 10) was 26.8% (51/190). Of these cases, 45.1% (n=23) had moderate to severe symptoms, 29.4% (n=15) had severe symptoms, and 25.5% (n=13) had moderate symptoms. The prevalence of medical students with depressive symptoms by year of study varied from 8.9% to 43.8% as presented in Figure 1. The highest prevalence rate was found amongst the second-year students, the six-year students and the third-year students. However, there were statistically significant differences in depression by year of study as shown in Figure 2. The significantly highest depression rate was found among the second-year students compared to students from all other academic years (OR=2.544; 95% CI 1.178-5.714; $p = 0.018$). The significantly lowest depression rate was reported among year one students compared to other students (OR=0.2034; 95% CI 0.075- 0.560; $p = 0.002$).

Factors associated with depressive symptoms

The univariate and multivariate analysis of the risk factors correlated with depression is shown in Table 1 and 2. In univariate analysis, the risk of depressive symptoms was found to be significantly increased among students with the presence of the following factors: dissatisfaction with family income (COR=2.747; 95% CI 1.173-6.432), loss of their family members (COR=0.229; 95% CI 0.052-1.016), having, or having a family member with psychological illness (COR= 2.581; 95% CI 1.039-6.413), having difficulties in personal relationships (COR=2.942; 95% CI 1.447-5.981), regretted study medicine (COR=5.245; 95% CI 2.583-10.650), failing in an academic year (COR=2.537; 95% CI 1.293-4.975), received a lower grade than expected (COR=3.020; 95% CI 1.316-6.928), having a conflict with tutors (COR=2.544; 95% CI 1.098-5.892), perceived lack of college facilities (COR=2.751; 95% CI 1.008-7.508), and felt heavy academic load (COR=2.310; 95% CI 1.092-4.888) (Table 1). Based on the retention of the significant relationships for the multivariate analysis, the independent risk factors that predicted the depressive symptoms were loss of family members during the last month (AOR=0.077; 95% CI 0.013-0.451), and difficulties in personal relationships (AOR=2.371; 95% CI 1.009-5.575), regret studying medicine (AOR=3.764; 95% CI 1.657-8.550), and failed in an academic year (AOR=2.559; 95% CI 1.112-5.887) (Table 2 and Figure 3).

Table 1. Univariate regression analyzing the associations between socio-demographic, academic factors and depression symptoms

	Variable	n (%)	No of participants who had depression symptoms	COR	P value
1	Family residency			1.165 (0.597-2.271)	0.654
	Bisha province	118 (62.1)	33 (28.0)		
	Another province	72 (37.9)	18 (25.0)		
2	Nature of residency during the study			2.096 (0.905-4.858)	0.080
	With family or friends	143 (75.3)	43 (30.1)		
	Alone	47 (24.7)	08 (17.0)		
3	Father education status			0.773 (0.404-1.479)	0.437
	University degree and above	113 (59.5)	28 (24.8)		
	Below University degree	77 (40.5)	23 (29.9)		
4	Mother education status			1.127 (0.593-2.142)	0.716
	University degree and above	89 (46.5)	25 (28.1)		
	Below University degree	101 (53.2)	26 (25.7)		
5	Satisfaction with family income			2.747 (1.173-6.432)	0.017
	Satisfied	164 (86.3)	39 (23.8)		
	Unsatisfied	26 (13.7)	12 (46.2)		
6	Parental relationship			0.441 (0.174-1.120)	0.079
	Stable	169 (88.9)	42 (24.9)		
	Unstable	21 (11.1)	9 (42.9)		
7	Loss of family members during last month			0.229 (.052-1.016)	0.036
	Yes	23 (12.1)	2 (8.7)		
	No	167 (87.9)	49 (29.3)		
8	Having or a family member with psychological illness				
	Yes	22 (11.6)	10(45.5)	2.581 (1.039-6.413)	0.036
	No	168 (88.4)	41(24.4)		

(continued next page)

Table 1. Univariate regression analyzing the associations between socio-demographic, academic factors and depression symptoms (continued)

	Variable	n (%)	No of participants who had depression symptoms	COR	P value
9	Limited time for social activities			1.088 (0.501-2.361)	0.832
	Yes	147 (77.4)	40 (27.2)		
	No	43 (22.6)	11 (25.6)		
10	Difficulties in personal relationships			2.942 (1.447-5.981)	0.002
	Yes	45 (23.7)	20 (44.4)		
	No	145 (76.3)	31 (21.4)		
11	Use of stimulant			1.897 (0.931-3.864)	0.075
	Yes	46 (24.2)	17 (37.0)		
	No	144 (75.8)	34 (23.6)		
12	Regret studying medicine			5.245 (2.583-10.650)	<0.001
	Yes	49 (25.8)	26 (53.10)		
	No	141 (74.2)	25 (17.7)		
13	Failed in an academic year			2.537 (1.293-4.975)	0.006
	Yes	57 (30.0)	23 (40.4)		
	No	133 (70.0)	28 (21.1)		
14	Lower-grade than expected			3.020 (1.316-6.928)	0.007
	Yes	132	43 (32.6)		
	No	58	08 (13.8)		
15	Conflict with teacher			2.544 (1.098-5.892)	0.026
	Yes	27	12 (44.4)		
	No	163	39 (23.9)		
16	Deficiency of college facilities			2.751 (1.008-7.508)	0.041
	Yes	153	46 (30.1)		
	No	37	05 (13.5)		
17	Heavy academic load			2.310 (1.092-4.8880)	0.026
	Yes	125	40 (32.0)		
	No	65	11 (16.9)		

Figure 1: Frequency of depression among medical students by academic year

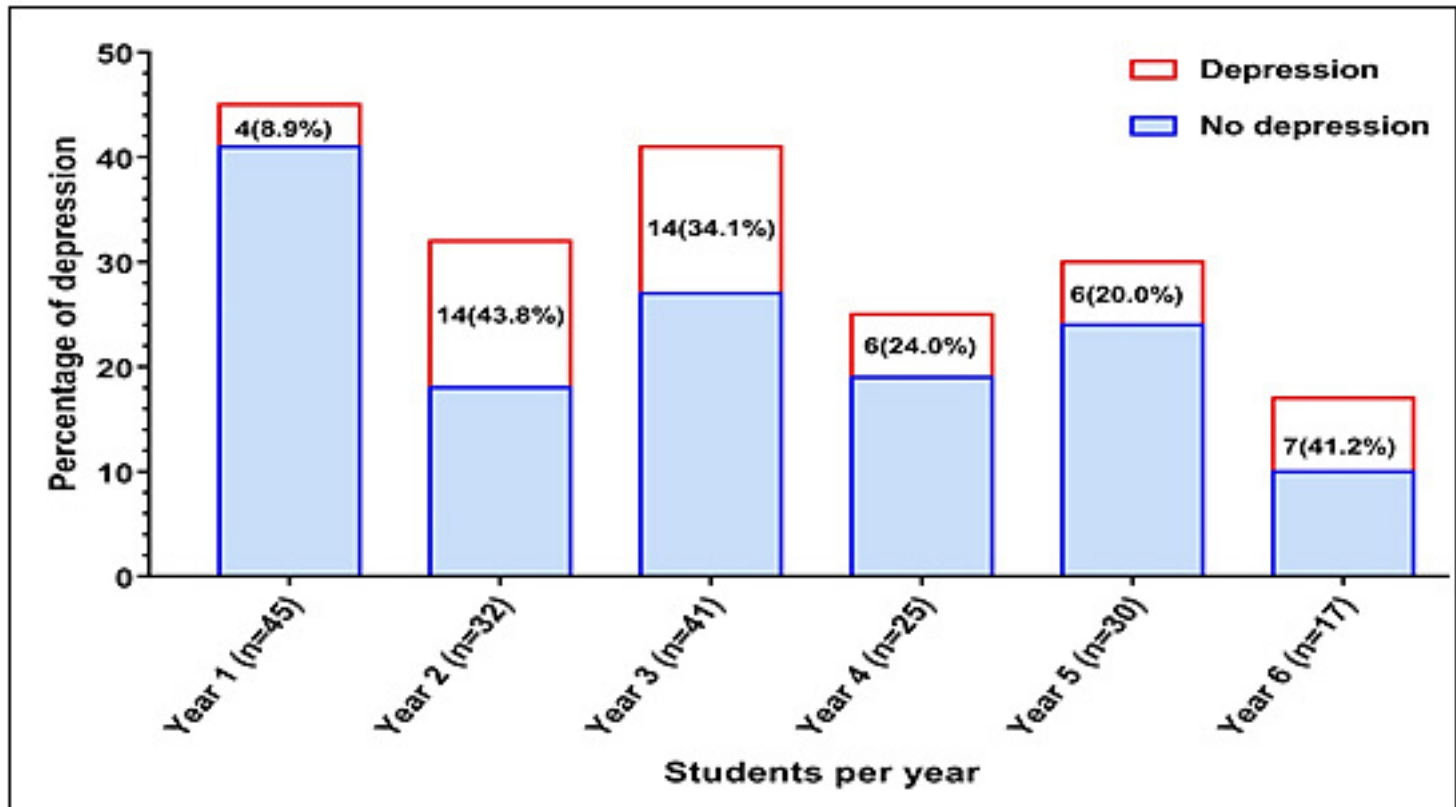


Figure 2: Odds ratio (95% confidence interval) for depressive symptoms among students at each level of study compared to students at other academic levels. ** p value < 0.02; * p value < 0.05.

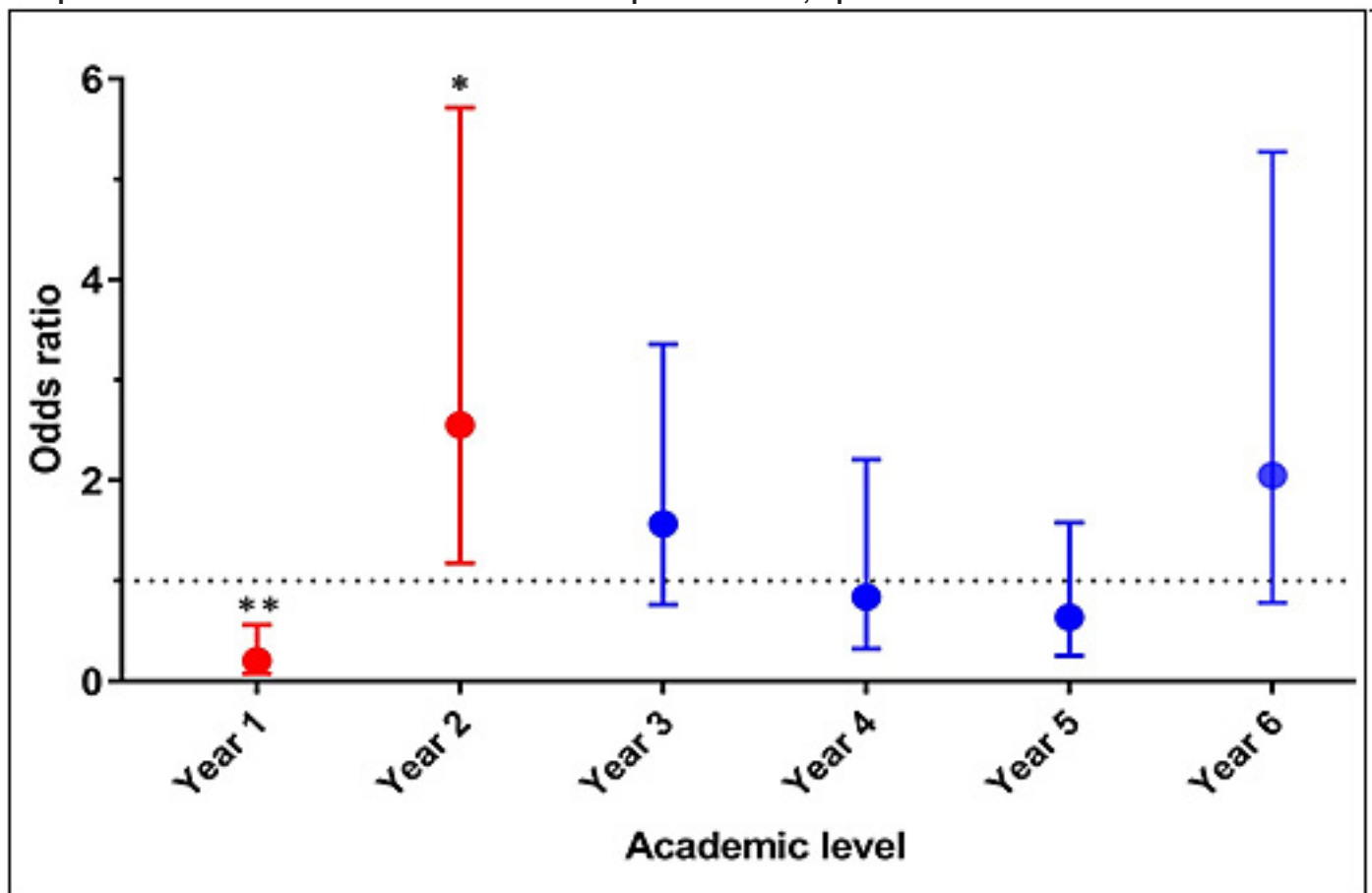
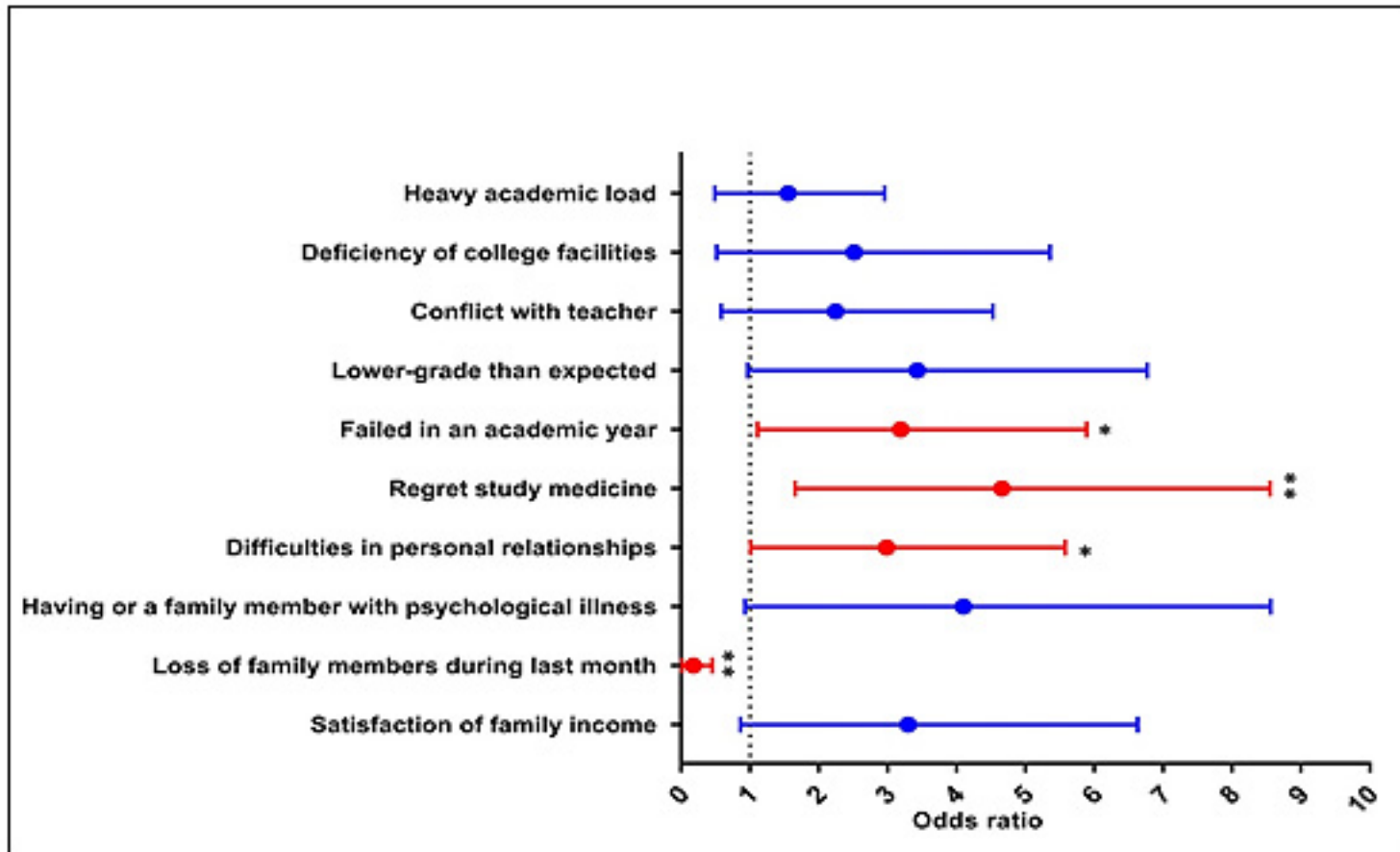


Table 2. Multivariate regression analyzing the predictor factors of depressive symptoms among medical students at the College of Medicine, University of Bisha

Variable	AOR	P value
Satisfaction with family income		
Satisfied	2.393 (0.864-6.628)	0.093
Unsatisfied	1	
Loss of family members during last month		
Yes	0.077 (0.013-0.451)	0.004
No	1	
Having, or having a family member with psychological illness		
Yes	2.817 (0.927-8.559)	0.068
No	1	
Difficulties in personal relationships		
Yes	2.371 (1.009-5.575)	0.048
No	1	
Regret studying medicine		
Yes	3.764 (1.657-8.550)	0.002
No	1	
Failed in an academic year		
Yes	2.559 (1.112-5.887)	0.027
No	1	
Lower-grade than expected		
Yes	2.556 (0.965-6.767)	0.059
No	1	
Conflict with teacher		
Yes	1.622 (0.581-4.524)	0.355
No	1	
Deficiency of college facilities		
Yes	1.664 (0.518-5.353)	0.393
No	1	
Heavy academic load		
Yes	1.206 (0.492-2.954)	0.683
No	1	

Figure 3: Logistic regression plot of adjusted odds ratios (95% confidence intervals) for risk factors associated with depressive symptoms. ** p value < 0.02; * p value < 0.05.



Discussion

The present study determined the prevalence and predicted factors of depression among medical students at the UBCOM in Bisha province in the southern region of Saudi Arabia. The overall prevalence of depression among students was 26.8%. This finding was higher than that reported among male medical students at King Faisal University in the eastern region of Saudi Arabia (16.2%)[13]. However, our result was lower than that reported among male medical students in Albaha University in Albaha neighboring city (53.8%)[10], in Umm Al-Qura University, Makkah Al-Mukaramah (31.2%)[6], and King Saud University, Riyadh capital (48.2%)[22]. In neighboring countries, the prevalence of depression among male medical students was 32.1% in Bahrain[23] and 28.6% in the United Arab Emirates[24].

Moreover, recent studies from other countries revealed variable prevalence rates of depression ranging between 71% to 13.6% [4,25–28]. Such discrepancy in the level of depression could be attributed to the differences in medical students' socio-cultural and demographic structures or due to the variation of academic environments between medical schools. A study conducted by Deb et al. disclosed that the students who reported positive views about the university academic environment and living arrangements had a lower level of depression than their counterparts[17]. Other possibilities might be to the differences in sample size selected, types of tools for depression assessment and the

cut-off values used to estimate the rate of depression.

Comparing the level of depression by the academic year, the second-year students scored the highest depression rate. This result is consistent with previous studies using different assessment tools for depression[29]. For instance, high rates of depression have been determined by the PHQ-9 scale among second-year medical students in Korea [30] and Malaysia[27]. These observations could be explained by that medical students could face a more complex curriculum in the second year. In UBCOM, the massive content of the medical curriculum is presented in year two, where the students learn comprehensive knowledge of the human body structure, function and biochemical basis in health and disease[19]. Likewise, increasing the level of depression among students during the early stages of medical schools has been reported in several studies. Vankar et al. determined that the prevalence of self-identified depression was significantly higher in the first year and second years compared to the third and fourth years[29]. In a longitudinal study, Roh et al. have suggested that depression rates increase during the first year and then reach the peak level during the second year, followed by a gradual decline during the later years of medical school[31]. A recent study in Saudi Arabia conducted among medical science students found that depression starts to escalate from the pre-professional year, reaches a peak in the third professional year, and then decreases in the final year of graduation[2].

Interestingly, our sixth-year students recorded the second-highest rate of depression. This might be due to the increasing demand for clinical training and new concerns and responsibilities of students during such academic levels. A recent study highlighted several stressful situations like using psychometric skills, applying clinical knowledge in real-life situations, trauma exposure, understanding the role, and regulating clinical settings during their clerkship[32]. Lin et al. argued that medical students, as novices in medical practice, experience greater physical demands resulting from their lack of efficiency or familiarity with the workload, leading to frustration in learning and reducing their compassion satisfaction[32]. Therefore, understanding of clinical learning process and essential supervision by clinicians in various disciplines might lead to a stress-free learning environment for our students in patient care and hospital setting.

In the present study, we identified a combination of predicted factors correlated with depression. In univariate analysis, students who perceived insufficient family income were about three times more likely to get depressive symptoms than other students. This association has been reported by many authors[22,31]. However, our result failed to determine a significant correlation between depression and family income at the multivariate level when adjusting other confounding factors. A previous study in Saudi Arabia suggested an insignificant association between the financial income and likelihood of depression due to the subjectivity of the income estimation[22].

The present study indicated that family members' loss and having psychological illnesses were possible risk factors for depression. However, at the multivariate level, the loss of a family member remained a significant depression indicator. Likewise, studies in Saudi Arabia linked depressive symptoms with physiological illness[2,10], and the loss of a family member[2]. Furthermore, inconsistent with a previous study in Saudi Arabia[33], we did not find significant associations between depression and parents' educational levels.

In the present study, medical students who had difficulties in personal relationships were about two and a half times more likely to develop depression. This might be attributed to the heavy academic requirements of studying medicine, which leave no time for building good personal relationships with friends or society. The other possible reason is that many students at UBCOM who leave their home base could fail to adapt to the new society and environments. Previous studies related the increasing rate of mental disorders to the feeling of isolation from family and community[17,28]. The high rate of depression observed among students with difficulties in personal relationships highlighted the importance of social support from peers, faculty members, and students' academic counseling. However, students' focus group discussions might be an essential approach to figure out their essential needs.

Several studies have evaluated the contribution of depression-related factors to the academic status of the medical institution[2,22]. In our findings, students who perceived a lack of college facilities were about three times more depressed than other students. Likewise, a study conducted at King Saud University in Riyadh capital found that medical students with negative perceptions about the educational environment had high depressive symptoms[22]. Others have suggested that well-structured learning and living environments play an essential role in good mental health [15,34]. Therefore, promoting the quality and quantity of medical school infrastructure of learning facilities, classroom spaces, laboratories and training sites can reduce students' depressive symptoms.

Evidence indicated that medical school students could experience significant psychological stress due to substantial academic requirements[2,25]. In the present study, the regret of studying medicine is the persistent and strong factor for causing depression. However, having a regretful feeling about studying medicine was a correlate of depression in many studies[4,33]. This can be explained by the fact that many students might find curriculum difficulties and find the nature of studying medical school more demanding than expected. However, our study found a significant correlation between depression and heavy academic load. Another possible factor could be a lack of interest and motivation of students after joining the medical school. Research showed that many students select a medical career because of family pressure rather than their self-interest[35]. Therefore, understanding the factors influencing students to choose medicine as a career needs to be investigated. Furthermore, implementing appropriate quality assurance procedures along with students' perception are recommended to evaluate medical curriculum content, teaching and learning strategies.

Regarding the academic performance, the proportion of depression was significantly increased among students who perceived their academic grade was lower than expected. Similar findings have been observed in Korea[30] and India[36]. Yoon et al. found that academic achievement was significantly related to the mean PHQ-9 score, and the prevalence of depression was significantly higher in poorly-perceived academic achievers than in excellent or fair achievers[30]. On the contrary, another study assumed that higher academic achievers might be under massive stress due to the competitive nature of the medical school[36]. The present study also found a strong correlation between academic failure and depression, confirming previous findings[37]. Research evidence indicated that depressive symptoms among medical and non-medical students were linked to frequent course failure and lower average curricular grade[38]. Noticeably, our medical students who failed at least in one academic year or a particular course were about three times more depressed than those who did not fail during their study. Such a situation urges for adopting a mentorship program combined with academic counseling and psychiatric services to guide students toward academic excellence.

Limitation

The study reveals several limitations that need to be considered. Firstly, this was a cross-sectional design that used a self-assessment measure without any confirmation from clinical physicians. Secondly, depressive symptoms were identified based on a PHQ-9 \geq 10 score; therefore, the correlation between risk factors and the severity of depression was not necessarily identified clearly. Thirdly, the study did not include students who dropped out or who were absent during the survey, which might affect the depression rate among our medical students. Finally, although the evidence in Saudi Arabia suggests that depressive symptoms are higher among female medical students than their male colleagues[2,9,22], the present study assessed only male students; in fact, the medical program for the females UBCOM had not yet started.

Conclusions

The study concluded that male medical students at UBCOM also experience the existence of depressive symptoms. Various risk indicators of depression dealt with students' social life and academic functioning identified in this study. Such situations may require more careful attention from medical schools and university administration to prevent and detect depression.

List of abbreviations

AOR: Adjusted Odd Ratio; CI: Confidence Interval; COR: Crude Odd Ratio; PHQ-9: Patient Health Questionnaire-9; SPSS: Statistical Package for Social Sciences; UBCOM: University of Bisha, College of Medicine.

Acknowledgment:

The authors would like to acknowledge the contribution of the students at the University of Bisha, College of Medicine who participated in this study.

Contributors:

AMA, MSA1, MHA, MSA2, MEI conceived the idea of the study and developed the protocol. AMA, MSA1, MSA2 and MEI designed and conducted the study. AMA, MSA2 and MEI collected the data. AMA, MSA1 and MEI analysed and interpreted the data and wrote the initial draft. AMA, MSA1, MHA, MSA2, MEI reviewed the literature. AMA, MHA and MEI revised the study for important intellectual contents. All authors have investigated the final draft and are accountable for the content and similarity index of the manuscript.

Funding: The study received no specific grant.

Availability of data and materials: The datasets during and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: None declared

Ethics approval and consent to participate: Ethical approval was obtained from the Research Ethics Local Committee at the UBCOM (Ref No.: UBCOM/H-06-BH-087(03/13)). Oral informed consent obtained from the participants prior to the start of the interview.

References

1. Ngasa SN, Sama C, Dzekem BS, Nforchu KN, Tindong M, Aroke D, et al. Prevalence and factors associated with depression among medical students in Cameroon: a cross-sectional study. *BMC Psychiatry*. 2017;17:216.
2. Hamasha AAH, Kareem YM, Alghamdi MS, Algarni MS, Alahedib KS, Alharbi FA. Risk indicators of depression among medical, dental, nursing, pharmacology, and other medical science students in Saudi Arabia. *Int Rev Psychiatry*. 2019;0:1–7.
3. Aldabal B, Koura M, Alsowielem L. Magnitude of depression problem among primary care consumers in Saudi Arabia. *Int J Med Sci Public Heal*. 2015;4:205.
4. Njim T, Mbanga CM, Tindong M, Fonkou S, Makebe H, Toukam L, et al. Burnout as a correlate of depression among medical students in Cameroon: a cross-sectional study. *BMJ Open*. 2019;9:e027709.
5. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety & depression among medical undergraduate students & their socio-demographic correlates. *Indian J Med Res*. 2015;141:354–7.
6. Alkot MM, Alnewirah AY, Bagasi AT, Alshehri AA, Bawazeer NA. Depression among Medical versus Non-Medical Students in Umm Al-Qura University, Makkah Al-Mukaramah, Saudi Arabia. *Am J Psychiatry Neurosci*. 2017;5:1–5.
7. Mayer FB, Santos IS, Silveira PSP, Helena M, Lopes I, Regina A, et al. Factors associated to depression and anxiety in medical students: a multicenter study. *BMC Med Educ*. 2016;16:282.
8. Puthran R, Zhang MWB, Tam WW, Ho RC. Prevalence of depression amongst medical students: a meta-analysis. *Med Educ*. 2016;50:456–68.
9. Inam SB. Anxiety and Depression among Students of a Medical College in Saudi Arabia. *Int J Heal Sci (Qassim Univ)*. 2007;1:295–300.
10. Albajjar MA, Bakarman MA. Prevalence and correlates of depression among male medical students and interns in Albaha University, Saudi Arabia. *J Fam Med Prim Care*. 2019;8:1889–94.
11. Kulsoom B, Afsar NA. Stress, anxiety, and depression among medical students in a multiethnic setting. *Neuropsychiatr Dis Treat*. 2015;11:1713–22.
12. Hakami RM. Prevalence of Psychological Distress Among Undergraduate Students at Jazan University: A Cross Sectional Study. *Saudi J Med Med Sci*. 2018;6:82–8.
13. El-Gilany AH, Amr M HS. Perceived stress among male medical students in Egypt and Saudi Arabia: effect of sociodemographic factors. *Ann Saudi Med*. 2008;28:442–8.
14. Bin Abdulrahman KA, Saleh F. Steps towards establishing a new medical college in the Kingdom of Saudi Arabia: an insight into medical education in the Kingdom. *BMC Med Educ*. 2015;15:85.
15. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic Review of Depression, Anxiety, and Other Indicators of Psychological Distress Among U. S. and Canadian Medical Students. *Acad Med*. 2006;81:354–73.
16. Bedaso A, Kediro G, Yeneabat T. Factors associated with depression among prisoners in southern Ethiopia: a cross-sectional study. *BMC Res Notes*. *BioMed Central*; 2018;11:637.

17. Kumar GS, Jain A, Hegde S. Prevalence of depression and its associated factors using Beck Depression Inventory among students of a medical college in Karnataka. *Indian J Psychiatry*. 2020;54:223–6.
18. Peluso MJ, Guille C, Sen S, Mata DA. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. *JAMA*. 2017;316:2214–36.
19. Ibrahim M, Al-Shahrani A. Implementing of a problem-based learning strategy in a Saudi medical school: requisites and challenges. *Int J Med Educ*. 2018;9:83–5.
20. Alhadi AN, Alateeq DA, Sharif E Al, Bawazeer HM, Alanazi H, Alshomrani AT, et al. An arabic translation, reliability, and validation of Patient Health Questionnaire in a Saudi sample. *Ann Gen Psychiatry*. *BioMed Central*; 2017;16:32.
21. Inoue T, Tanaka T, Nakagawa S, Nakato Y, Kameyama R, Boku S, et al. Utility and limitations of PHQ-9 in a clinic specializing in psychiatric care. *BMC Psychiatry*. 2012;12:73.
22. Al-Faris EA, Irfan F, Van der Vleuten CPM, Naeem N, Alsalem A, Alamiri N, et al. The prevalence and correlates of depressive symptoms from an Arabian setting: A wake up call. *Med Teach*. 2012;34 suppl 1:S32-6.
23. Mahroon ZA, Borgan SM, Kamel C, Maddison W, Royston M, Donnellan C. Factors Associated with Depression and Anxiety Symptoms Among Medical Students in Bahrain. *Acad Psychiatry*. *Academic Psychiatry*; 2017;42:31–40.
24. Ahmed I, Banu H, Al-fageer R, Al-suwaidi R. Cognitive emotions: Depression and anxiety in medical students and staff. *J Crit Care*. 2009;24:e1–18.
25. Azim SR, Baig M. Frequency and perceived causes of depression , anxiety and stress among medical students of a private medical institute in Karachi: a mixed method study. *J Pak Med Assoc*. 2017;69:840–5.
26. Fawzy M, Hamed SA. Prevalence of psychological stress, depression and anxiety among medical students in Egypt. *Psychiatry Res*. 2017;255:186–94.
27. Fata Nahas ARM, Elkalmi RM, Al-Shami AM ET. Prevalence of Depression Among Health Sciences Students: Findings From a Public University in Malaysia. *J Pharm Bioallied Sci*. 2019;11:170–5.
28. Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, Ephgrave K, et al. Depressive Symptoms in Medical Students and Residents: A Multischool Study. *Acad Med*. 2009;84:236–41.
29. Vankar JR, Prabhakaran A, Sharma H. Depression and Stigma in Medical Students at a Private Medical College. *Indian J Psychol Med*. 2014;36:246–54.
30. Yoon S, Lee Y, Han C, Steffens DC, Kim Y. Usefulness of the Patient Health Questionnaire-9 for Korean Medical Students. *Acad Psychiatry*. 2014;38:661–7.
31. Roh M, Jeon HJ, Kim H. The Prevalence and Impact of Depression Among Medical Students: A Nationwide Cross-Sectional Study in South Korea. *Acad Med*. 2010;85:1384–90.
32. Lin YK, Lin C, Lin BY, Chen D. Medical students' resilience: a protective role on stress and quality of life in clerkship. *BMC Med Educ*. *BMC Medical Education*; 2019;19:473.
33. Ibrahim N, Kharboush DA-, El-khatib L, Al A, Asali D. Prevalence and Predictors of Anxiety and Depression among Female Medical Students in King Abdulaziz University, Jeddah, Saudi Arabia. *Iran J Publ Heal*. 2013;42:726–36.
34. Deb S, Sc PD, R BP, Thomas S, Vardhan RV, Rao PT, et al. Depression among Indian university students and its association with perceived university academic environment, living arrangements and personal issues. *Asian J Psychiatr*. 2016;23:108–17.
35. Shankar N, Singh S, Gautam S, Dhaliwal U. Motivation and preparedness of first semester medical students for a career in medicine. *Indian J Physiol Pharmacol*. *India*; 2013;57:432–8.
36. Sidana S, Kishore J, Ghosh V, Gulati D, Jiloha RC, Anand T. Prevalence of depression in students of a medical college in New Delhi: A cross-sectional study. *Australas Med J*. 2012;5:247–50.
37. Waqas A, Rehman A, Malik A, Muhammad U, Khan S, Mahmood N. Association of Ego Defense Mechanisms with Academic Performance, Anxiety and Depression in Medical Students: A Mixed Methods Study. *Cureus*. 2015;7:e337.
38. Sousa JMDE, Moreira CA, Telles-correia D. Anxiety , Depression and Academic Performance: A Study Amongst Portuguese Medical Students Versus Non-Medical Students. *Acta Med Port*. 2018;31:454–62.