



## COULD ACADEMIC PERFORMANCE BE A TOOL FOR SCREENING DEPRESSION: A CROSS-SECTIONAL STUDY AMONG 1<sup>ST</sup> YEAR MEDICAL STUDENTS?

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### ABSTRACT

The medical curriculum leads to increased burden and stress among medical students. The consistent failure may result in depression or vice-versa. Since early diagnosis of depression could help to improve work performance, this study evaluated the association of depression with academic performance among medical students. Total 100 first year medical students (54 males and 46 females) participated in the study. Parameters used were Hamilton depression rating scale 17 (cut-off value 7), average attendance (cut-off value 70%) and average marks (cut-off value 50%) obtained. Chi square test was applied to analyse the association between gender and academic performance with depression. The overall prevalence of depressed medical students was 31%. The association of depression with gender was not statistically significant. The average class attendance and average marks obtained was inversely associated with the HDRS score. Thus, academic performance could be used for screening of possible depressed students by regular teaching faculty followed by their referral to the experts for more in-depth evaluations and appropriate treatment because prior screening would help in early detection of depressive cases and their early treatment as well as such screening will also reduce the burden on experts. This could reduce the rate of lowered academic performance as an adverse effect of depression.

**KEY-WORDS:** Depression, Medical students, Academic performance, HDRS-17



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## INTRODUCTION

Depression is a major public health problem worldwide, due to its high prevalence rate, difficulty in treatment & its tendency to become chronic depression. Depression exerts a high impact on the life of patients and their families, significantly affecting their social and occupational lives as well as causing other functional impairment. While depression is less common during childhood, it increases during the onset of adolescence<sup>1</sup>. The most common psychological problems of adolescence are depression and anxiety<sup>2</sup>. While joining a university or other tertiary educational institutions are a delightful time for some students, but it can be a stressful for others. First year students are particularly at risk as they face a number of new stressors like social, emotional and physical and family problems during the transitional period of starting a new life in university or college<sup>3</sup>. It had been suggested that some inadequacies in social activities of students might play a role in this type of disturbances<sup>4</sup>. The prevalence of depression is higher in medical students than in general population<sup>5</sup> or age-matched peer<sup>6</sup> as they faced a significantly higher pressure during the early years of medical education<sup>5</sup>. Similar results were reported by other studies<sup>4, 7</sup>. While entering medical school, students' emotional status resembles that of the general population. However, the rise in depression scores and their persistence over time suggests that emotional distress during medical school is chronic and persistent rather than episodic<sup>8</sup>. The prevalence of depression varies between 13 to 66% among medical students. Western countries reported lower prevalence of depression among medical students<sup>5, 9</sup>, while in Asian countries like India, Pakistan and China more varying results (21.5% to 66%) were reported in various studies<sup>10-14</sup>. Comparisons of depressive symptoms by gender among medical students have yielded mixed findings. Some studies reported no difference in depression score by gender<sup>8, 11</sup> and <sup>13</sup> while others reported higher depression scores among female medical students than

their male colleagues' did<sup>5, 10 and 15</sup>. Depression is known to affect individual's work performance and attendance. Kessler et al<sup>16</sup> reported that depression is associated with a higher rate of short-term work disability than virtually any other chronic condition and that early intervention and treatment of workers with depression reduces hospitalization and long-term work disability. Birnbaum et al<sup>17</sup> found that additional benefits to the employer from the treatment of depression include reduced work cutback, decreased sporadic absenteeism of treated employees, reductions in some types of medical and prescription drug expenditures following appropriate depression treatment, and productivity improvements by employees. We assume that while considering depression among medical students, work performance can be assessed with their academic performance i.e. their mark grades and attendance (absenteeism). Several students with depression go undiagnosed and untreated at a time, when they are at life's most important junctures. So, our basic aim of this study was to determine the association of academic performance with depression in medical students. Besides this, we also looked for an overall prevalence of depression and any gender preponderance among depressed students.

## MATERIALS AND METHODS

This study was performed in May 2012, at a private medical college in northern India having an annual intake of 100 MBBS students. This work was approved by Institutional Ethical committee.

### SAMPLE

All the subjects were the student of 1st year MBBS (n=100). After explaining the aims and objectives of the study, the informed consent was obtained from the subjects. The subject's selection criterion was on the voluntary participation, while subjects with any history of psychiatric illness treatment were excluded from the study.

## **DATA COLLECTION TOOLS**

### **1) Sociodemographic Data**

This proforma includes questions regarding age, sex, weight, height, marital status, education and working conditions of parents, consumption of tobacco/ alcohol/ sedative-hypnotic or antianxiety drug in last one year, any regular exercise, yoga or meditation or history of past psychiatric illness or any major surgery on chest or abdomen.

### **2) Hamilton Depression Rating Scale 17 (HDRS-17)**

The degree of depressive symptoms was measured by 17 questions based Hamilton Depression Rating scale. This was recorded by qualified medical staffs that were further supplemented by two trained faculties. For HDRS-17, a score of 0-7 is considered as normal range, a score of 8-10 borderline depression, a score of 11-17 mild depression, a score of 18-24 as moderate depression, and score more than 25 is severe depression. We considered cut-off value 7 for the HDRS score to mark a subject as depressed.

### **3) Class attendance and Class Test records**

We took the past 6 month's average class attendance (in percentage) and average routine class test records of the entire 1st year curriculum subjects. These records were taken from Anatomy, Physiology and Biochemistry Departments. To avoid absentees, we took the best 75 % records in each type of tests viz. System test record, lab assessments, lab test, table viva, part completion test, seminar and tutorial marks. Cut off value for marks were 50%, while the cut-off for attendance was 70%.

## **PROCEDURE**

Students were informed before the start of study that they did not have to provide their names or any identifying information and the data would be used only for scientific purposes. Questionnaires used in the study were administered in the classroom in the guidance of researchers. These questionnaires were filled using code number. HDRS scale was taken by qualified staff in few successive sessions. After screening two groups were formed. Criteria for inclusion for Group A were a HDRS score  $\leq 7$  and absence of psychiatric illness history, while Criteria for inclusion for Group B were a HDRS score  $> 7$  and absence of psychiatric illness treatment. Then, we compared the class attendance and test records in both groups.

## **STATISTICAL METHOD**

Chi square test was used to find out the gender differences in medical student depression, and the difference between the two group's class average attendance and test scores. A 'P' value of  $<0.05$  was considered statistically significant.

## **RESULTS**

Total 100 first year medical students participated in this study, out of which 54% were males and 46% were females. The overall prevalence of depressed medical students was 31%. The present study showed that 15 out of 54 males (27.77%) and 16 out of 46 females (34.78%) were having depression. Depression was found to be higher in females than in males but the association of depression with gender was not statistically significant ( $p = 0.45$ ). [Table-1].

**Table 1**  
**Gender wise distribution of medical students with and without depression**

			HDRS score		Total	Chi-square	df*	p value
			≤7	>7				
Gender	Male	Count	39	15	54	0.570	1	0.450
		% of Total	72.22%	27.77%				
	Female	Count	30	16	46			
		% of Total	65.22%	34.78%				
Total	Count	69	31	100				
	% of Total	69.0%	31.0%					

\*df: degree of freedom.

In this study, 60 out of 69 (86.96%) non-depressed medical students had attendance more than 70 %, while 20 out of 31 depressed medical students (64.52%) had attended less than 70 % of classes. The average class attendance was inversely associated with the HDRS score. This was statistically highly significant ( $p < 0.0001$ ). [Table-2]

**Table 2**  
**Association of depression scores with average class attendance**

			Attendance		Total	Chi-square	df*	p value
			<70%	≥70%				
HDRS score	≤7	Count	9	60	69	27.524	1	0.0001**
		% of Total	13.04%	86.96%				
	>7	Count	20	11	31			
		% of Total	64.52%	35.48%				
Total	Count	29	71	100				
	% of Total	29.0%	71.0%					

\*df: degree of freedom, \*\* Statistically highly significant.

Results also showed that 69.2% of students without depression scored more than 50% marks as an aggregate in various exams, whereas among depressed students only 22.6% of students were able to score more than 50% marks. This inverse association of depression score with average marks obtained was statistically highly significant ( $p < 0.0001$ ). [Table-3]

**Table 3**  
**Association of depression with average marks obtained**

			Marks		Total	Chi-square	df*	p value
			<50%	≥50%				
HDRS score	≤7	Count	22	47	69	17.855	1	0.0001**
		% of Total	31.88%	68.12%				
	>7	Count	24	7	31			
		% of Total	77.42%	22.58%				
Total	Count	46	54	100				
	% of Total	46.0%	54.0%					

\*df: degree of freedom, \*\* Statistically highly significant.

## DISCUSSION

### **Prevalence of Depression**

We found the prevalence of depression among first year medical students was 31%, which was close to a recent study in Pakistan<sup>14</sup> (35.1%) and another study in Nepal<sup>18</sup> (36.74%). Earlier studies had reported that the prevalence of depression varies from 13-66% among medical students, but in India, data regarding first year medical students were lacking in most of the studies. Developed countries like USA<sup>9</sup>, Sweden<sup>5</sup> reported quite low prevalence of depression (22% & 12.9% respectively) in respect to other studies among medical students. Past studies from Asian countries reported a high prevalence of depression among medical students, 59.3% (2010) and 66% (2003) in India<sup>10</sup> and Pakistan<sup>11</sup> respectively, further supported by a study in china (1991) suggesting nearly half of the medical students found to be depressed<sup>12</sup>, but an interesting thing to note that the recent studies from the very similar Asian countries reported a lower prevalence of depression as compared to previous studies. [21.5% (2012) in India<sup>13</sup> and 35.1% (2010) in Pakistan<sup>14</sup>]

This discrepancy in prevalence rate can be attributed to many factors like 1) sample size 2) difference in the selection criteria of subjects 3) involvement of only first year students or addition of other academic session students 4) ethnic and demographic profile of study population 5) different screening method or cut-off value taken 6) involvement of trained persons. In previous studies self-reporting tool (patient-rated) like Children's Depression Inventory (CDI)<sup>1</sup>, Beck Depression Inventory (BDI)<sup>19</sup> and the Center for Epidemiological Studies Depression Scale (CES-D)<sup>8</sup> have been used, instead of observer-rated like Hamilton depression rating scale, which is a gold standard for screening depression and needs experts to employ it (clinician administered). The Hamilton depression scale was found to be more sensitive to change than the Beck Depression Inventory, and the Zung Self-Rating Depression Scale<sup>20</sup>. While using self-reporting scales, subjects could falsely report the symptoms to gain sympathy or hide acts to conceal their ill health to others.

### **Gender & depression**

We found no significant association between gender and depression scores. It is in accordance with previous Indian studies<sup>11, 13, 21, and 22</sup>. Furthermore, Rosal et al<sup>8</sup> reported that at baseline there was no gender difference; however the women experienced higher depression levels than the men at 2nd year and at 4th year. The predictors of the magnitude of this increase in CES-D (Center for epidemiological studies - depression) scale scores of women were increased perceived stress, anger, and frequency of social contacts outside work/school. Other studies reported female preponderance<sup>5, 10, and 15</sup>; the possible reason could be the gender distribution among the study population or the presence of baseline depression among the study population.

### **Relationship between depression scores and performance (attendance and test score)**

We also studied all medical students' performance in terms of average class attendance and test scores and found a negative association between depression scores and academic performance. This indicates that higher depression scores among student lead to lower their level of academic achievement and attendance. It is also supported by other studies<sup>13, 21, 23, and 24</sup>, though it is difficult to say whether depression leads to poor performance or vice versa as lower performance can also lead to depression. It may also form a vicious cycle in which depression and poor academic performance may continue to aggravate each other.

However, it is important to diagnose and treat depression in medical students as

- 1) It can lead to decrease academic performance or vice-versa, which can further lead to substance abuse and attrition from medical school. It can also influence the patient care and safety by medical students and interns in hospital settings<sup>25</sup>.

2) Only few students are using mental health facility. Givens et al<sup>9</sup> suggested that only few depressed students sought mental health counselling services due to lack of time, lack of confidentiality, stigma associated with using mental health services, cost, fear of documentation on academic record, and fear of unwanted intervention. While Schwenk et al<sup>15</sup> revealed that many depressed medical students frequently agreed that "if I were depressed, fellow medical students would respect my opinions less" and that faculty members would view them as being unable to handle their responsibilities.

So, the academic performance evaluated by teaching faculties (non-expert) could be advocated to search for possible depressed candidates and refer them for a more in-depth evaluation to improve detection of depression.

## CONCLUSION

This study concluded that in 1<sup>st</sup> year of medical studies, the overall prevalence of depression was 31% and there was no gender preponderance regarding depression. There was a strong negative association between academic performance and depression among 1<sup>st</sup> year medical students. Thus, non-expert, regular teaching faculty can use the academic performance as a screening tool of possible depression among students. Faculty members should be motivated to monitor absenteeism and consistent deterioration of academic performance of any student followed by reporting it to the concerned authorities immediately.

### *Importance of the study*

- As the prevalence of depression among medical students varies widely, such

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3. Sreeramareddy CT, Shankar PR, Binu VS, Mukhopadhyay C, Ray B and Menezes RG, Psychological morbidity, studies should be performed in every medical college and data from these studies should be integrated to obtain the prevalence of depression in specific regions/state or country, so that these data can be used as reference for future studies.
- Most of the medical students do not seek mental health services. Also, screening of depression using standard tools is time consuming and requires a lot of manpower wastage. So by just using academic performance as a screening tool by regular teaching faculty reduces manpower burden and assist the further referral for counselling and treatment.
- Most of the studies found a female preponderance amongst depressed medical students but we found no significant association of gender and depression. It further warrants a larger study that includes more medical colleges.

### *Limitations*

- As this study was a cross sectional study, we could not identify a cause and effect relationship.
- Other confounding factors like socioeconomic status, substance abuse, social activities, various coping styles (defense mechanisms), history of previous psychiatric illness and/or family history of psychiatric illness might also affect the results. Randomized controlled trials should be performed to establish the role of each of these factors in the causation of depression.
- Also, the results of this study cannot be generalized as it involves only first year students of one medical college.

### *Conflict of Interest*

Conflict of interest declared none.

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