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Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students



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KEYWORDS

Prevalence;
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Abstract *Background:* Mental health issues are increasing in severity and number on college campuses. Improving adolescent mental well-being remains a challenge for most societies.

Objectives: The objectives of this study was to study the prevalence of psychological mood disorders and its association with some factors.

Methods: A cross-sectional-questionnaire based study was conducted among medical students in Fayoum University. Propensity to Psychological mood disorders was assessed by using a short version Depression, Anxiety and Stress Scale-21 (DASS-21), along with a pretested Sociodemographic questionnaire.

Results: A total of 442 students participated in the study with the mean age of 20.15 ± 1.9 years. Overall, the prevalence of stress, anxiety and depression with various degrees was 62.4%, 64.3%, and 60.8% among studied sample respectively. Higher stress and anxiety scores were significantly associated with female sex, older age, and $BMI \geq 25 \text{ kg/m}^2$. Higher depression score was associated with increasing age, low socioeconomic standard and among students from other governorates.

Conclusion: A substantial proportion of medical students are suffering from depression, stress, and anxiety. Female sex, increasing age, overweight and obesity are significant associated factors. Further studies need to be carried to identify other associated factors related to academic medical education.

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1. Introduction

Mental health disorders according to the World Health Organization (WHO) are one of the leading causes of disability

worldwide. Three of the ten leading causes of disability in people between the ages of 15 and 44 are mental disorders, and the other causes are often associated with mental disorders.¹ The mental health action plan for 2013–2020, recently published by the WHO, demonstrated the need for a collective evidence based effort to improve mental health.²

Stress is anything that poses a challenge or a threat to our well-being. It has been defined as a process in which environmental demands exceed the adaptive capacity of an organism,

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resulting in psychological and biological changes that may place persons at risk for disease.³ Anxiety is a psychological and physiological state characterized by cognitive, somatic, emotional, and behavioral components. These components combine to create an unpleasant feeling that is typically associated with uneasiness, fear, or worry. Anxiety is a generalized mood condition that occurs without an identifiable triggering stimulus,⁴ while many symptoms of depression include, persistent sad, anxious or “empty” feelings, feelings of hopelessness, feelings of guilt, worthlessness and/or helplessness, irritability, restlessness, and loss of interest in activities or hobbies once pleasurable.⁵

University students are a special group of people that are enduring a critical transitory period in which they are going from adolescence to adulthood and can be one of the most stressful times in a person’s life.⁶ Several studies have reported high rates of psychological morbidity among medical students using various instruments. Both retrospective and prospective researches have shown that most adulthood mental disorders begin in childhood and adolescence.⁷

The psychological health complaints and symptoms, mental health issues are increasing in severity and number on college campuses.^{8,9} Because, up to 60% of university students left university without finishing their studies because of depression, anxiety and maladjustment.^{8,10} A review of psychological distress among medical students found a high prevalence of depression and anxiety, with levels of psychological distress consistently higher than in the general population and age-matched peers by the later years of training.^{11–13} In Arab countries, recent studies from Egypt, Saudi Arabia, and United Arab Emirates reported high rates of anxiety and depression.^{14–17}

It is important to identify the prevalence, and risk factors of stress among medical students, which not only affect their health but also their academic achievements at different points of time in their study period.^{18,19} In addition patients care is affected by psychological distress among physicians such as Poor communication, diminished quality of care and medical errors have been found to be associated with physical stress.²⁰

The association of mental illness and obesity especially depression has been concluded in previous research.^{21,22} The prevalence of obesity has tripled concurrently with the rate of depression in many countries of the World Health Organization (WHO) European Region since 1980 s, and continues to rise at an alarming rate.²³ We study through this research this relation among university students. This help to identify special at risk group, and to develop and evaluate more effective preventive and therapeutic interventions to these conditions.

High rates of psychological problem among medical students are most likely related to academic, financial and social demands that college environments place on students at a time when they are also involved in issues related to lifestyle and careers.²⁴ Much of the literature on risk factors among students has focused on suicidality and has found higher risks for students who are over age 25 or male undergraduates.²⁵ In Egypt, Mental disorders were associated with social, demographic, behavioral, and educational factors.¹⁴

The current study aimed to explore the magnitude of psychological mood disorders (stress, anxiety and depression) among Fayoum university medical students. The study also aimed to explore the association between these disorders and

some factors such as sex, age, socioeconomic standard, and obesity.

2. Methods

2.1. Study design and setting

A cross-sectional study was conducted in Fayoum University of Egypt from January to April, 2015, among the first to fourth academic year students of medicine who were available in teaching classes in the main faculty building. Fayoum is a large depression or basin in the southwest of Cairo, and Fayoum Governorate’s population amounts to 3.07 millions persons.²⁶ Most of them live in rural communities and work in agriculture and its related industries. The average family size ranges from 4.1 to 4.5 from urban to rural communities respectively.²⁷

2.2. Ethical consideration

This study was approved by the Medical Research and the Ethical Committee of Faculty of Medicine, Fayoum University. A verbal consent was obtained from all participants before filling the questionnaire.

2.3. Sample population

The total number of Fayoum medical students in year 2014/2015 was 834 (509 females and 325 males) and the number in the four first academic years was 703 students (420 females and 283 males) distributed across the academic years as follows: 215 in the 1st academic class, 190 in the 2nd academic class, 166 in 3rd academic class and 132 in the 4th academic class. All were invited to participate, and of those, 442 gave verbal consent and participated in this study. They were distributed across academic years as follows: 120, 106, 118 and 98 students in the 1st, 2nd, 3rd, and 4th academic years respectively. A purposive sample was chosen from first to fourth academic years students who were available in classes and gave verbal consent.

Sample size was calculated using stat- Calc, by using the following data; prevalence rate 50%, significance level 0.05 and power of the study is 80%. Thus in this study, the minimum size required was 377. The size taken was 442 students.

2.4. Study tools

2.4.1. A predesigned self-administered questionnaire was used to assess demographic data, socioeconomic condition, and life-style, of students.

2.4.2. Psychological disorders were assessed by using the Arabic short version of the standardized Depression Anxiety Stress Scale-21 Items (DASS21). DASS21 is a set of three self-report scales designed to measure the negative emotional states of depression, anxiety and stress with 7 items per scale, the depression scale assesses dysphoria, hopelessness, self-deprecation and lack of interest. The Anxiety scale assesses autonomic arousal, skeletal muscle effect. The stress scale assesses relaxing difficulty, nervous arousal and being easily agitated.²⁸

2.4.3. Tools for measuring: weight, height and waist circumference; the weight was measured in kilogram without shoes using a standing weighing machine. Checks on the scale were made routinely before recording the weight of each student and the pointer was adjusted to zero using the screw provided; reading was taken to the nearest 1 kg. The height was taken barefooted in centimeter using standard measuring tape, and reading was taken to the nearest 1 cm. The waist circumference is measured by a measure tape at a level midway between the lowest rib and the iliac crest. The measuring tape should be snug but not compressing the skin and held parallel to the floor.²⁹

All selected students were invited to participate in the study after explaining purpose of study, and confidentiality was ensured. The self-administered questionnaires were distributed in and at the end of their classes. Filling questionnaire was taking about fifteen minutes of time. From a total of 500 distributed questionnaires, 442 completed questionnaires were returned with participation rate 88.4%. Body measurements: weight, height, and WC were taken from every student completed questionnaire.

2.5. Data manipulation and scoring system

2.5.1. Collected data were checked for completeness and manipulated as follows: -Body mass index was calculated by dividing the weight in kilograms by the square of the height in meters. A BMI over 25 kg/m^2 is defined as overweight and a BMI of over 30 Kg/m^2 as obese.³⁰ - Reference levels for desirable waist circumference (for men < 102 cm and for women < 88 cm).

2.5.2. The socioeconomic score was calculated according to (the modified Fahmy and El-sherbini Social Score).³¹ This system includes the following:

2.5.2.1. Crowding Index (persons per room) < 2 = 3, 2- = 2, Occupation for father or mother → Working = 2 and not working =

2.5.2.2. Education for father or mother: → Illiterate or read and write = 1, Primary = 2, Preparatory = 4, Secondary = 6, University or higher = 8.

2.5.2.3. Family income meets expenses → Yes and Save = 4, Yes = 3, Sometimes = 2, No = 1 -Sanitation → all of Three (water, electricity and waste disposal) = 3, two of three = 2, one of three = 1.

2.5.2.4. The overall Social Scoring is classified into four levels: Less than 15 Very Low Social Standards. 15–19 low social standards. 20–24 middle social standards 25–30 high social standards.

2.5.3. Lovibond scoring scale for psychological mood. Items are scored on 0–3 scale scoring for Depression, Anxiety and Stress, scale are derived by summing the item in each scale (range 0–42). Scores obtained on the DASS 21 will need to be multiplied by 2 to calculate the final score (**Table 1**).

2.6. Statistical analysis

Data were analyzed using Statistical Package for Social Science version 16.0 software, SPSS, Inc., Chicago, IL. Data were summarized using mean and standard deviation values of age, median and interquartile range (IQR) for stress, anxiety and depression scores, number and percentage for qualitative

Table 1 Lovibond scoring scale for psychological mood.

	Stress Scale	Anxiety scale	Depression scale
Normal	0–14	0–7	0–9
Mild	15–18	8–9	10–13
Moderate	19–25	10–14	14–20
Severe	26–33	15–19	21–27
Very severe	≥34	≥20	≥28

Lovibond and Lovibond (1995).²⁸

variables. Comparison between groups was done using chi-square and Fisher's exact test for qualitative variables and Mann-Whitney and Kruskal-Wallis tests for scores. Logistic regression analysis was done to test for risk factors of stress, anxiety, and depression. A *p* value less than or equal to 0.05 was considered statistically significant.

3. Results

3.1. Sociodemographic characteristics of the students

Table 2 revealed the distribution of the studied students who have shared in the study. The total number was 442 students with the mean age of 20.15 ± 1.9 years. They were divided into two age groups: the first age group (17–19) years with a percentage of 33.9%, and the other age group (20–22) years

Table 2 Sociodemographic characteristics of the students (total number 442).

Characteristics	Number (%)
<i>Age groups</i>	
17–19 years	150(33.9)
20–22 years	292(66.1)
Mean age ± SD	20.15 ± 1.9
<i>Sex</i>	
Males	172(38.9)
Females	270(61.1)
<i>Marital status</i>	
Single	408(92.3)
Married	34(7.7)
<i>Residence</i>	
Town	192(43.4)
Village	250(56.6)
<i>Governorate</i>	
Other governorates	34(7.7)
Fayoum governorate	408(92.3)
<i>Socioeconomic standard</i>	
Very low	78(17.6)
Low	80(18.1)
Middle	106(24.0)
High	178(40.3)
<i>Academic Years</i>	
First	120(27.1)
Second	106(24.0)
Third	118(26.7)
Fourth	98(22.2)

by 66.1%. The male students were represented by 38.9% where the female students were represented by 61.1%. Rural residence was represented by 56% of students; those from other governorates were represented by low percent (7.7%). The percent of students with very low and low socioeconomic standard represented over 30% of students.

3.2. Prevalence of psychological mood disorders among study participants

Fig. 1 and **Table 3** show the prevalence of stress among study participants over 60% with increasing prevalence among females compared to males (p value = 0.001); the percent of stress represented 65.9%, in females (mild and moderate 29.6%, severe and very severe 36.3%) and 57% in males. The prevalence of anxiety among students was near 65% with increasing prevalence in females (70.4%) than males (54.7%). Depression was detected in 60% of students with no significant difference between males and females. The proportion of

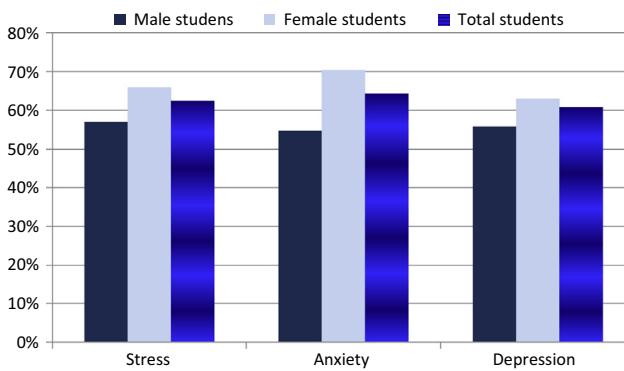


Figure 1 Prevalence of stress, anxiety, and depression among study participants.

overweight and obese students was 23.5% and 14.5% respectively with no significant difference between males and females. Regarding abdominal obesity detected by WC, a higher proportion of females 22.2% than males 14.0% was in obese classes (p = 0.03). **Table 4** shows that a significant association between stress and student age more than > 20 years has been recorded (p 0.049); they represented higher percentages in stressed students than normal. Also significant association between stress, anxiety, and depression and higher academic classes was detected with p values, 0.023, 0.001, and 0.023. Significant association between stress and marital status has also been reported (p 0.00); married students were less prone to stress. Significant association between the presence of anxiety and age and body weight has been detected; the prevalence of anxiety was significantly higher among older and overweight and obese students. Regarding depression, a significant association has been reported between the presence of depression and age (p 0.04).

3.3. Psychological disorders associated factors

3.3.1. **Table 5** shows median and IQR of stress, anxiety, and stress scores according to Sociodemographic, weight and lifestyle characters;

3.3.1.1. Sex: the median stress and anxiety scores were significantly higher in females than male students, p value 0.00 and 0.009 respectively with no association between depression and sex.

3.3.1.2. Age: the median stress and depression scores were significantly higher among older students aged from 21 to 23 years, p value 0.015 and 0.011 respectively.

3.3.1.3. It was shown also that there was a significant association between socioeconomic standard and stress and depression scores, p value 0.045 and 0.029 respectively, with higher scores detected among those with lower socioeconomic classes.

3.3.1.4. A higher depression score was detected among students from other governorates than those from Fayoum

Table 3 Psychological disorders and weight measurements of student by sex.

	Male students No (%)	Female students No (%)	Total No (%)	Chi-square test	p value
<i>Stress score</i>					
Normal	74(43.0)	92(34.1)	166(37.6)	17.9	0.001
Mild and moderate	60(34.9)	80(29.6)	140(31.7)		
Severe and very severe	38(22.1)	98(36.3)	136(30.8)		
<i>Anxiety</i>					
Normal	78(45.3)	80(29.6)	158(35.7)	14.8	0.001
Mild and moderate	58(33.7)	94(34.8)	152(34.4)		
Severe and very severe	36(20.9)	96(35.6)	132(29.9)		
<i>Depression</i>					
Normal	76(44.2)	100(37.0)	176(39.8)	2.28	0.319
Mild and moderate	60(34.9)	104(38.5)	164(37.1)		
Severe and very severe	36(20.9)	66(24.4)	102(23.1)		
<i>BMI</i>					
Normal	104(60.5)	170(63.0)	274(62.0)	0.66	0.718
Overweight	44(25.6)	60(22.2)	104(23.5)		
Obese	24(14.0)	40(14.8)	64(14.5)		
<i>WC</i>					
Normal	148(86.0)	210(77.8)	358(81.0)	4.66	0.03
Obese	24(14.0)	60(22.2)	84(19.0)		

Table 4 Demographic, physical activity and body weight risk factors of stress, anxiety, and depression among study participants.

		Normal	Mild & moderate	Severe & very severe	Chi-square	p value
Stress		N = 166	N = 140	N = 136		
Age	Students > 20 years(n = 292)	98(59.0)	100(71.4)	94(69.1)	6.02	0.049
Socioeconomic standard	Low & very low standard students(n = 158)	68(41.0)	44(31.4)	46(33.8)	3.3	0.190
Academic years	Third and fourth years(n = 216)	68(41.0)	79(56.4)	69(50.7)	7.5	0.023
Body weight	Overweight and obese students(n = 168)	52(31.3)	60(42.9)	56(41.2)	5.123	0.077
Residence	Urban students(192)	64(38.6)	58(41.4)	70(51.5)	5.4	0.067
Marital status	Married student(n = 34)	24(14.5)	2(1.4)	8(5.9)	19.06	0.00
Practicing exercise	At least than three times per week(n = 210)	76(45.8)	66(47.1)	68(50.0)	0.544	0.76
Anxiety		N = 158	N = 152	N = 132		
Age	Students > 20 years(n = 292)	90(57.0)	114(75.0)	88(66.7)	11.27	0.004
Socioeconomic standard	Low & very low standard students(n = 158)	50(31.6)	54(35.5)	54(40.5)	2.69	0.26
Academic years	Third and fourth years(n = 216)	59(37.3)	85(55.9)	72(54.5)	13.1	0.001
Body weight	Overweight and obese students(n = 168)	46(29.1)	62(40.8)	60(45.5)	8.9	0.012
Residence	Urban students(192)	58(36.7)	70(46.1)	64(48.5)	4.7	0.095
Marital status	Married student(n = 34)	10(6.3)	12(7.9)	12(9.1)	0.78	0.67
Practicing exercise	At least than three times per week(n = 210)	74(46.8)	70(46.1)	66(50.0)	0.48	0.78
Depression		N = 176	N = 164	N = 102		
Age	Students > 20 years(n = 292)	106(60.2)	120(73.2)	66(46.7)	6.45	0.04
Socioeconomic standard	Low & very low standard students(n = 158)	54(30.7)	60(36.6)	44(43.1)	4.442	0.109
Academic years	Third and fourth years(n = 216)	72(40.9)	90(54.9)	54(52.9)	7.5	0.023
Body weight	Overweight and obese students(n = 168)	60(34.1)	68(41.5)	40(39.2)	2.04	0.361
Residence	Urban students(192)	76(43.2)	78(47.6)	38(37.3)	2.72	0.256
Marital status	Married student(n = 34)	10(5.7)	14(8.5)	10(9.8)	1.8	0.405
Practicing exercise	At least than three times per week(n = 210)	84(47.7)	74(45.1)	52(51.0)	0.87	0.647

Table 5 Factors affecting psychological illness among students.

		Stress score		Anxiety score		Depression score	
		Median & IQR *	p value	Median & IQR	p value	Median & IQR	p value
Sex	Male	8(2:14)	0.00	16(12:24)	0.009	10(4:20)	0.115
	Female	10(6:18)		20(12:28)		14(6:20)	
Age	18-20	8(2:16)	0.015	16(10:28)	0.08	10(2:20)	0.011
	> 20	10(6:16)		20(12:26)		12(6:20)	
Socioeconomic standard	Very low & low	12(6:20)	0.045	18(12:26)	0.20	12(6:24)	0.029
	Moderate	8(4:16)		18(13:24)		12(6:18)	
	High	10(4:16)		20(12:28)		12(2:18)	
Governorate	Fayoum	10(4:16)	0.229	18(12-26)	0.63	12(4:18)	0.002
	Other	10(6:16)		18(12-24)		18(6.5:26)	
Marital status	Married	8(5.5:18)	0.89	12(11.5:19)	0.02	10(7.5:22.5)	0.683
	Unmarried	10(4:16)		19(12:26)		12(4:20)	
BMI	Normal	8(4:16)	0.002	18(12:26)	0.04	10(4:20)	0.615
	Overweight	11(6:19.5)		18(12:26)		13(6:23)	
	Obese	12(8:19.5)		24(14:30)		12(6:19)	
WC	Normal	8(4:16)	0.00	18(12:26)	0.84	10(4:20)	0.145
	Obese	14(8:22)		21(14:28)		12(6:18)	
Exercise	No	10(4:16)	0.87	18(12:26)	0.50	12(4:18)	0.39
	Yes	10(4:16)		18(13:28)		12(6:20)	

governorate $p = 0.002$. A significant association also was detected between anxiety and unmarried students.

3.3.1.5. A significant association between obesity and stress and anxiety scores: a higher stress and anxiety scores were detected among obese and overweight than normal students (p value 0.002 and 0.04). No association of depression and obesity

was detected in our results. Abdominal obese students detected by WC showed higher stress score than normal students ($p = 0.00$).

3.3.2. Table 6 shows that age > 20 years was a significant predictor for stress, anxiety and depression. Female sex was a predictor for both stress and anxiety. BMI $\geq 25 \text{ kg/m}^2$ was an important predictor for stress and anxiety.

Table 6 Multivariate stepwise logistic analysis of predictors.

Risk factors	p-value	OR	95% CI
<i>Predictors of stress</i>			
Age > 20 years	0.009	1.7	1.2–2.6
Sex (female sex)	0.047	1.5	1.005–2.23
BMI $\geq 25 \text{ kg/m}^2$	0.013	1.7	1.12–2.54
<i>Predictors of anxiety</i>			
Age > 20 years	0.000	2.3	1.49–3.6
Sex(female sex)	0.001	2.08	1.37–3.2
Standard(low standard versus moderate & high)	0.03	1.68	1.04–2.7
BMI $\geq 25 \text{ kg/m}^2$	0.001	2.09	1.34–3.25
Governorate (other governorate versus Fayoum governorate)	0.055	1.9	0.98–3.85
<i>Predictors of depression</i>			
Age > 20 years	0.01	1.7	1.14–2.6
Governorate(other governorate versus Fayoum governorate)	0.02	2.11	1.12–3.98

4. Discussion

The present study aimed at identifying different psychological disorders and associated factors among medical Fayoum university students. The data were collected from 442 students aged from 18 year to 22 years old from first to fourth academic years from different socioeconomic levels (Table 2).

The result of this study showed that the overall prevalence of stress was 62.5% among medical students. Similar studies from other countries showed a wide variety of rates; two studies in Saudi Arabia reported prevalence stress rates of 71.9% and 57%.^{32,33} In Malaysian, it was 41.9%, and in Thai it was 61.4%.^{34,35} This variation has been explained to be due to cultural differences, differences in the healthcare system, and differences in the population and the tools used in the study. Regarding our tools, DASS-21 questionnaire is used. The validity and reliability of the DASS-21 questionnaire in measuring the dimensions of depression, anxiety, and depression have been proved in different studies.^{36,37} This tool is only an indicator that couldn't replace clinical examination; it is suitable for screening normal adolescents and adults. This scale was psychometrically validated to the Arabic culture by Taouk et al.³⁸

The present study showed a significant association of stress score with increasing age (Table 5). Neimi and Vainiomaki reported that the level of stress increased progressively during the course to reach as high as 40% by the end of clinical training period.³⁹ Results of other studies in North America also suggest that mental health worsens after students join a medical school and remain poor throughout the course, especially in the transition from basic science teaching to clinical training.⁴⁰, but contrary to this finding, other studies concluded that the prevalence of stress was decreased as the students progressed in their years of study.^{35,36}

Our results revealed also an association of stress score with lower socioeconomic standard, and increased BMI and WC (Table 5) while factors such as, residence and exercise did not show any statistically significant association with stress.

These findings are in accordance with some findings of other studies; Jizan University study reported that factors such as BMI and the gender showed statistical association with stress.³⁵ In study conducted in Menoufiya University, Egypt, stress was significantly associated with gender, residence, perceived socioeconomic standard, feeling loneliness, and sharing family in social activities,¹⁴ while Labib et al. in Fayoum University reported that academic and family sources of stress were statistically significantly more in medical than in nonmedical students.⁴¹

In our study the prevalence of depression and anxiety was detected among 60.2% and 64.3% of medical students (Fig. 1). Similar studies conducted in Egypt universities reported other figures; in Menoufiya University, the prevalence of depression and anxiety, was 63.6% and 78.4% respectively,¹⁴ in Alexandria University; 43.9% and 57.9% of medical students were suffering from anxiety and depression respectively.⁴² Another study conducted in Mansoura University among medical students has reported lower figures; prevalence of depressive and anxious symptoms was 28.3% and 21.2%.⁴³ Our findings are also similar to what is reported in other countries; in Pakistan, a prevalence of 70% anxiety and depression was reported among medical students.⁴⁴ On the other hand, Jadoon et al.²⁴ have reported a prevalence of 43.89% of anxiety and depression among 482 medical students. In Beirut (27.63% and 69%),⁴⁵ and in Iran was 33%.⁴⁶

Depressive, anxiety disorders and obesity are among the leading public health concerns globally causing disability, reduced quality of life, increased mortality and comorbid conditions; however, the relationship between obesity and psychiatric disorders has not been clear. Methodological differences across studies have contributed to inconsistent observations. In our finding, the Anxiety score was significantly higher with increasing BMI and the BMI $>= 25$ was a predictor of anxiety, however the depression score was not (Tables 4 and 5). Some studies found positive association between obesity and psychiatric morbidity (depression and/or anxiety), especially among women,²¹ but others didn't find association between obesity and mental health⁴⁷ while, others reported the prevalence of depression and/or anxiety was higher in underweight men and women⁴⁸ and in underweight men.⁴⁷ Prospective research done by Nigatu et al.²² added evidence that obesity is associated with the subsequent onset of recurrent major depressive disorder (MDD-R) but not of single episode MDD among adults in the general population. Although the reverse association was not found, MDD-R tends to be also associated with subsequent development of obesity.

The current study revealed gender difference in self-reported anxiety and stress with significantly higher stress and anxiety among females than males (Tables 3, 5 and 6). This was consistent with Menoufyia university study; it was reported that females were more vulnerable to anxiety and stress.¹⁴ Amr et al., in Mansoura University, Egypt, reported no significant difference in stress between male and female medical students.⁴⁹ Previous epidemiological studies have concluded that females were more prone to psychological symptoms than males.^{37,42,43} This is possibly due to the fact that females complain more about the high load of the curriculum, are more liable to over complaint about physical and psychological symptoms and face less job opportunities than males in eastern countries.⁴³ Stressors such as Exams, contacts with patients and autopsy were described as a high stressors that

are significantly more frequent in female students.⁵⁰ Regarding depression, our results showed no gender difference. Amr et al. found that among medical student in Mansoura, females scored higher on a depression and neuroticism scale than males. Sarokhani et al. ⁴⁶ reported an opposite finding that prevalence of depression was higher among boys (28%) than among girls (23%). Tyssen et al. found a higher prevalence of mental problems among male doctors than the general male population, but findings about female doctors did not differ from the generally high prevalence rates among the general female population.⁵¹ The inconsistent data about gender difference are most likely explained by multifactorial, including biological, sociocultural, or variable combinations of each.⁴⁹

The current study showed significant association of Depression and stress scores with lower socioeconomic class with higher score detected in low and very low socioeconomic (**Table 5**) and the low and very low socioeconomic standard was a predictor of anxiety (**Table 6**). This was in accordance with what was reported by Eisenberg et al.⁵², that the students who grew up in poor families were substantially more likely to screen positive for depression or anxiety disorders and to report suicidal thoughts.

The prevalence of stress, anxiety and depression scores was higher among unmarried students (**Table 5**). Sarokhani et al. ⁴⁶ reported similar findings; the prevalence of depression among single students (39%) was higher than married students 20%. Contrary to our study, Bayram and Bilgel ⁵³ showed that married students reported higher levels of depression.

4.1. Conclusion and recommendation

A substantial proportion of Fayoum medical university students are suffering from Psychological disorders. The prevalence is more among females than males, with increasing age and with increasing BMI. Counseling and preventive mental health services should be an essential part of the routine investigation of medical students. Actions should be taken to encourage the students to seek help on exposure to distress. Further studies should be done to identify different sources and causes of stress especially related to academic and educational factors, and the effect of different intervention measures to avoid or cope with the psychological effect of the life tension.

Limitation

In this study, some limitation should be considered. Some factors are not studied as academic and educational factors, and fifth and sixth academic years even other faculties are not included in this study. Further studies should take these limitations into consideration.

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Conflict of interest

The authors declare that there are no conflicts of interest.

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References

- Murray C, Lopez A. World Health Report 2002: Reducing Risks, Promoting Healthy Life. Geneva, Switzerland: World Health Organization
- WHO. World Health Organization Mental health action plan 2013–2020. Geneva: available at <http://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf>.
- Cohen S, Kessler RC, Underwood-Gordon L. Strategies for measuring stress in studies of psychiatric and physical disorders. In: Cohen S, Kessler RC, Underwood-Gordon L, editors. *Measuring stress*. New York: Oxford University Press; 1995. p. 3–28.
- Seligman ME, Walker EF, Rosenhan DL. *Abnormal psychology*. 4th ed. New York: W.W. Norton & Company, Inc.; 2001.
- NIMH. National Institute of Mental Health; 2008. <<http://www.nimh.nih.gov>>.
- Buchanan JL. Prevention of depression in the college student Population: a review of the literature. *Arch Psychiatric Nurs* 2012;26(1):21–42.
- Kessler RC, Amminger GP, Aguilar-Gaxiola S, Alonso J, Lee S, Ustun TB. Age of onset of mental disorders: a review of recent literature. *Curr Opin Psych* 2007;20:359–64.
- Rubin LE. Student mental health in a chiropractic university setting. *J Chiropr Educ* 2008;22:12–6.
- Ovuga E, Boardman J, Wasserman D. Undergraduate student mental health at Makerere University, Uganda: research report. *World Psychiatry* 2006;5:1.
- Porter OF. *Undergraduate completion and persistence at four-year colleges and universities*. Washington: National Institute of Independent Colleges and Universities; 1990.
- 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.
- Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ* 2005;39:594–604.
- Rosenthal JM, Okie S. White coat, mood indigo: depression in medical students. *N Engl J Med* 2005;353:1085–8.
- Abdallah AR, Gabr HM. Depression, anxiety and stress among first year medical students in an Egyptian public university. *Int Res J Med Med Sci* 2014;2(1):11–9.
- El-Gilany AH, Amr M, Hammad S. Perceived stress among male medical students in Egypt and Saudi Arabia: effect of sociodemographic factors. *Ann Saudi Med* 2008;28:442–8.
- Amr M, El-Gilany A, El-Sayed M, El-Sheshtawy E. Study of stress among medical students at Mansoura University. *Banha Med J* 2007;2007(37):25–31.
- Carter AO, Elzubeir M, Abdulrazzaq YM, Revel AD, Townsend A. Health and lifestyle needs assessment of medical students in the United Arab Emirates. *Med Teacher* 2003;25(5):492–6.
- Abdulghani H, AlKanhal A, Mahmoud E, Ponnampuruma G, Alfaris E. Stress and its effects on medical students. A cross-sectional study at a College of Medicine in Saudi Arabia. *J Health Popul Nutr* 2011;29(5):516–22.
- Hysenbegasi A, Hass SL, Rowland CR. The impact of depression on the academic productivity of university students. *J Ment Health Policy Econ* 2005;8(3):145–51.
- Firth-Cozens J, Greenhalgh J. Doctors' perceptions of the links between stress and lowered clinical care. *Soc Sci Med* 1997;44:1017–22.
- Carpenter KM, Hasin DS, Allison DB, Faith MS. Relationships between obesity and DSM-IV major depressive disorder, suicide

- ideation, and suicide attempts: results from a general population study. *Am J Public Health* 2000;90(2):251–7.
22. Nigatu YT, Bültmann U, Reijneveld SA. The prospective association between obesity and major depression in the general population: does single or recurrent episode matter? *BMC Public Health Sample* 2015;15:350. <http://dx.doi.org/10.1186/s12889-015-1682-9>.
 23. World Health Organization. Nutrition; 2015; Available at: <http://www.euro.who.int/en/what-we-do/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/_body-mass-index-bmi> .
 24. Jadoon NA, Yaqoob R, Raza A, Shehzad MA, Choudhry ZS. Anxiety and depression among medical students: a cross-sectional study. *J Pak Med Assoc* 2010;60(8):699–702.
 25. Silverman MM, Meyer PM, Sloane F, Raffel M, Pratt DM. The big ten student suicide study: A 10-year study of suicides on midwestern university campuses. *Suicide Life Threat Behav* 1997;27:285–303.
 26. Official Fayoum Web Site: <<http://www.fayoum.gov.eg>> .
 27. CAPMAS. Statistical data and records of El-Fayoum Governorate. Egypt, Central Agency for Public Mobilization and Statistics; 2009.
 28. Lovebird SH, Lovibond. *Manual for the depression anxiety stress scales*. 2nd. Ed. Sydney: Psychology Foundation; 1995.
 29. Han T, Van Leer E, Seidell J, Lean M. Waist circumference action levels in the identification of cardiovascular risk factors: prevalence study in a random sample. *BMJ* 1995;311(7017):1401–5.
 30. WHO. Obesity and overweight, Global Strategy on diet, physical activity and health; 2003.
 31. Fahmy SI, El Sherbini AF. Determining simple parameters for social classification for health research. *Bull High Inst Publ Health* 1983;13:95–108.
 32. Sani M, Mahfouz MS, Bani I, Alsomily AH, Alagi D, Alsomily NY. Prevalence of stress among medical students in Jizan University, Kingdom of Saudi Arabia. *Gulf Med J* 2012;1(1):19–25.
 33. Abdulghani H. Stress and depression among medical students: a cross sectional study at a medical college in Saudi Arabia. *Pak J Med Sci* 2008;24:12–7.
 34. Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia* 2004;59:207–11.
 35. Saipanish R. Stress among medical students in a Thai medical school. *Med Teach* 2003;25:502–6.
 36. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *Br J Clin Psychol* 2005;44:227–39.
 37. Psychology Foundation of Australia. DASS publications. Available online at: <www2.psy.unsw.edu.au/groups/dass/pub.htm> . last accessed: February 15, 2009.
 38. Taouk M, Lovibond PF, Laub R. Psychometric Properties of an Arabic Version of the Depression Anxiety Stress Scale (DASS); 2001. From <<http://www2.psy.unsw.edu.au/Groups/Dass/Arabic/Arabic.htm>> .
 39. Niemi PM, Vainiomaki PT. Medical students' distress—quality, continuity and gender differences during a six-year medical programme. *Med Teach* 2006;28(2):136–41.
 40. Dyrbye L, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clin Proc* 2005;80:1613–22.
 41. Labib NA, Barakat AA, El Sherbiny N, Ebrahim E. Stress Profile among Fayoum University Students. *Egypt J Commun Med* 2010;28:59–71.
 42. Ibrahim MB, Abdelreheem MH. Prevalence of anxiety and depression among medical and pharmaceutical students in Alexandria/University Faculty of Medicine, Alexandria University. *Alexandria J Med* 2015;51:167–73.
 43. Amir M, El Gillany AH. Self-reported depression and anxiety by students at an Egyptian Medical School. *J Pakist Psych Soc (JPPC)* 2010;2:71.
 44. Khan MS, Mahmood S, Badshah A, Ali SU, Jamal Y. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. *J Pak Med Assoc* 2006;56:583–6.
 45. Mehanna Z, Richa S. Prevalence of anxiety and depressive disorders in medical students. Transversal study in medical students in the Saint-Joseph University of Beirut. *Encephale* 2006;32:976–82.
 46. Sarokhani D, Delpisheh A, Veisani Y, Sarokhani MT, Manesh K, Sayehmiri K. *Prevalence of depression among university students: a systematic review and meta-analysis study*, vol. 2013. Hindawi Publishing Corporation Depression Research and Treatment; 2013. <http://dx.doi.org/10.1155/2013/373857>, p. 7 373857.
 47. Han TS, Tijhuis MA, Lean ME, Seidell JC. Quality of life in relation to overweight and body fat distribution. *Am J Public Health* 1998;88:1814–20.
 48. Zhao G, Ford ES, Dhingra S, Li C, Strine TW, Mokdad AH. Depression and anxiety among US adults: associations with body mass index. *Int J Obes* 2009;33:257–266; <http://dx.doi.org/10.1038/ijo.2008.26>.
 49. Amr M, El Gilany A, El-Hawary A. Does gender predict medical students' stress in Mansoura, Egypt? *Med Educ Online* 2008;13:12 doi:10. Available from <<http://www.med-ed-online.org>> ..
 50. Backović D, Živojinović J, Maksimović J, Maksimović M. Gender difference in academic stress and burnout among medical students in final years of education. *Psychiat Danubina* 2012;24(2):175–81.
 51. Tyssen R, Vaglum P, Gronvold NT, Ekeberg O. Suicidal Nationwide and prospective study of prevalence and ideation among medical students and young physicians: a predictors. *J Affect Disord* 2001;64:69–79.
 52. Eisenberg D, Gollust SE, Golberstein E, Hefner JL. Prevalence and correlates of depression, anxiety, and suicidality among university students mph university of michigan. *Am J Orthopsych* 2007;77(4):534–42, Copyright by the American Psychological.
 53. Bayram N, Bilgel N. The prevalence and sociodemographic correlations of depression, anxiety and stress among a group of university students". *Social Psychiat Psychiat Epidemiol* 2008;43(8):667–72.