



ORIGINAL ARTICLE

Prevalence of anxiety and depression among medical and pharmaceutical students in Alexandria University



Motaz B. Ibrahim *, Moataz H. Abdelreheem

Faculty of Medicine, Alexandria University, 293 Port Said Street, Sidi Gaber, Alexandria 21311, Egypt

Received 26 February 2014; accepted 4 June 2014

Available online 28 July 2014

KEYWORDS

Anxiety;
Depression;
Students;
Alexandria

Abstract *Introduction:* Depression and anxiety in the community are considered as specific indicator for mental status of a person and various studies have documented anxiety and depression among medical and pharmaceutical students.

Objective: In this study, the prevalence of anxiety and depression was measured among medical and pharmaceutical students in the Alexandria University.

Methods: Students from both faculties were asked to complete both Beck depression inventory and Beck anxiety inventory.

Results: In Faculty of Medicine, with total number of 164 students, the prevalence of anxiety and depression was found to be 43.9% and 57.9%, respectively, based on the cut-off points of both questionnaires.

In Faculty of Pharmacy, with total number of 164 students, the prevalence of anxiety and depression was found to be 29.3% and 51.1% respectively, based on the cut-off points of both questionnaires.

Conclusion: The study revealed significant distress among both medical and pharmaceutical students. Moreover, it was concluded that the prevalence of anxiety and depression in Faculty of Medicine was found higher than that in Faculty of Pharmacy. Furthermore, it was noticed that the prevalence of symptoms was higher among females.

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1. Introduction

Anxiety and depression are worldwide problems which reflect the mental health of the population. A lot of researches reported anxiety and depression among medical students specially in their first academic year as they are going to suffer from academic stressors such as information input overload, lack of leisure time and academic evaluation (exams and

* Corresponding author. Tel.: +20 1002356766.

E-mail address: Motazmd@hotmail.com (M.B. Ibrahim).

Peer review under responsibility of Alexandria University Faculty of Medicine.

continuous assessments), for many students depression stimulates feeling of fright, lack of ability, anger and can be associated with psychological and physical morbidities.^{1,2}

Increase in levels of anxiety and depression³⁻⁵ may have a negative effect on proficiency of academic study program, courses suggested by schools such as (deteriorating clinical practice and stress induced disorders)⁶ plus it will affect the society economically^{7,8} 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).^{9,10}

Gender differences in anxiety and depression have been found in both practicing and newly qualified physicians, which mirrors epidemiological studies indicating that depression is more common among women than men.¹⁷ Most, but not all, studies conducted among medical students, using various instruments, show a similar pattern.¹²⁻¹⁵

The prevailing view is that anxiety and depression rise during undergraduate medical education and this rise is more pronounced among women.¹⁶⁻¹⁸

Our purposes in this study are:

- (a) Describing the prevalence of anxiety and depression among first year medical students in Faculty of Medicine and Faculty of Pharmacy in the Alexandria University.
- (b) Comparing prevalence of both anxiety and depression among both faculties.
- (c) Comparing gender differences of both anxiety and depression among a representative sample of both faculties in the Alexandria University.
- (d) Comparing our findings with other studies either in the Middle East or in the western countries.

This study may help in designing appropriate intervention strategies to enhance the learning abilities which will improve the patient care by achieving good communication, increasing quality of care and decreasing medical errors in addition to burden the costs paid by the society through anxiety and depression attenuation.

2. Materials and methods

2.1. Study population

The medical course at the Alexandria University, which is the main and only governmental university in Alexandria, consists of two components; the first one is the core science component, which is the first three years. During this period, students study core medical science, and the other one is the clinical component, the next three years. During this period, the curriculum focuses mainly on clinical subjects and skills. Around 1400 students, typically aged 18–19 years, enter Year 1.

While in Faculty of Pharmacy, the course comprises only 1 year core science (Year 1) and 4 years biomedical, pharmaceutical and clinical sciences.

A cross sectional study was conducted in Faculty of Medicine and pharmacy in the Alexandria University of Egypt, in March 2013, among the first academic year students, who had spent more than six months in their schools. This was after the mid-year vacation. These students were selected randomly.

2.2. Sample size determination

According to student affairs administration in each faculty, the total number of registered students in 2012/2013, in the first academic year was 1376 and 1454 of both sexes, in the Faculty of Medicine and pharmacy respectively.

Sample size was calculated using the G power 3.010 statistical tool. Previous studies revealed that prevalence of depression among medical students was moderate (about 25%). thus effect size was used as .3, alpha error was used as 0.05, power was used as 0.95 and degree of freedom was used as 1. The calculated sample size was 145. Thus in this study a number greater than 145 was used, in a part to overcome the sampling error (328 students).

2.3. Methods

The selected students were personally contacted, informed of the questionnaire, aims, advantages and disadvantages of the study, and asked to take part in the study. Confidentiality was ensured, and they were informed that their results will be sent to them through emails. All the students were contacted directly in and after the end of their classes. They were informed that filling in the questionnaire will not take more than fifteen minutes of their time. Filling in the questionnaire was completely optional for all the students. The study was held in the mid semester, to ensure that the students were not undergoing any stress related to final exams.

The twenty-one-item Beck anxiety inventory (BAI) and the twenty-one-item Beck depression inventory (BDI) were our tools to measure anxiety and depressive symptoms of the students. BAI and BDI were created by Dr. Aron T. Beck.^{19,20}

Beck depression inventory (BDI) is a twenty-one-multiple-choice question self-report inventory. Each question has four possible answers. Each answer is given a score from zero to three, indicating how much the symptoms are severe. It is considered as one of the best used tools to assess depression and predict its severity. The questionnaire is best used for persons aged thirteen or more. BDI measures mood, pessimism, sense of failure, self-dissatisfaction, guilt, punishment, self-dislike, self-accusation, suicidal ideas, crying, irritability, social withdrawal, body image, work difficulties, insomnia, fatigue, appetite, weight loss, bodily preoccupation, and loss of libido. Items one to thirteen measure symptoms that are psychological in nature, while items fourteen to twenty-one measure more physical symptoms.

BDI scores were categorized into normal (1–10), mild mood disturbance (11–16), borderline clinical depression (17–20), moderate depression (21–30), severe depression (31–40) and extreme depression (more than 40).

Beck anxiety inventory (BAI) is a twenty-one-multiple-choice question self-report inventory. It measures common symptoms of anxiety (such as numbness and tingling, sweating not due to heat, and fear of the worst happening). The questionnaire is best used for persons between the ages from seventeen to eighty years. Each question has four possible answers like that of BDI. The questions are arranged in columns and the students were asked to mark against the appropriate answer.²⁰ The possible answers are: Not at all which takes 0 point, mildly (It did not bother me much) which takes 1 point, moderately (It was very unpleasant, but I could stand it) which

takes 2 points, severely (I could barely stand it) which takes 3 points.

BAI-1 scores were categorized into very low anxiety (1–21), moderate anxiety (22–35) and severe anxiety (more than 36).

A paper published in 1999 stated that the BAI came third after both STAI and the Fear Survey Schedule as the most used measuring tool for anxiety.¹⁹

According to the American thoracic society website BAI shows scoring test–retest reliability with a correlation over one week, $r = 0.75$, Scoring Internal consistency with a Cronbach's alpha = 0.92 and Validity correlated with the modified Hamilton Anxiety Rating Scale; good discriminated validity.

BDI and BAI were given to the students in the Arabic version as it is the mother tongue in Egypt and to ensure that it was fully understood.^{21,22}

The demographic variables included gender, age (18–20), major of study and year of study.

2.4. Data analysis

The collected data were analyzed using IBM SPSS version 20 program. For analysis purpose, sex, faculty, depression score and anxiety score were coded. Frequency tables and graphs (pie charts and bar charts) were generated. Mean and standard deviation values of age, depression score and anxiety score were calculated.

The cut-off score used for depression using BDI was 17 or more, while that of the anxiety using BAI was 22 or more.

3. Results

3.1. The distribution of studied medical students according to age, sex, anxiety and depression levels (Table 1)

In Faculty of Medicine a total number of 164 students participated.

Table 1 Distribution of medical students studied according to age, sex, anxiety and depression levels.

Variable	Number	Percentage
<i>Age</i>		
18	75	45.7
19	80	48.8
20	9	5.5
<i>Sex</i>		
Male	82	50.0
Female	82	50.0
<i>Anxiety</i>		
Mild anxiety	92	56.1
Moderate anxiety	55	33.5
Severe anxiety	17	10.4
<i>Depression</i>		
Normal	32	19.5
Mild mood disturbance	37	22.6
Borderline clinical depression	34	20.7
Moderate depression	40	24.4
Severe depression	19	11.6
Extreme depression	2	1.2

According to their anxiety level it was found that, 92 (56.1%), 55 (33.5%) and 17 (10.4%) suffer from very low, moderate and severe anxiety states respectively. Based on the BAI questionnaire cut-off point, 72 (43.9%) students are suffering from anxiety (Fig. A).

According to their depression level, it was found that 32 (19.5%) were within the normal level, while 37 (22.6%), 34 (20.7%), 40 (24.4%), 19 (11.6%) and 2 (1.2%) suffer from mild mood disturbance, borderline clinical depression, moderate, severe and extreme depressions respectively. Based on BDI questionnaire cut-off point, 95 (57.9%) suffer from depression (Fig. B).

3.2. The distribution of studied pharmaceutical students according to age, sex, anxiety and depression levels (Table 2)

In Faculty of Pharmacy a total number of 164 students participated.

According to their anxiety level it was found that, 116 (70.7%), 40 (24.4%) and 8 (4.9%) suffer from very low, moderate and severe anxiety states respectively. Based on the BAI questionnaire cut-off point, 48 (29.3%) students are suffering from anxiety (Fig. C).

According to their depression level, it was found that 32 (19.5%) were within the normal level, while 48 (29.3%), 33 (20.1%), 46 (28.0%) and 5 (3.0%) suffer from mild mood disturbance, borderline clinical depression, moderate and severe depressions respectively and there was no extreme level of depression. Based on BDI questionnaire cut-off point, 84 (51.1%) suffer from depression (Fig. D).

3.3. Summarizing table showing the distribution of studied students according to age, sex, anxiety and depression levels for each faculty (Table 3)

From this table it was found that:

In Faculty of Medicine out of 164 students 89 (43.9%) students are suffering from anxiety while in Faculty of Pharmacy out of 164 students 48 (29.3%) students are suffering from anxiety according to the above mentioned cut off point. It was also found that in Faculty of Medicine out of 164 students 95 (57.9%) suffer from depression while in Faculty of Pharmacy out of 164 students 84 (51.1%) suffer from depression according to the above mentioned cut-off point.

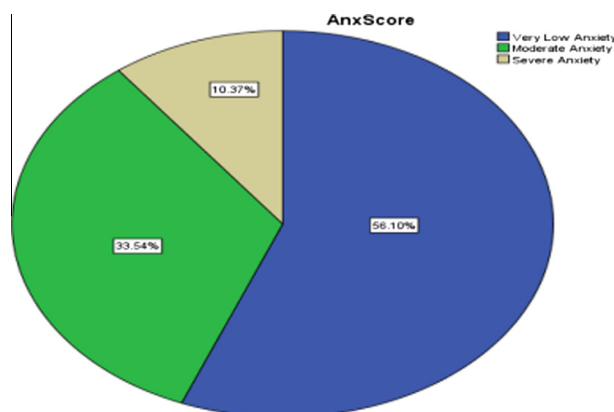


Figure A Prevalence of anxiety among medical students.

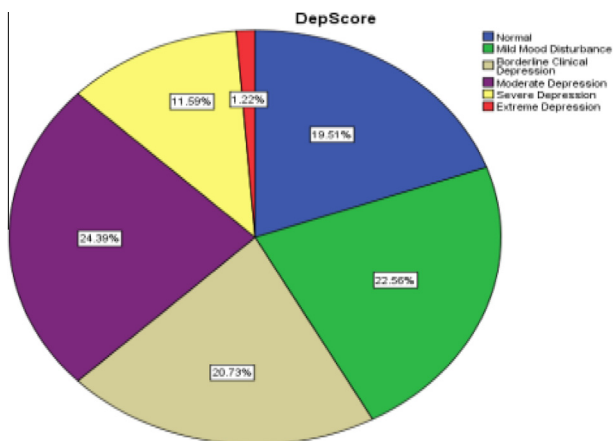


Figure B Prevalence of depression among medical students.

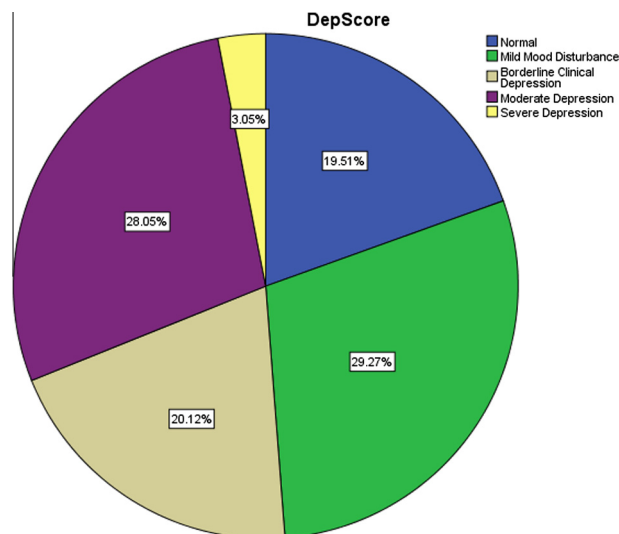


Figure D Prevalence of depression among pharmaceutical students.

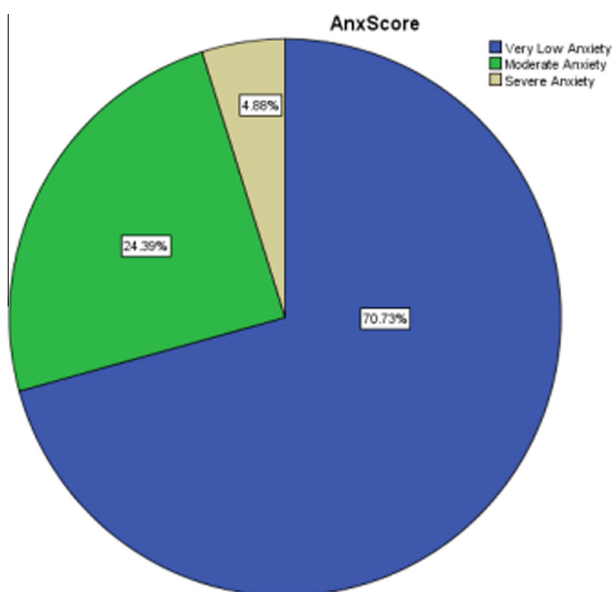


Figure C Prevalence of anxiety among pharmaceutical students.

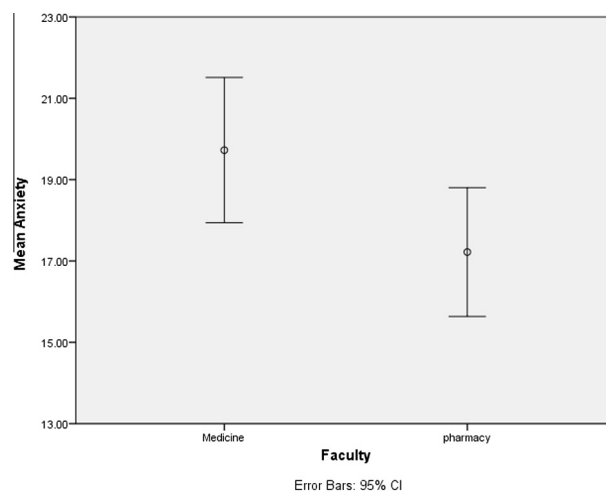


Figure E Comparison of mean values of students of Faculty of Medicine and Faculty of Pharmacy according to anxiety score.

So it was concluded that both anxiety and depression levels in Faculty of Medicine were found higher than that in Faculty of Pharmacy.

3.4. Comparing mean and standard deviation of age, anxiety score and depression score for each faculty (Table 4)

Figs. E and F compare the mean values of the students of Faculty of Medicine and Faculty of Pharmacy according to their anxiety and depression scores.

3.5. Comparing the anxiety and depression levels between male and female of each faculty (Table 5)

In Faculty of Medicine, regarding anxiety according to the sex, 41.5% of male and 45.1% of female are suffering from anxiety, while in Faculty of Pharmacy, 13.6% of male and

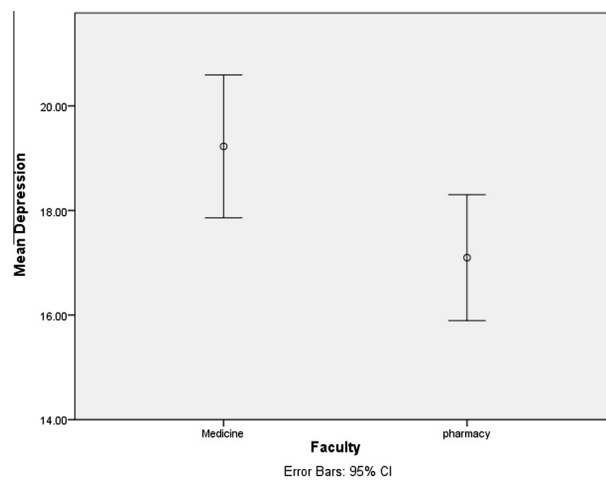


Figure F Comparison of mean values of students of Faculty of Medicine and Faculty of Pharmacy according to depression score.

Table 2 Distribution of pharmaceutical students studied according to age, sex, anxiety and depression levels.

Variable	Number	Percentage
<i>Age</i>		
18	67	40.9
19	86	52.4
20	11	6.7
<i>Sex</i>		
Male	81	49.4
Female	83	50.6
<i>Anxiety</i>		
Mild anxiety	116	70.7
Moderate anxiety	40	24.4
Severe anxiety	8	4.9
<i>Depression</i>		
Normal	32	19.5
Mild mood disturbance	48	29.3
Borderline clinical depression	33	20.1
Moderate depression	46	28.0
Severe depression	5	3.0
Extreme depression	0	0.0

Table 3 Summarizing table showing the distribution of studied students according to age, sex, anxiety and depression levels for each faculty.

Variable	Number	Percentage
<i>Age</i>		
18	142	43.3
19	166	50.6
20	20	6.1
<i>Sex</i>		
Male	163	49.7
Female	165	50.3
<i>Faculty</i>		
Medicine	164	50.0
Pharmacy	164	50.0
<i>Anxiety state</i>		
Very low anxiety	208	63.4
Moderate anxiety	95	29.0
Severe anxiety	25	7.6
<i>Depression state</i>		
Normal	64	19.5
Mild mood disturbance	85	25.9
Borderline clinical depression	67	20.4
Moderate depression	86	26.2
Severe depression	24	7.3
Extreme depression	2	.6

43.3% of female are suffering from anxiety, based on the cut-off point of anxiety. Regarding depression, in Faculty of Medicine, 52.5% of male and 62.2% of female are suffering from depression, while in Faculty of Pharmacy, 50.7% of male and 50.6% of female are suffering from depression, based on the cut-off point of depression.

Table 4 Comparing mean and standard deviation of age, anxiety score and depression score for each faculty.

	Faculty of Medicine	Faculty of Pharmacy
Mean age	18.5976	18.6585
Standard deviation of age	0.59362	0.60101
Mean anxiety score	19.7256	17.2195
Standard deviation of anxiety score	11.58290	10.26642
Mean depression score	19.2256	17.0976
Standard deviation of depression score	8.85834	7.80610

4. Discussion

Medical school has long been recognized as involving numerous stressors that can affect the well-being of students.²³ Anxiety and depression are worldwide problems which reflect the mental health of the population.²⁴ The mental status of medical and pharmaceutical students has been an important issue to be taken under consideration, reported in 1956,²⁵ as it is more liable to be affected by several stressors such as examining stress which will in turn lead to a series of consequences at both personal and professional levels. Several studies have reported significant distress among medical students.²⁸⁻³² Contrarily, some studies have found little or no evidence of stress among medical students.^{26,27}

In this research, among the medical students, 43.9% students are suffering from anxiety and 57.9% are suffering from depression. While in Faculty of Pharmacy, 29.3% students are suffering from anxiety and 51.1% are suffering from depression. Therefore, the study reveals significant distress among both medical and pharmaceutical students.

Moreover, it was concluded that the prevalence of anxiety in Faculty of Medicine (43.9%) was found higher than that in Faculty of Pharmacy (29.3%). Also, the prevalence of depression in Faculty of Medicine (57.9%) was found higher than that in Faculty of Pharmacy (51.1%). Several theories were explained in many researches. Some have contributed these findings to that medical students pass through continuous examinations throughout their academic years. Studying medicine is competitive. Several academic stressors were reported in many previous researches.³³ Pharmaceutical students pass through less number of examinations and much easier than those of the medical students. Others stated that medical students are liable to be critical of themselves. Moreover, medical students tend to be more socially isolated than other students of different faculties. Medical students may be influenced by all these factors more than pharmaceutical students.

Our study revealed that there are differences in anxiety and depressive symptoms between genders. The prevalence of the symptoms was higher among females. Different studies show similarity with our study in reporting higher levels of depression among females.^{34,35} This is possibly due to the fact that (1) females complain more about the high load of the curriculum, (2) they are more likely to report stress,³⁷ (3) females are more liable to over complaint about physical and psychological symptoms,³⁸ and (4) female faces less job opportunities than males in eastern countries. However, in our study, since the questionnaire was self-administered and anonymous, solu-

Table 5 Comparing the anxiety and depression levels between male and female of each faculty.

	Faculty of Medicine		Faculty of Pharmacy	
	Male	Female	Male	Female
<i>Anxiety state</i>				
Very low anxiety	48 (58.5%)	45 (54.9%)	70 (86.4%)	47 (56.6%)
Moderate anxiety	27 (32.9%)	27 (32.9%)	11 (13.6%)	28 (33.7%)
Severe anxiety	7 (8.54%)	10 (12.2%)	0 (0.0%)	8 (9.6%)
<i>Depression state</i>				
Normal	21 (25.6%)	13 (15.9%)	19 (23.5%)	13 (15.7%)
Mild mood disturbance	18 (22.0%)	18 (22.0%)	21 (25.9%)	28 (33.7%)
Borderline clinical depression	18 (22.0%)	15 (18.3%)	22 (27.2%)	11 (13.3%)
Moderate depression	16 (19.5%)	24 (29.3%)	19 (23.5%)	27 (32.5%)
Severe depression	8 (9.76%)	11 (13.4%)	0 (0.0%)	4 (4.8%)
Extreme depression	1 (1.22%)	1 (1.22%)	0 (0.0%)	0 (0.0%)

tions could not be made to rule out the above mentioned factors. However, some research findings are contrary to our results, and found no differences in anxiety and depressive symptoms between genders.^{39,40} This may be because of the equality of rights and job opportunities between both genders.

5. Conclusion

The study reveals significant distress among both medical and pharmaceutical students. Moreover, it was concluded that the prevalence of anxiety and depression in Faculty of Medicine was found higher than that in Faculty of Pharmacy. Furthermore, it was noticed that the prevalence of symptoms was higher among females.

Medical students with anxiety and depression if identified early can be managed by behavioral therapy, emotional support, interpersonal psychotherapy, social skill training etc., this may help the young medicos to overcome their difficulties and lead a healthier life.

6. Limitations

In this study, some limitations should be considered. One of those limitations is possibility of biased sampling because samples were randomly selected from the University of Alexandria. Generalizing our results to all Egyptian medical students is hard. The second point is that family history of depression and stressful events was not taken into consideration. Further studies should take these limitations including genetic and environmental problems into consideration.

Lastly, not enough sample size was selected, so larger sample size should be considered in future studies.

Fund statement

The whole study was funded by the authors.

Conflict of interest

We have no conflict of interest to declare.

Acknowledgments

The authors thank Prof. Dr. Fathi El-Gamal (Professor of community department, Alexandria University) for his active supervision in this study.

References

- Bostanci M, Ozdel O, Oguzhanoglu NK, Ozdel L, Ergin A, et al. Depressive symptomatology among university students in Denizli, Turkey: prevalence and sociodemographic correlates. *Croat Med* 2005;46(1):96–100.
- Eller T, Aluoja A, Vasar V, Veldi M. Symptoms of anxiety and depression in Estonian medical students with sleep problems. *Depress Anxiety* 2006;23(4):250–6.
- Kumar Ganesh S, Jain Animesh, Hegde Supriya. Prevalence of depression and its associated factors using Beck depression inventory among students of a medical college in Karnataka. *Indian J Psychiatry* 2012;54(3):223–6.
- Quince Thelma A, Wood Diana F, Parker Richard A, Benson John. Prevalence persistence of depression among undergraduate medical students: a longitudinal study at one UK medical school. *BMJ* 2012;2(4):e001519.
- Sidana Surbhi, Kishore Jugal, Ghosh Vidya, Gulati Divyansh, Jiloha RC, Anand Tanu. Prevalence of depression in students of a medical college in New Delhi: a cross-sectional study. *Australas Med J* 2012;5(5):247–50.
- Kessler RC, Walters EE. Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the National Comorbidity Survey. *Depress Anxiety* 1998;7(1):3–14.
- 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.
- Sobocki P, Jonsson B, Angst J, Rehnberg C. Cost of depression in Europe. *J Ment Health Policy Econ* 2006;9(2):87–98.
- Sobocki P, Lekander I, Borgstrom F, Strom O, Runeson B. The economic burden of depression in Sweden from 1997 to 2005. *Eur Psychiatry* 2007;22(3):146–52.
- Firth-Cozens J, Greenhalgh J. Doctors' perceptions of the links between stress and lowered clinical care. *Soc Sci Med* 1997;44:1017–22.
- Kessler RC. Epidemiology of women and depression. *J Affect Disord* 2003;74:5–13.
- Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety and other indicators of psychological distress

- among US and Canadian medical students. *Acad Med* 2006;**81**:354–73.
14. Dahlin ME, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ* 2005;**39**:594–604.
 15. Sreeramareddy CT, Shankar PR, Binu VS, et al. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. *BMC Med Educ* 2007;**7**:26.
 16. Mancevska S, Bozinovska L, Tecce J, et al. Depression, anxiety and substance use in medical students in the Republic of Macedonia. *Bratisl Lek Listy* 2008;**109**:568–72.
 17. Al-Dabal Badria K, Koura Manal R, Parveen Rasheed, Al-Sowielem Latifa, Makki Suhair M. A comparative study of perceived stress among Female Medical and Non-Medical University Students in Dammam, Saudi Arabia. *Sultan Qaboos Univ Med J* 2010;**10**(2):231–40.
 18. Bazmi Inam SN. Anxiety and depression among students of a Medical College in Saudi Arabia. *Int J Health Sci (Qassim)* 2007;**1**(2):295–300.
 19. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;**4**:561–71.
 20. Beck AT et al. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol* 1988;**56**(6):893–7.
 21. West J. An Arabic validation of a depression inventory. *Int J Soc Psychiatry* 1985;**31**(4):282–9.
 22. Al-Issa Ihsan, Al Zubaidi Abdulgawi, Bakal Donald, Tak S. Fung Beck anxiety inventory symptoms in Arab college students. *Arab J Psychiatry (AJP)* 2000;**11**(1).
 23. Khan MS, Mahmoud SF, 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.
 24. Mitchell RE, Mathews JR, Grandy TG. The question of stress among first year medical students. *J Med Educ* 1983;**58**:367–72.
 25. Saslow G. Psychiatric problems of medical students. *J Med Educ* 1956;**31**:27–33.
 26. Vaz RF, Mbajjorgu EF, Acuda SW. A preliminary study of stress levels among first year medical students at the University of Zimbabwe. *Cent Afr J Med* 1998;**44**:214–9.
 27. Bramness JA, Fixdal TC, Vaglum P. Effect of medical school stress on the mental health of medical students in early and late clinical curriculum. *Acta Psychiatr Scand* 1991;**84**:340–5.
 28. Clark DC, Zeellow PB. Vicissitudes of depressed mood during four years of medical school. *JAMA* 1988;**260**:2521–8.
 29. Vitaliomo PP. A biopsychosocial model of medical student distress. *J Behav Med* 1988;**11**:311–3.
 30. Inam SN, Saqib A, Alan E. Prevalence of anxiety and depression among medical students of a private university. *J Pak Med Assoc* 2003;**53**:44–7.
 31. Davilia J, Hammen C, Burge D, Paley B, Daley S. Poor interpersonal problem solving as a mechanism of stress generation in depression among adolescent women. *J Abnorm Psychol* 1995;**104**:592–600.
 32. Lamerine RJ. Child and adolescent depression. *J Sch Health* 1995;**65**:390–3.
 33. Mikolajczyk R, Maxwell A, El Ansari W, Naydenova V, Stock C, et al. Prevalence of depressive symptoms in university students from Germany, Denmark, Poland and Bulgaria. *Soc Psychiatry Psychiatr Epidemiol* 2008;**43**(2):105–12.
 34. Franko DL, Striegel-Moore RH, Bean J, Barton BA, Biro F, et al. Self-reported symptoms of depression in late adolescence to early adulthood: a comparison of African-American and Caucasian females. *J Adolesc Health* 2005;**37**(6):526–9.
 35. Wade TJ, Cairney J, Pevalin DJ. Emergence of gender differences in depression during adolescence: national panel results from three countries. *J Am Acad Child Adolesc Psychiatry* 2002;**41**(2):190–8.
 37. Verbuegge LM. Gender and health: an update on hypothesis and evidence. *J Health Soc Behav* 1985;**26**:156–82.
 38. Bostanci M, Ozdel O, Oguzhanoglu NK, Ozdel L, Ergin A, et al. Depressive symptomatology among university students in Denizli, Turkey: prevalence and sociodemographic correlates. *Croat Med J* 2005;**46**(1):96–100.
 39. Bayram N, Bilgel N. The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Soc Psychiatry Psychiatr Epidemiol* 2008;**43**(8):667–72.
 40. Grant K, Marsh P, Syniar G, Williams M, Addlesperger E, et al. Gender differences in rates of depression among undergraduates: measurement matters. *J Adolesc* 2002;**25**(6):613–7.