



Factors associated with depression among medical students in a private tertiary care hospital in South India

M Gautham Raj¹, Jay Jaiswal², Mahesh Anirudh³, M Logaraj⁴

¹⁻⁴ Department of Community Medicine, SRM Medical College Hospital & Research Centre, Kattankulathur, Tamil Nadu, India

Abstract

Background: Undergraduate medical training is perceived more stressful compared to other undergraduate program. Medical students to undergo strenuous curriculum and evaluation added to that other factors like homesickness, heavy workload, sleep deprivation, financial concern, environment not ideally suited for learning, information over load and career planning make them more susceptible to depression compared of students of other profession.

Objectives: to estimate the prevalence of depression and assess the factors associated with depression among medical students.

Methodology: A cross-sectional study was conducted among medical undergraduate students of a tertiary care hospital in Tamil Nadu situated in the suburban area of Chennai. A total of 232 students was studied to estimate the prevalence of depression using Beck's Depression Inventory (BDI) questionnaire was used.

Results: A total of 232 medical students were included in the study based on the inclusion criteria, of which 49.5% (115/232) were males while 50.5% (117/232) were females. Prevalence of severe depression was 12.5% and very severe depression was 3.4%. Higher number of students in the age group 17 -19 years were with severe and very severe depression compared to 20-22 years of age group and it was found statistically significant ($p=0.001$). Compared to males higher number of females were having severe and very severe depression and it was found statistically significant ($p=0.04$) severe and very severe depression was higher in first year students compare to final year students and it was found statistically significant ($p=0.000$). Significance association was found between higher BMI, consuming alcohol, previous exam failure and do not do regular exercise with depression.

Conclusion: The burden of depression among medical Students found to be common that do more in the first year of college life compared to final years an effective counseling of the students at the time of induction will reduce the burden of depression in medical colleges.

Keywords: prevalence, depression, medical students, Beck's Depression Inventory questionnaire

Introduction

Depression is one of the common mental disorder affecting globally, more than 300 million people of all ages. Depression is the leading cause of disability and is a major contributor to the overall global burden of disease worldwide. More women are affected by depression than men. At its worst, depression can lead to suicide^[1] Depression is one of the common problems in our society. Undergraduate medical training is perceived more stressful compared to other undergraduate program^[1, 3]. Medical students to undergo strenuous curriculum and evaluation added to that other factors like homesickness, heavy workload, sleep deprivation, financial concern, environment not ideally suited for learning, information over load and career planning make them more susceptible to depression compared of students of other profession^[5, 6]. Studies done in other parts of the world had also shown that depression is more prevalent among medical students^[7, 10]. Studies done among students of private medical colleges elsewhere shown higher prevalence of depression^[11, 12]. Studies

done on depression among the private medical college students in are Tamil Nadu is lacking. Hence the present study was under taken with the objective to estimate the prevalence of depression and assess the factors associated with depression among medical students.

Methodology

A cross-sectional study was conducted among medical undergraduate students of a tertiary care hospital in Tamil Nadu situated in the suburban area of Chennai. A total of 232 students was studied which included. based on the study meta-analysis and systematic review on prevalence of depression among medical students done by Rotenstein LS in the year 2016 showed a prevalence of 27.2% sample size was calculated at 5% significant level and 20% allowable error^[13] The sample size was worked out using the formula $n=4pq/L^2$ which came to 230. There was Total of 600 students from first year to final year. To get a sample size of 230 students every third students were selected for

the study from the roll numbers. To estimate the prevalence of depression Beck's Depression Inventory (BDI) questionnaire was used. The information on selected socio-demographic variables, age, sex, year of study, religion and other history like alcohol use, smoking, living with parents, parents were live, failure in exam, regular exercise were collected with the help of pre tested structured questionnaire. The physical examination of all the participants included measurements of height and weight to arrive at body mass index.

Study was carried out after obtaining institutional ethics committee approval. Data were entered into Microsoft Excel spreadsheet and analyzed using the standard statistical software packages. Descriptive data were presented as percentages and unadjusted odds ratios (OR) to measure the strength of association and 95% confidence intervals (CI) were calculated. Chi-square test was used to prove associations between categorical variables.

Results

Table 1 depicts socio-demographic profile of medical students. A total of 232 medical students were included in the study based on the inclusion criteria, of which 49.5% (115/232) were males while 50.5% (117/232) were females. More or less equal number of students had been included for all years (60 to 63) except for 2nd year with 48 students. Majority of the students belongs to Hindu by religion 84.5% (196/232). About 32.3% (75/232) were overweight and 6.9% (16/232) were obese. Nearly 55.6% (129/232) were hostellers. Students living with parents were 37.1% (86/232) and have both parents alive were 95.2% (221/232). Students who were having habits of smoking and alcohol consumption were 7.7% (18/232) and 9.5% (22/232) respectively. About 40.1% (93/232) of them did regular exercise and 22.8% (53/232) told history of failure in the examinations. Figure 1. Shows the prevalence of depression among the medical students, prevalence of severe depression was 12.5% and very severe depression was 3.4%.

Table 2 shows the distribution levels of depression with socio-demographic variables. Higher number of students in the age group 17-19 years were with severe and very severe depression [(16.5% & 5.9%), (10.2% & 2%)] compared to 20-22 years of age group and it was found statistically significant ($p=0.001$) compared to males higher number of females were having severe and very severe depression [(10.4% & 3.5%), (14.5% & 3.4%)] and it was found statistically significant ($p=0.04$) severe and very severe depression was higher in first year students compare to final year students [(12.7% & 3.2%), (6.7% & 3.3%)] and it was found statistically significant ($p=0.000$). There was no statistical differences in the level of depression between the religion ($p=0.5$). More number of obese students with BMI of more than 30 were having severe and very severe depression (37.5% & 12.5%) compared to normal students (12.1% & 3.5%) with BMI less than 30. There was statistical differences among students who were hostellers and living with parents in prevalence of severe and very severe depression. Higher number of students who gave a history of consuming alcohol had very severe depression (11.1%) compared to students who do not consume alcohol (2.8%) and it was statistically significant ($p=0.04$). Statistically significant difference was not found in the level of depression between

students who did regular exercise and who did not ($p=0.08$). More number of students who gave history previous failure in exam have very severe depression (7.5%) compared to students who did not have history previous failure in exam (2.2%) and it was found statistically significant ($p=0.002$).

Table 3 depicts the association between presence of depression and certain demographic variables. Students who were young (17-19 years) had higher risk of developing depression compared to students in the age group of 20-22 years and it was found statistically significant (OR=3.0, 95% CI 1.72-5.22, $p<0.0001$). Female medical students have higher risk of developing depression compared to male medical students and it was found statistically significant (OR=2.93, 95% CI 1.23-5.38, $p=0.005$). As the year of study increases odds of getting depression decreases and it was found statistically significant for III & IV year students ($p=0.001$ & $p<0.0001$ respectively). Compared to students with normal BMI with obese at lesser chance of developing depression (OR=0.30, 95% CI 0.340-1.803, $p=0.03$). Even though odds of getting depression was higher among students consume alcohol and smoke it was not statistically significant. Lesser chance of getting depression who practice regular exercise and it was found statistically significant $p=0.012$. Students who gave history of failure in previous exams were at 2.82 times at higher risk of developing depression (OR=2.83, 95% CI=1.48-5.36, $p=0.001$).

Table 1: Socio-demographic Profile of medical students

Characteristics	Male	Female	Total
Age group			
17-19 years	36(42.3)	49(57.7)	85(36.6)
20-22 years	79(53.7)	68(46.3)	147(63.4)
Total	115(49.5)	117(50.5)	232(100)
Year of study			
1 year	29(46)	34(54)	63(27.1)
2 year	16(33.3)	32(66.7)	48(20.7)
3 year	51(83.6)	10(16.4)	61(26.3)
4 year	19(31.7)	41(68.3)	60(25.9)
Religion			
Hindu	97(49.5)	99(50.5)	196(84.5)
Muslims	6(54.5)	5(45.5)	11(4.7)
Christians	12(48)	13(52)	25(10.8)
BMI			
Normal	55(39.0)	86(61.0)	141(60.8)
Over weight	48(64)	27(36)	75(32.3)
Obese	12(75)	4(25)	16(6.9)
Hosteller			
Yes	63(48.8)	66(51.2)	129(55.6)
No	52(50.5)	51(49.5)	103(44.4)
Living with parents			
Yes	37(43)	49(57)	86(37.1)
No	78(53.4)	68(46.6)	146(62.9)
Both parents alive			
Yes	108(48.9)	113(51.1)	221(95.2)
No	7(63.3)	4(36.7)	11(4.8)
Smoking			
Yes	13(72.2)	5(27.8)	18(7.7)
No	102(47.7)	112(52.3)	214(92.3)
Consume alcohol			
Yes	15(68.2)	7(31.8)	22(9.5)
No	100(47.6)	110(52.4)	210(90.5)
Regular Exercise			
Yes	41(44.1)	52(55.9)	93(40.1)
No	74(53.2)	65(46.8)	139(59.9)
Failure in exam			
Yes	36(67.9)	17(32.1)	53(22.8)
No	79(44.1)	100	179(77.2)
Total	115(49.5)	117(50.5)	232(100)

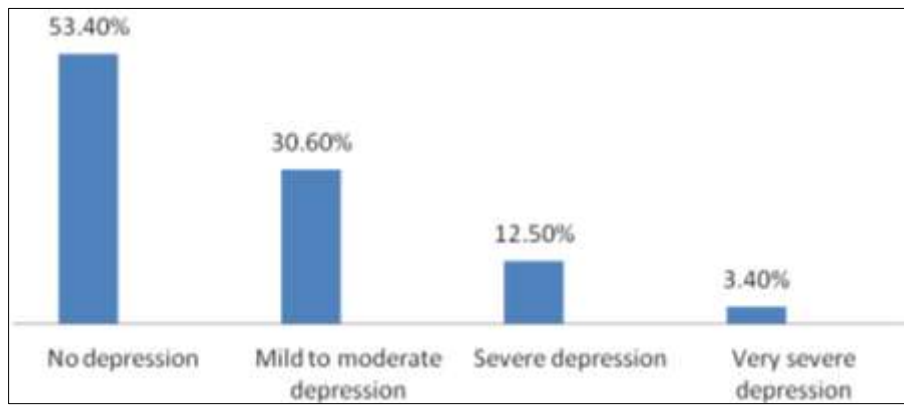


Fig 1: Prevalence of depression among medical students

Table 2: Distribution of levels of depression among medical students

Characteristics	No depression	Mild to Moderate depression	Severe depression	Very severe depression	Total	X ² , df & p value
Age						
17-19	31(36.5)	35(41.2)	14(16.5)	5(5.9)	85(36.6)	X ² -16.13,df-3, p=0.001
20-22	93(63.3)	36(24.5)	15(10.2)	3(2)	147(63.4)	
Sex						
Male	72(62.6)	27(23.5)	12(10.4)	4(3.5)	115(49.5)	X ² -8.41,df-3, p=0.043
Female	52(44.4)	44(37.6)	17(14.5)	4(3.4)	117(50.5)	
Year of study						
I year	23(36.5)	30(47.6)	8(12.7)	2(3.2)	63(27.1)	X ² -32.38,df-9, p=0.000
II year	18(37.5)	19(39.6)	7(14.6)	4(8.3)	48(20.7)	
III year	40(65.6)	11(18)	10(16.4)	0(0)	61(26.3)	
IV year	43(71.4)	11(18.3)	4(6.7)	2(3.3)	60(25.9)	
Religion						
Hindu	106(54.1)	59(30.1)	25(12.8)	6(3.1)	196(84.5)	X ² -4.61,df-6, p=0.594
Muslims	6(54.5)	5(45.5)	0(0)	0(0)	11(4.7)	
Christians	12(48)	7(28)	4(16)	2(8)	25(10.8)	
BMI						
Normal	74(52.5)	45(3.9)	17(12.1)	5(3.5)	141(60.8)	X ² -17.6,df-6, p=0.007
Overweight	46(61.3)	22(29.3)	6(8)	1(1.3)	75(32.3)	
Obese	4(25)	4(25)	6(37.5)	2(12.5)	16(6.9)	
Hostellers						
Yes	66(51.2)	43(33.3)	16(12.4)	4(3.1)	129(55.6)	X ² -1.09,df-3, p=0.778
No	58(56.3)	28(27.2)	13(12.6)	4(3.9)	103(44.4)	
Living with parents						
	48(55.8)	25(29.1)	10(11.6)	3(3.5)	86(37.1)	X ² -0.33,df-3, p=0.954
	76(52.1)	46(31.5)	19(13)	5(3.4)	146(62.9)	
Both parents alive						
Yes	117(52.9)	68(30.8)	29(13.1)	7(3.2)	221(95.2)	X ² -2.77,df-3, p=0.428
No	7(63.6)	3(27.3)	0(0)	1(9.1)	11(4.8)	
Alcohol						
Yes	6(33.3)	9(50)	1(5.6)	2(11.1)	18(7.7)	X ² -7.95,df-3, p=0.047
No	118(55.1)	62(29)	28(13.1)	6(2.8)	214(92.3)	
Smoking						
Yes	9(40.9)	9(40.9)	3(13.6)	1(4.5)	22(9.5)	X ² -1.66,df-3, p=0.644
No	115(54.8)	62(29.5)	26(12.4)	7(3.3)	210(90.5)	
Exercise						
	59(63.4)	23(24.7)	8(8.6)	3(3.2)	93(40.1)	X ² -6.55,df-3, p=0.087
	65(46.8)	48(34.5)	21(15.1)	5(3.6)	139(59.9)	
Failure in exam						
Yes	18(34)	25(47.2)	6(11.3)	4(7.5)	53(22.8)	X ² -14.46,df-3, p=0.002
No	106(59.2)	46(25.7)	23(12.8)	4(2.2)	179(77.2)	
Total	124(53.4)	71(30.6)	29(12.5)	8(3.4)	232(100)	

Table 3: Association between socio-demographic characteristics and depression among medical students

Characteristics	No depression	With depression	Total	OR	95% CI	P Value
Age						
17-19	31	54	85	3.0	1.723-5.223	P<0.0001
20-22	93	54	147			
Sex						
Female	52	65	115	2.093	1.238-3.538	P=0.005
Male	72	43	117			
Year of study						
I year	23	40	63	1		
II year	18	30	48	0.958	0.440-2.085	0.920
III year	40	21	61	0.301	0.144-0.630	0.001
IV year	43	17	60	0.227	0.106-0.486	<0.0001
Religion						
Hindu	106	90	196	1		
Muslims	12	13	25	0.783	0.340-1.803	0.565
Christians	12	13	25	0.783	0.340-1.803	0.565
BMI						
Normal	74	67	141	1		
Overweight	46	29	75	1.436	0.811-2.540	0.213
Obese	4	12	16	0.301	0.092-0.981	0.037
Hostellers						
Yes	66	63	129	1.230	0.731-2.070	0.434
No	58	45	103			
Living with parents						
	48	38	86	0.859	0.503-1.468	0.577
	76	70	146			
Both parents alive						
Yes	117	104	221	1.555	0.442-5.465	0.488
No	7	4	11			
Alcohol						
Yes	6	12	18	2.458	0.889-6.792	0.075
No	118	96	214			
Smoking						
Yes	9	13	22	1.748	0.716-4.267	0.214
No	115	95	210			
Exercise						
	59	34	93	0.506	0.295-0.866	0.012
	65	74	139			
Failure in exam						
Yes	18	35	53	2.823	1.485-5.364	0.001
No	106	73	179			
Total	124(53.4%)	108(46.6%)	232(100%)			

Discussion

Prevalence of depression

In the present study the prevalence of depression was 46.6% similar findings was reported by Singh A *et al.* [14] with 49% of medical students had depression and Ranu Rawat *et al.* [15] reported in his study among medical students in south India slightly higher proportion of medical students had depression (58%) and G S Kumar *et al.* [16] had reported nearly two third of the medical students had depression (71.3%). In our study compare to males nearly half of the females had depression, similar findings of higher proportion of depression was reported by Ranu Rawat *et al.* in our study as the year study increases the prevalence of depression decreases, similar findings was observed by Ranu Rawat *et al.* [15] In our study severe depression and 3.4% had very severe depression. Similar findings was reported by Ranu Rawat *et al.* [15] with 3% severe students had severe depression. Wala'a Al Raddadi *et al.* [17] reported as 7% of

the medical students had severe depression.

Risk factors for depression

In present study the association between presence of depression and certain demographic variables was analyzed. Students who were young (17-19 years) had higher risk of developing depression compared to students in the age group of 20-22years and it was found statistically significant(OR=3.0,95% CI 1.72-5.22, p<0.0001).

Female medical students have higher risk of developing depression compared to male medical students and it was found statistically significant (p=0.005). Similar findings was reported by

Ivana Lúcia Damásio Moutinho *et al.* [18] reported as women having greater prevalence of depression.

as the year of study increases odds of getting depression decreases and it was found statistically significant for III & IV

year students ($p=0.001$ & $p< 0.0001$ respectively). similar findings of study decrease in the prevalence of depression from I year students to 4th year students was reported by Ranu Rawat *et al.* [15] Similar findings were reported by Vankar *et al.* [19] and Sharma *et al.* [20] with highly significant association between the year of the study and the depression levels.

Compared to students with normal BMI with obese at lesser chance of developing depression (OR=0.30, 95% CI 0.340-1.803, $p=0.03$).

Even though odds of getting depression was higher among students consume alcohol and smoke it was not statistically significant. Similar findings were reported by Kumar G S *et al.* [16], Iqbal *et al.* [4]

Lesser chance of getting depression who practice regular exercise and it was found statistically significant $p=0.012$. Students who gave history of failure in previous exams were at 2.82 times at higher risk of developing depression (OR=2.83, 95% CI=1.48-5.36, $p=0.001$).

Conclusion

The burden of depression among medical Students found to be common that do more in the first year of college life compared to final years an effective counseling of the students at the time of induction will reduce the burden of depression in medical colleges.

References

1. Fact sheet on depression World health organization, 2018. <http://www.who.int/en/news-room/fact-sheets/detail/depression>. accessed on 22.7.2018
2. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ* [Internet]. Jun [cited 2016 Dec 18]. 2005; 39(6):594-604.
3. 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* [Internet]. Apr [cited 2016 Dec 18]. 2006; 81(4):354-73.
4. 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(3):e1-7.
5. Ghodasara SL, Davidson MA, Reich MS, Savoie CV, Rodgers SM. Assessing student mental health at the Vanderbilt University School of Medicine. *Acad Med*. 2011; 86(1):116-21.
6. Levey R. Sources of stress for residents and recommendations for programs to assist them. *Acad Med*. 2001; 76:142-50.
7. Haldorsen H, Bak NH, Dissing A, Petersson B. Stress and symptoms of depression among medical students at the University of Copenhagen. *Scand J Public Health*. 2014; 42(1):89-95.
8. Bassols AM, Okabayashi LS, Silva ABd, Carneiro BB, Feijó F, Guimarães GC, *et al.* First- and last-year medical students: is there a difference in the prevalence and intensity of anxiety and depressive symptoms? *Rev Bras Psiquiatr*. 2014; 36(3):233-40.
9. Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia* [Internet]. Jun [cited 2016 Dec 18]. 2004; 59(2):207-11.
10. Abdulghani HM, AlKanhil AA, Mahmoud ES, Ponnampuruma GG, Alfaris EA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr* [Internet]. Oct [cited 2016 Dec 18]. 2011; 29(5):516-22.
11. Khan MS, Mehmood S, Badshan 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(12):583-6.
12. Nadia Azad, Afshan Shahid, Nadeem Abbas, Azra Shaheen, Nargis Munir. Frequency of Anxiety and Depression in Medical Students of a Private Medical College. *J Ayub Med Coll Abbottabad*. 2017; 29(1):123-127.
13. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, *et al.* Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation among Medical Students: A Systematic Review and Meta-Analysis. *JAMA*. 2016; 316(21):2214-2236. doi: 10.1001/jama.2016.17324
14. Singh A, Lal A, Shekhar. Prevalence of depression among medical students of a private medical college in India. *Online J Health Allied Scs*. 2010; 9(4):8
15. Rawat R, Kumar S, Manju L. Prevalence of depression and its associated factors among medical students of a private medical college in south India. *Int J Community Med Public Health*. 2016; 3:1393-8.
16. 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 Psych*. 2012; 54(3):223-6.
17. Wala'a Al Raddadi, Jawaher N. Aljabri, Mohammed A. Kareem, Abdullah M. Alattas, Mohammed J Alkhalawi. The Prevalence of Depression and Anxiety among Medical Students in Comparison with Non-Medical Students: A Cross-Sectional Study in Taibah University, Al Madinah Al Munawwarah, Saudi Arabia. *International Journal of Academic Scientific Research*. 2017; 59(1):72-80.
18. Ivana Lúcia Damásio Moutinho, Natalia de Castro Pecci Maddalena, Ronald Kleinsorge RolandI, Alessandra Lamas Granero Lucchetti, Sandra Helena Cerrato Tibiriçá1, Oscarina da Silva Ezequiel, Giancarlo Lucchetti. Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters. *Rev Assoc Med Bras*. 2017; 63(1):21-28.
19. Vankar JR, Prabhakaran A, Sharma H. Depression and stigma in medical students at a private medical college. *Indian J Psychol Med*. 2014; 36(3):246-54.
20. Sharma A, Gupta SK, Khare N, Agarwal SS. Assessment of depression among medical students of private University in Bhopal, India. *National J Comm Med*. 2015; 6(2):161-5.