"A Study on Prevalence of Depression and Its Association with Sleep Quality among Medical Undergraduates in Tirupati."

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Abstract:
BACKGROUND: *Depression is an important yet most neglected mental disorder among medical students. Depression if not diagnosed and treated early may lead to serious consequences like suicides. Poor sleep quality is also rampant among medical students. This study has been taken up to study the association between depression and sleep quality among medical undergraduates.*
MATERIAL AND METHODS: *A cross-sectional study has been carried out on 379 medical undergraduates from first year to final year. Beck's Depression Inventory – II and Pittsburgh Sleep Quality Index questionnaires were utilized to estimate the prevalence of depression and sleep quality and the association between them was analyzed using Chi-square test.*
RESULTS: *M*ean age of the study subjects was 19.8 ± 1.21 years. *Among the study subjects, 25.3% of them were found to have depression.* Prevalence of depression was higher in males (28.8%) and *among first year students (34.0%). Poor sleep quality was found in 43.8% of the study participants. Statistically significant association was found between prevalence of depression and poor sleep quality.*
CONCLUSION: *Depression and poor sleep quality are found to be causes of concern among medical students. Poor sleep quality is found to be an important causative factor for depression among the medical undergraduates.*
Key Words: *Depression, sleep quality, medical students.*

I.　Introduction

Medical profession is an esteemed profession. Medical students are confronted with significant academic, psychological and existential stressor.[1] Prevalence of depression is higher in medical students compared to the general population.[2,3] Owing to the vast syllabus, high expectations from the parents, inability to cope up with stress, the undergraduates in medical profession are vulnerable to several mental health issues among which the most commonly reported disorder is depression. Depression makes its sufferers to being less confident, having low self esteem, poor concentration, substance abuse and suicides.

Depression, if undetected, will hamper their relationship with parents and faculty, also affecting patient care and eventually their medical profession as a whole. Hence early detection and timely intervention of depression is the need of the hour.

Poor sleep quality is believed to be one of the most obvious public health problems and the rates of poor sleep quality are increasing in both developing and modern societies.[4] A study reported that 50% of the study subjects with sleep problems were found to have depression.[5] A study in Bangalore reported that 11.7% of study subjects who had insomnia were found to be depressed.[6] There is strong association between depression and poor sleep quality where it causing ideas of suicide[7] making poor sleep quality a cause for concern. As sleep problems are easily detectable, addressing them at the earliest makes it preventable to improve the sleep quality, reducing depression and further improving the quality of life.

Although there had been many studies on prevalence of depression, there is paucity of information on the association of depression and poor sleep quality among medical undergraduates. Hence, the present study has been undertaken to estimate the prevalence of depression among medical undergraduates and to study the association between depression and sleep quality among them.

II.　Material and Methods

This study was carried out among medical undergraduates studying at Sri Venkateswara Medical College, Tirupati, Andhra Pradesh from November 1st 2020 to January 31st 2021 for a period of three months. A total of 379 study subjects (both males and females) had participated in this study.

Study design: Cross-sectional study

Study Location: A tertiary care institution Sri Venkateswara Medical College, Tirupati, Chittoor District, Andhra Pradesh.

Study Duration: November 1st 2020 to January 31st 2021.

Sample size: 379 study subjects.

Sample size calculation: The prevalence of depression among medical undergraduates in Kerala state of India was 58.0%.[8] Considering the prevalence of 58.0% and 10% allowable error, sample size is calculated at 95% confidence interval using the formula $N=4PQ/L^2$ where P is the prevalence, Q = 100-P, L is the allowable error taken as 10% of the prevalence estimate i.e., 10% of 58.0 = 5.8. Thus the sample size for the present study is calculated as follows:

$$N = 4\times58\times42/5.8\times5.8$$

= 9744/33.64

= 289.6

= 290 (rounded)

Multiplying by design effect of 1 and adding 5% of Non-response rate, adjusted sample size for the study is:

$290 \times 5/100 = 14.5$

$290 + 14.5 = 304.5$

Actual sample size required for the study is 305 (rounded).

Hence, a sample size of 379 can be considered as adequate for the present study.

Subjects and selection method: Out of 846 medical students enrolled in the Medical college from first year to final year MBBS, 379 students were selected as study subjects by Simple random sampling technique using random number table. The nature and purpose of study was clearly explained to them in the language they understood. Informed consent was taken in prior to the study and the study subjects were assured of the confidentiality of the information provided by them.

Inclusion criteria:

1) Students who have given informed consent to participate in the study.

Exclusion criteria:

1) Students who were already diagnosed with depression or other psychiatric disorders and are on treatment.

Ethical consideration: Ethical clearance was obtained by the Institutional Ethics Committee, Sri Venkateswara Medical College, Tirupati.

Procedure methodology: The study subjects were administered with semi-structured questionnaire through google forms, which included their name, age, gender, year of study, Beck's Depression Inventory-II (BDI-II) and Pittsburgh Sleep Quality Index (PSQI) questionnaires. Beck's Depression Inventory-II is a 21-item questionnaire which is based on subjective nature. Each item has a 4-point scale ranging from 0-3. Participants with Beck's Depression Inventory-II score of 0-13 are considered to have no or minimal depression, 14-19 as mild depression, 20-28 as moderate depression, 29-63 as severe depression. Sleep quality was assessed by Pittsburgh Sleep Quality Index questionnaire containing 10 items, each item ranging from 0-3, where 0 indicates no difficulty and 3 indicates severe difficulty. The scores of the items are added up to give component scores. A total of seven component scores are obtained which are further summated to give a global PSQI score. Participants with Pittsburgh sleep quality index score of less than 5 are considered to be good sleepers and a score of more than or equal to 5 are considered as poor sleepers.

Statistical analysis: Data was entered in MS Excel sheet and analyzed using Epi info software version 7.2.2.6 (CDC, Atlanta). Chi square test was done to find the association between depression and sleep quality and p value less than 0.05 was considered to be significant.

III.   Results

A total of 379 students have participated in the study among whom 163 (43.0%) were males and 216 (56.9%) were females. Mean age of the study subjects was 19.8 ± 1.21 years. The overall prevalence of depression among the study subjects is found to be 25.3% (n = 96). Majority of them had mild depression, reported in 71 participants (18.7%).

The prevalence of depression was found to be higher in males (28.8%) than in females (22.7%) and the association of depression and gender showed statistical significance ($\chi2 = 7.93$, p = 0.047). Prevalence of depression is higher at 21 years of age 32.6% (n = 86) but there was no statistically significant association between depression and age ($\chi2 = 23.99$, p = 0.15). Depression is higher among first year students (34.0%)

followed by final year students (30.0%). However, prevalence of depression and year of study did not show statistically significant association ($\chi2 = 15.27$, p=0.08).

Poor sleep quality was found in 166 participants (43.8%) which was higher in males 47.2% than in females (41.2%) and the difference was not statistically significant ($\chi2 = 1.37$, p=0.24). Sleep quality was poorer in students of 23 years age being 71.4% and the association was statistically significant ($\chi2 = 12.81$, p=0.04). In comparison with the year of study, poor sleep quality was found in students belonging to first year (55.6%) and the association between sleep quality and year of study was statistically significant ($\chi2 = 16.55$, p = 0.001). It has been observed that 39.7% of poor sleepers had depression and the association between depression and poor sleep quality was statistically significant ($\chi2 = 34.17$, p-value is <0.001). Among poor sleepers, majority (28.9%) of them were found to have mild depression.

Table 1: Severity distribution of BDI - II scores among study participants (N = 379)

Depression scores	Number	Percentage
No or minimal depression (0-13)	283	74.7%
Mild depression (14-19)	71	18.7%
Moderate depression (20-28)	21	5.5%
Severe depression (29-63)	4	1.1%
Total	**379**	**100.0%**

Table 2: Depression scores in comparison with gender, age and year of study among the study participants

Depression scores according to BDI - II						
		No / minimal depression (0-13)	Mild depression (14-19)	Moderate depression (20-28)	Severe depression (29-63)	Statistical significance
Gender	Males (n = 163)	116 (71.2%)	31 (19.0%)	15 (9.2%)	1 (0.6%)	$\chi2 = 7.93$, p = 0.04
	Females (n = 216)	167 (77.3%)	40 (18.5%)	6 (2.8%)	3 (1.4%)	
Age (years)	17-19 (n = 136)	98 (72.0%)	25 (18.4%)	10 (7.4%)	3 (2.2%)	$\chi2 = 23.99$, p = 0.15
	≥20 (n = 243)	185 (76.1%)	46 (18.9%)	11 (4.5%)	1 (0.4%)	
Year of study	First year (n = 106)	70 (66.0%)	25 (23.6%)	9 (8.5%)	2 (1.9%)	$\chi2 = 15.27$, p = 0.08
	Second year (n = 113)	89 (78.8%)	17 (15.0%)	7 (6.2%)	0 (0.0%)	
	Third year (n = 80)	68 (85.0%)	11 (13.7%)	1 (1.3%)	0 (0.0%)	
	Final year (n = 80)	56 (70.0%)	18 (22.5%)	4 (5.0%)	2 (2.5%)	

Table3: Association of depression with sleep quality (N = 379)

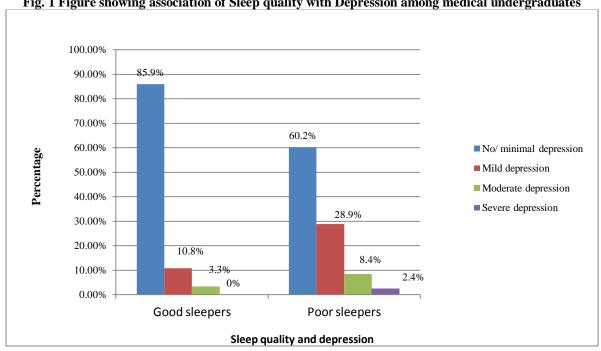| Depression scores according to BDI - II						Statistical significance
		No/minimal depression	Mild depression	Moderate depression	Severe depression	
Sleep quality	Good (n = 213)	183 (85.9%)	23 (10.8%)	7 (3.3%)	0 (0.0%)	$\chi2 = 34.17$, P < 0.001
	Poor (n = 166)	100 (60.2%)	48 (28.9%)	14 (8.4%)	4 (2.4%)	

Fig. 1 Figure showing association of Sleep quality with Depression among medical undergraduates

IV.   Discussion

The present study showed that the prevalence of depression among medical undergraduates is lower (25.3%) when compared to a study by Kumar et.al in Puducherry where the prevalence of depression was 48.4%.[9] A study in Bhubaneswar showed that the prevalence of depression was 51.3%[10] which was higher than that of the present study. A study in Mysore reported that prevalence of depression was 37.6%[11] and a study at Kerala showed a higher prevalence of depression (58.0%) among their medical undergraduates[8]. Prevalence of depression was higher (29.1%) in a study at Delhi[12] when compared to the present study. The lower prevalence in our study when compared to other studies may be due to adoption of different screening tools in their studies.

In the present study, prevalence of depression was higher in males (28.8%) as compared to females (22.7%) and the association of depression and gender showed statistically significant association ($\chi2$ =7.93, p=0.047). A study at Puducherry[9] showed almost similar prevalence in both males (47.8%) and females (49.1%) but there was no significant association between the two variables (p=0.79). Research studies at Mysore, Bhubaneswar and Kerala showed higher prevalence of depression among females being 59.2%, 51%, 63.7% respectively and also showed significant association between prevalence of depression and gender.[11,10,8] Higher prevalence of depression in females which had been reported in other studies may be attributed to different lifestyles of the students in various geographical areas.

Depression was higher in the age group of 17-19 years (28.0%) when compared to those belonging to 20 years and above (23.8%) and there was no statistically significant association between the variables. The results of the present study are in accordance with the studies at Puducherry and Mysore.[9,11] There had been statistically significant association between prevalence of depression and age of the study subjects in both of these studies (p < 0.05).

First year students showed higher prevalence of depression (33.9%) when compared to other years of study. Similar findings were reported in medical undergraduates of Mysore, Kerala and Delhi where the prevalence of depression was higher among first year students being 64.8%, 72.6% and 43.2% respectively.[11,8,12] The reason can be attributed to not being able to cope up with new environment, vast academic syllabus, stress and being homesick.

In the present study, prevalence of poor sleep quality was found in 43.8% of the study participants. Basu et.al in their study at Kolkata[13] and Shad et.al study at Delhi[14] showed a higher prevalence of poor sleep quality being 63.5% and 62.6% respectively. In the present study, poor sleep quality was higher in males (47.2%) than in females (41.2%). The results are consistent with a study in Maharashtra by Giri et.al[15] and are in contrast to a study by Basu et al[13] at Kolkata. In the present study, sleep quality was poorer in students belonging to 17 – 19 years of age (51.5%) which are in accordance with the results of Basu et.al.

In the present study, prevalence of depression was found to be higher among poor sleepers (39.7%) when compared with good sleepers (14.1%). The difference among the variables was also found to be statistically significant. These results are consistent with the results of Awasthi et.al in a study at Uttarakhand.[16]

Abdusallam et.al reported a positive correlation between poor sleep quality and depression.[17] Study at China revealed positive correlation between sleep quality and depression among the medical undergraduates.[18]

V. Conclusion

Depression is a mental disorder which is very detrimental to overall health and well-being often affecting medical students. Although it is due to multi-factorial causation, there had been a strong association between depression and poor sleep quality. It raises our concern to address these issues and prevent them among medical undergraduates before they can become alarming in the future. Health programmes and other interventions should emphasize on the prevention of depression and promotion of sleep quality. Implementation of stress management techniques and extension of social and emotional support must be ensured through parents, faculty and peer groups. Awareness programmes must be conducted regarding the importance of sleep and motivation should be given to maintain regularity of sleep habits to improve mental health.

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