



# Sleep Quality, Wellbeing and Happiness in Medical Undergraduates in Western India

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## ABSTRACT

**Background:** Medical students appear to be one group that is especially vulnerable to sleep problems. The study's objective was to evaluate the sleep quality, wellbeing, and happiness of Indian medical students at various stages of their education, as well as students from all three major streams (allopathic, ayurveda, and homoeopathic medicine).

**Methodology:** A convenience sample of 873 medical students was used in this cross-sectional and questionnaire-based study, which included homoeopathic (n=205), allopathic (n=389), and ayurvedic (n=279) medical students. The tools used were the Medical Outcomes Study Sleep Scale, the Short Depression – Happiness Scale, and the Short Warwick-Edinburgh Mental Well-Being Scale.

**Results:** Students in the Allopathic stream showed statistically significantly worse sleep quality ratings than students in the Homoeopathic and Ayurvedic streams. Further, when compared to students in the second and fourth years, third-year students had significantly lower sleep quality ratings. The happiness measure had a statistically significant positive relationship with wellbeing ( $\rho = 0.56$ , p.001), sleep quality ( $\rho = 0.13$ , p.001), and sleep adequacy ( $\rho = 0.25$ , p.001).

**Conclusion:** Sleep is essential for maintaining human bio-psychosocial homeostasis. Further, happiness and well-being were linked to sleep disturbance and other sleep domains in a substantial way. A concerted effort should be made to educate medical students about sleep hygiene and practical techniques to improve their sleep quality.

**Keywords:** medical students, sleep, wellbeing, happiness, sleep quality

## INTRODUCTION

Sleep is vital for the maintenance of proper functioning of both mental and physical functions of human body. Sleep related issues are frequent in the general population, and medical students appear to be one subset that is particularly sensitive to poor sleep than in non-medical students<sup>1</sup>. The primary variables contributing to poor sleep are their academic load<sup>1</sup>, emotional symptoms and bad sleep habits<sup>2</sup>. Further, recent studies report high prevalence internet over-use<sup>3</sup> and excessive smartphone<sup>4</sup> usage is associated with poor sleep among medical students.

Poor sleep quality is a major concern among medical students<sup>5,6</sup>. Sleep quality affects academic performance in a large proportion of medical students<sup>7,8</sup>. Medical students are frequently at risk for mental health illness. The prevalence rate of anxiety<sup>9</sup> and depressive symptoms<sup>10</sup> among medical students was substantially higher than the general population. Further, low quality of sleep was significantly linked to high stress levels<sup>11</sup> among medical students. Sleep quality was significantly associated with depression, anxiety, and stress<sup>12</sup>. Furthermore, the consumption of caffeine, cigarette and alcohol is associated with

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increment in poor sleep quality among medical students<sup>13</sup>.

Despite the fact that poor sleep quality is frequent among medical students and is linked to a variety of unfavourable health outcomes, the majority of the survey research focused on allopathic medical students. In this study, we used a multi-stream sample from India, including allopathic, ayurvedic, and homoeopathic medical students. We look at Indian medical students' sleep quality, wellness, and depression/happiness at all phases of their education and all three main streams of medical education.

## METHODS AND MATERIALS

This is a cross-sectional and questionnaire-based study included medical students attending allopathic, ayurvedic, and homoeopathic stream of medical students enrolled from different medical schools, Pune, Maharashtra, India. Due to missing data, fifteen participants were removed, the study sample consisted of total 873 medical students who included homoeopathic (n=205), allopathic (n=389), and ayurvedic (n=279) by using a convenience sample. Participants age ranged from 18 to 27 years with a mean age of 20.25 years (SD=1.14). A total of 238 males (27.3%) and 635 females (72.7%) constituted the final sample. Participants were not provided with any incentives for their participation. Each participant read and signed an informed consent document. All procedures were reviewed and accepted by the appropriate institutional review board, and was conducted between April 10<sup>th</sup> and July 30<sup>th</sup> 2017. Participants were given questionnaire packets including demographic details and self-report measures. Students completed the questionnaire in group sessions during regular academic hours. The average completion time for the sessions was 35 minutes. After participants completed the packet of questionnaires, they were debriefed about the study.

## MEASUREMENTS

**Short Depression – Happiness Scale<sup>14</sup>:** In order to go beyond the zero point of existing depression measures, the Short Depression – Happy Scale was developed in order to assess not only the absence of depression but also the existence of happiness. The scale consists of six items, three items measuring happiness (e.g., I felt that the life was enjoyable) and three reverse coded items measure depressive states (e.g., I felt dissatisfied with my life). On a four-point scale, participants assess how often they feel the way indicated in the item 0 = never, 1 = rarely, 2 = sometimes, 3 = often). When the items are added up the people can score from 0 (depressive state) through 9 (neither unhappy nor happy) to 18 (very happy). Cronbach's alpha of 0.65 indicates that the scale has good internal consistency in the current investigation, demonstrating its reliability.

**Medical Outcomes Study - Sleep Scale (MOS-Sleep)<sup>15</sup>:** The MOS-Sleep is a 12-item questionnaire that assesses sleep quality and quantity. The scale is divided into six subscales: sleep disturbance, which quantifies an individual's capacity to fall asleep and stay restful sleep (four items), Snoring (one item), sleep awakening, short of breath or with headache (one item), sleep adequacy, refers to the amount of sleep required to restore wakefulness (two items), somnolence, which quantifies the amount of daytime drowsiness or sleepiness (3 items), and sleep quantity is a metric that indicates (in hours) how much sleep a person gets each night (one item). A categorical scale ranging from "all of the time" to "none of the time" is used to rate the ten elements on the scale. One question uses a five-point likert scale to ask about how long it takes you to fall asleep, ranging from "0 to 15 minutes" to "more than 60 minutes". Further, sleep quantity is an open-ended question that records the average number of hours of sleep each night. To express the percentage, all dimensions besides sleep quantity are translated with a 0–100 scale. Higher scores associated with domains of Sleep Disturbance, Somnolence, Awaken Shortness of Breath and the Snoring show impairment of sleep, whereas lower values for Sleep Quantity and Sleep Adequacy demonstrate problems with sleep. Previous findings indicate that the MOS-Sleep scale is an accurate and reliable measure of sleeping quality and of sleep-related issues with 0.70 Cronbach's alpha coefficients<sup>15,16</sup>. The MOS-Sleep scale has a good internal reliability, according to the current study, with a Cronbach's alpha of 0.69.

**Short Warwick-Edinburgh Mental Well-Being Scale<sup>17</sup>:** The SWEMWBS comprises of seven items that assess participants' mental well-being by asking them questions about their feelings over the last two weeks (for example, "feeling positive about the future" or "feeling relaxed"). The 14-item full version Warwick-Edinburgh Mental Health Scale (18) was used to develop the SWEMWBS seven items. The items are all expressed in positively statement. The scale has a score range at 7–35 with higher values reflect better mental health. Previous research indicates that the SWEMWBS scale is a valid and reliable indicator of mental well-being with 0.89 Cronbach's alpha coefficients. With a Cronbach's alpha of 0.79, the SWEMWBS has shown high psychometric qualities in this study.

## STATISTICAL ANALYSIS

We transferred the recorded data from questionnaire sheets to an excel spreadsheet and double-checked the data entry for any typographical errors. R statistical software, version 4.0.2, was used to conduct all of the analyses (R Core Team, 2020). The OSF Link ([https://osf.io/de7x8/?view\\_only=b82e99a0fb704145bd2f1666e78a6295](https://osf.io/de7x8/?view_only=b82e99a0fb704145bd2f1666e78a6295)) contains the dataset utilised in this investigation. The Shapiro-Wilk test was performed to determine the normality of each variable's data distribution. Non-parametric Spearman's rank correlation coefficients for continuous data are

used in analysis. For group differences, Mann Whitney U-test and Kruskal-Wallis H test were used.

## RESULTS

A Kruskal-Wallis test revealed statistically significant differences between medical school years (see Table 2): the 'First Year' (n = 131), 'Second Year' (n = 274), 'Third Year' (n = 251), and 'Fourth Year' (n = 217) for the Happiness scores,  $\chi^2(3) = 9.040$ ,  $p = 0.029$ , sleep disturbance scores  $\chi^2(3) = 20.159$ ,  $p = 0.001$ , snoring  $\chi^2(3) = 10.087$ ,  $p = 0.018$ , quality of sleep,  $\chi^2(3) = 19.453$ ,  $p = 0.001$ , sleep adequacy  $\chi^2(3) = 10.885$ ,  $p = 0.012$  and Sleep Problem Index-II  $\chi^2(3) = 9.261$ ,  $p = 0.026$ .

Pair-wise comparisons were carried out using the Dunn's (1964) technique, with a Bonferroni correction used for multiple comparisons. Using post hoc analysis, it was revealed that second year students (mean rank = 466.93) reported statistically significantly higher happiness scores when compared to third year students (mean rank = 408.71) ( $p = 0.047$ ). Sleep disturbances were also statistically significantly lower among second year students (mean rank = 398.99) compared to fourth year students (mean rank = 490.75) ( $p = 0.001$ ), and statistically significantly lower among third year students (mean rank = 415.22) compared to fourth year students ( $p = 0.007$ ). Further, the results indicated that third-year students (mean rank = 416.41) had significantly lower snoring scores than fourth-year students (mean rank = 473.47) ( $p = 0.018$ ). Furthermore, the results indicated that third-year students (mean rank = 382.77) had statistically significantly poorer quality of sleep ratings as compared to students in the second year (mean rank = 468.96) ( $p = 0.001$ ) and the fourth year (mean rank = 460.76) ( $p = 0.003$ ). The findings also revealed that there were statistically significant variations in sleep adequacy ratings was seen between the second-year students (mean rank = 472.69) and the third-year students (mean rank = 407.08). An additional statistically significant difference in Sleep Problem Index-II scores was identified between the Third Year (mean rank = 406.01) and the Fourth Year (mean rank = 473.65).

A Kruskal-Wallis test revealed statistically significant differences between medical students of different schools (see Table 3): the 'Homoeopathic' (n = 205), 'Ayurvedic' (n = 389), and 'Allopathic' (n = 279) for the sleep disturbance,  $\chi^2(2) = 8.934$ ,  $p = 0.011$ , quality of sleep,  $\chi^2(2) = 9.126$ ,  $p = 0.010$ , somnolence,  $\chi^2(2) = 16.817$ ,  $p = 0.001$ , and sleep problem index,  $\chi^2(2) = 8.564$ ,  $p = 0.014$ . The post hoc analysis found that Ayurvedic students (mean rank = 411.06) had significantly less sleep disturbance than Allopathic students (mean rank = 469.79) ( $p = 0.009$ ). Medical students reported sleeping quality an average of 7.07(SD=1.16) hours per night over the previous four weeks, with a range of 3 to 12 hours each night. Further, the results revealed that students in the Allopathic stream (mean rank = 400.96) had statistical-

ly substantially lower quality of sleep ratings than students in the Homoeopathic stream (mean rank 456.94) ( $p = 0.036$ ) and the Ayurvedic stream (mean rank 452.34) ( $p = 0.021$ ). Furthermore, the results indicated that Allopathic students (mean rank 485.55) had statistically higher levels of somnolence than students in the Homoeopathic (mean rank 456.94) ( $p = 0.036$ ) and the Ayurvedic stream (mean rank 452.34) ( $p = 0.021$ ). When compared to Allopathic (mean rank 472.41) ( $p = 0.023$ ) students, Homoeopathic (mean rank 410.60) students endorsed lower ratings on the sleep problems index.

A Mann-Whitney U test was run to determine if there were differences in variables among gender categories. The data has shown that there was statistically significant differences between gender level among medical students in wellbeing level for Female (mean rank = 420.95) were statistically significantly lower than for Male (mean rank = 479.82),  $U = 85756.00$ ,  $z = -3.08$ ,  $p = 0.002$ , sleep disturbance level for Female (mean rank = 410.03) were statistically significantly lower than for Male (mean rank = 508.95),  $U = 92688.00$ ,  $z = -5.17$ ,  $p = 0.001$ , snoring level for Female (mean rank = 407.24) were statistically significantly lower than for Male (mean rank = 516.40),  $U = 94461.50$ ,  $z = -6.91$ ,  $p = 0.001$ , sleep awakening level for Female (mean rank = 416.11) were statistically significantly lower than for Male (mean rank = 492.73),  $U = 88828.00$ ,  $z = -4.45$ ,  $p = 0.001$  and somnolence level for Female (mean rank = 426.60) were statistically significantly lower than for Male (mean rank = 464.74),  $U = 82167.00$ ,  $z = -2.00$ ,  $p = 0.045$ .

**Table 1: Summarises the demographic characteristics of the sample population**

Level	Overall (%)
<b>Religion</b>	
Buddhist	9 (1.0)
Christian	17 (1.9)
Hindu	797 (91.3)
Islam	33 (3.8)
Jain	15 (1.7)
Others	2 (0.2)
<b>Year of Study</b>	
Ms1	131 (15.0)
Ms2	274 (31.4)
Ms3	251 (28.8)
Ms4	217 (24.9)
<b>Economic</b>	
High Income	32 (3.7)
Low Income	26 (3.0)
Middle Income	815 (93.4)
<b>Marital</b>	
Married	1 (0.1)
Single	872 (99.9)
<b>Residence</b>	
Hostel Accommodation	395 (45.2)
Parental Home	378 (43.3)
Rented Accommodation	100 (11.5)
<b>Motive to Join Course</b>	
Others	49 (5.6)
Own Interest	744 (85.2)
Parental Influence	80 (9.2)

**Table 2: Analysis for sleep patterns by class year (n= 873)**

Variables	Md (IQR)				$\chi^2$	p	$\eta^2$ [H]
	MS1	MS2	MS3	MS4			
Happiness	12.0 (11.0 to 14.0)	13.0 (10.0 to 15.0)	12.0 (10.0 to 14.0)	12.0 (10.0 to 14.0)	9.040	0.029*	0.007
Wellbeing	25.0 (22.0 to 27.0)	24.0 (21.0 to 27.0)	24.0 (21.0 to 27.0)	25.0 (21.0 to 27.0)	6.003	0.111	0.003
Sleep Disturbance	25.0 (15.6 to 38.8)	20.0 (5.0 to 40.9)	20.0 (8.1 to 40.0)	31.2 (15.0 to 46.2)	20.159	0.001*	0.020
Snoring	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	10.087	0.018*	0.008
Sleep Awakening	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	0.0 (0.0 to 40.0)	0.0 (0.0 to 20.0)	1.164	0.762	-0.002
Quality of Sleep	7.0 (6.0 to 8.0)	7.0 (6.0 to 8.0)	7.0 (6.0 to 8.0)	7.0 (7.0 to 8.0)	19.453	0.001*	0.019
Somnolence	26.7 (20.0 to 40.0)	33.3 (20.0 to 46.7)	33.3 (20.0 to 46.7)	33.3 (20.0 to 53.3)	3.877	0.275	0.001
Sleep Adequacy	60.0 (40.0 to 80.0)	60.0 (50.0 to 80.0)	60.0 (40.0 to 70.0)	60.0 (40.0 to 70.0)	10.885	0.012*	0.009
Sleep Problem Index	32.8 (27.8 to 41.7)	31.1 (24.4 to 42.6)	31.1 (22.8 to 40.6)	34.4 (26.7 to 47.2)	9.261	0.026*	0.007

Md Median, IQR Interquartile Range, MS1 first year medical student, MS2 second year medical student, MS3 third year medical student, MS4 fourth year medical student, \* $p < 0.05$

**Table 3: Kruskal-Wallis tests and Descriptive Statistics for Homoeopathic, Ayurvedic and Allopathic Medical Student (n=873)**

Variables	Md (IQR)			$\chi^2$	p	eta <sup>2</sup>
	HP(n=205)	AD(n=389)	AP(n=279)			
Happiness	12.0 (10.0 to 14.0)	12.0 (10.0 to 14.0)	12.0 (10.0 to 14.0)	0.802	0.670	-0.001
Wellbeing	25.0 (22.0 to 27.0)	24.0 (20.0 to 27.0)	25.0 (21.0 to 27.0)	1.774	0.412	0.000
Sleep Disturbance	25.0 (11.2 to 38.8)	21.2 (5.0 to 41.2)	26.2 (10.6 to 46.2)	8.934	0.012*	0.008
Snoring	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	1.614	0.446	0.000
Sleep Awakening	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	0.0 (0.0 to 20.0)	3.205	0.201	0.001
Quality of Sleep	7.0 (7.0 to 8.0)	7.0 (6.0 to 8.0)	7.0 (6.0 to 8.0)	9.126	0.010*	0.008
Somnolence	26.7 (20.0 to 40.0)	33.3 (20.0 to 46.7)	33.3 (26.7 to 46.7)	16.817	0.001*	0.017
Sleep Adequacy	60.0 (40.0 to 70.0)	60.0 (40.0 to 80.0)	60.0 (40.0 to 80.0)	5.838	0.054	0.004
Sleep Problem Index	30.6 (24.4 to 40.0)	31.7 (24.4 to 42.8)	34.4 (26.7 to 45.6)	8.564	0.014*	0.008

Md Median, IQR Inter Quartile Range, HP Homoeopathic medical student, AD Ayurvedic medical student, AP Allopathic medical student, \* $p < 0.05$ .

**Table 4: Spearman's rank correlation between sleep domains, happiness and wellbeing**

	Happiness	Wellbeing	Sleep Disturbance	Snoring	Sleep Awakening	Quality of Sleep	Somnolence	Sleep Adequacy
Happiness								
Wellbeing	0.56***							
Sleep Disturbance	-0.40***	-0.31***						
Snoring	-0.14***	0	0.20***					
Sleep Awakening	-0.28***	-0.20***	0.42***	0.28***				
Quality of Sleep	0.13***	0.14***	-0.15***	0	0			
somnolence	-0.25***	-0.25***	0.43***	0.25***	0.44***	-0.11**		
Sleep Adequacy	0.25***	0.12***	-0.23***	-0.04	-0.18***	0.30***	-0.15***	
Sleep Problem Index II	-0.33***	-0.31***	0.85***	0.24***	0.54***	-0.06	0.63***	0.09**

Table 4 shows the relationships between sleep dimensions with the well-being and happiness. The Spearman's rank correlation rho shown the Happiness scale was positive, statistically significant association observed with and wellbeing, ( $\rho = 0.56$ ,  $p < .001$ ), quality of sleep ( $\rho = 0.13$ ,  $p < .001$ ), and sleep adequacy ( $\rho = 0.25$ ,  $p < .001$ ). Further, the Spearman's rank correlation rho between Happiness was negative, statistically significant association observed with and sleep disturbance ( $\rho = -0.40$ ,  $p < .001$ ), snoring ( $\rho = -0.14$ ,  $p < .001$ ), sleep awakening ( $\rho = -0.28$ ,  $p < .001$ ), somnolence ( $\rho = -0.25$ ,  $p < .001$ ), and Sleep Problem Index II ( $\rho = -0.33$ ,  $p < .001$ ). The Spearman's rank correlation rho between wellbeing negative, statistically significant relation with sleep disturbance ( $\rho = -0.31$ ,  $p < .001$ ), sleep awakening ( $\rho = -0.20$ ,  $p < .001$ ), somnolence ( $\rho = -0.25$ ,  $p < .001$ ) and Sleep Problem Index II ( $\rho = -0.31$ ,  $p < .001$ ). Furthermore, wellbeing statis-

tically significant positive association with quality of sleep and sleep adequacy ( $\rho = 0.12$ ,  $p < 0.001$ ).

## DISCUSSION

In this study we have reported quality of sleep, wellbeing and happiness among 1<sup>st</sup> to 4<sup>th</sup> year medical students from Allopathy, Ayurveda, and Homeopathy streams. The results of batch-wise comparison of medical students are reported below. All the results reported here are statistically significant. Results revealed that second year students reported higher happiness scores than the third-year students. Similarly, higher level of happiness was reported among 2<sup>nd</sup> year medical student's i.e., 60.8%<sup>19</sup>

In our study, third-year students had poorer quality of sleep than second year and fourth year students. Likewise, there was a decrease in sleep quality among first year and third year medical students

when compared to second year and fourth year students<sup>20</sup>. Scores on sleep adequacy was higher in second year students than the third-year students. Similarly, low sleep adequacy was reported among third year students when compared to second year and fourth year students<sup>20</sup>. Overall, higher Sleep Problem Index II scores were identified in the fourth year when compared to third year medical students. In contrast, low levels of Sleep Problems Index were seen among fourth year students<sup>20</sup>. As it is known that curricular burden is different from 1<sup>st</sup> to 4<sup>th</sup> year of medical education, their stress levels and coping strategies also differ accordingly. This could be the reason for difference among students.

Next, we have compared between all the three streams of medical education. In our study, Ayurvedic students had less sleep disturbance than Allopathic students. Overall, students in the Allopathic stream had lower quality of sleep ratings, higher levels of somnolence than the Homoeopathy and the Ayurvedic stream students. Low sleep problems index was reported among Homoeopathic students when compared to Allopathic students. This finding from our study is noteworthy because we were unable to identify any comparisons across various streams of medical education.

With the advancement in technology getting everything on tip of the finger which can be the best thing that happened to mankind, but this has many disadvantages too especially on health. Around 46% of medical college students reported smart phone addiction with significant correlation to poor sleep quality and high perceived stress<sup>21</sup>. There was a significant association between Internet Addiction, poor sleep quality and depression among medical students (medical college, Delhi) from 1<sup>st</sup> to 4<sup>th</sup> year and internship students<sup>22</sup>. Internet addiction was significantly more among students residing in hostels than those residing with their family and high stress levels were reported among students aged between 17-20 years<sup>23</sup>. In this study, when compared between female and male students, female students reported lower levels in wellbeing, sleep disturbance, snoring, sleep awakening, somnolence when compared to male students. There is a significant positive correlation between smartphone addiction females-33.33% and males-46.15%, poor sleep quality (63.39%) and poor health status (62.05%) among medical students<sup>4</sup>. The reason for gender difference could be smart phone addiction.

There was a significant positive correlation between Happiness and wellbeing, quality of sleep and sleep adequacy. However, negative correlation was reported between Happiness and sleep disturbance, snoring, sleep awakening, somnolence, and Sleep Problem Index II. Similarly, wellbeing is negatively correlated with sleep disturbance, sleep awakening, somnolence, and Sleep Problem Index II and positively correlated with quality of sleep and sleep adequacy. However, poor sleep quality is more prevalent among medical students<sup>1,24</sup> and is a common prob-

lem among medical students<sup>5,6</sup>. Results highlight the relationship between sleep and psychological well-being.

Several factors contribute to poor sleep quality among medical students. Excessive daytime sleepiness (EDS) and sleep deprivation are two issues that medical students frequently encounter<sup>25</sup>. The rigorous academic load, exam anxiety, and tight schedules of medical students cause persistent stress. In light of the numerous studies that have been conducted on medical students' poor sleep quality, internet addiction, and/or excessive smart phone use has a relationship, it is necessary to take this into consideration. Further, the disparity between students in the allopathic and other medical streams, as well as other difficulties, must be recognized and addressed throughout their medical education, and relevant interventions should be implemented.

The results of the study should be viewed in light of a number of limitations. To generalize our findings, we need to look at the significant relation between sleep and psychological wellbeing with a larger number of samples from multiple institutions. There was no face-to-face interview, and all data was acquired using a self-reporting questionnaire, introducing the possibility of response bias. The relationship between sleep and well-being in medical students can be better understood using objective measurements of sleep. The data were obtained at a specified point in time of the year, providing the possibility of confounding variables, and environmental conditions were not taken into consideration when collecting the data. Longitudinal design would be more beneficial in determining how sleep quality changes as student's progress through the years.

## CONCLUSION

To the best of our knowledge, this was the first study in India to compare the sleep quality, wellness, and happiness across different streams of medical students. Our findings indicate that medical students studying allopathic medicine are more likely than medical students studying homoeopathy or ayurvedic medicine to suffer from sleep-related issues. Further, the happiness and wellbeing had significant association with sleep disturbance and other domains of sleep. An effort needs to be made to enlighten medical students about sleep hygiene and practical ways to improve the quality of their sleep which in turn enhance their wellbeing and happiness. These assessments will assist students in developing suitable sleep management strategies that will improve their sleep quality as well as have an impact on their psychosocial well-being.

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## REFERENCES

- Azad MC, Fraser K, Rumana N, Abdullah AF, Shahana N, Hanly PJ, et al. Sleep disturbances among medical students: A global perspective. *J Clin Sleep Med*. 2015;11(1):69–74. Available from: <https://jcsa.aasm.org/doi/full/10.5664/jcsa.4370>
- Carrillo-Mora P, Fonseca-Vázquez DM, Magaña-Vázquez K, Ramírez-Peris J. Poor Sleep Quality in Medical Students is Related to Sleep Habits and Emotional Symptoms: A Pilot Study Conducted in México. *Sleep Vigil*. 2021;5(1):99–102. <https://link.springer.com/article/10.1007/s41782-021-00133-9>
- Nayak A, Saranya K, Fredrick J, Madumathy R, Subramanian SK. Assessment of burden of internet addiction and its association with quality of sleep and cardiovascular autonomic function in undergraduate medical students. *Clin Epidemiol Glob Heal [Internet]*. 2021;11. Available from: <https://api.elsevier.com/content/article/eid/1-s2.0-S2213398421000816>
- Chatterjee S, Kar SK. Smartphone Addiction and Quality of Sleep among Indian Medical Students. *Psychiatry (New York) [Internet]*. 2021/04/16. 2021 Apr 15;84(2):182–91.
- Giri P, Baviskar M, Phalke D. Study of Sleep Habits and Sleep Problems Among Medical Students of Pravara Institute of Medical Sciences Loni, Western Maharashtra, India. *Ann Med Health Sci Res*. 2013;3(1):51. Available from: <https://doi.org/10.4103/2141-9248.109488>
- Jniene A, Errguig L, El Hangouche AJ, Rkain H, Aboudrar S, El Ftouh M, et al. Perception of Sleep Disturbances due to Bedtime Use of Blue Light-Emitting Devices and Its Impact on Habits and Sleep Quality among Young Medical Students. *Biomed Res Int*. 2020/01/18. 2019;2019:7012350. Available from: <https://doi.org/10.1155/2019/7012350>
- Sundas N, Ghimire S, Bhusal S, Pandey R, Rana K, Dixit H. Sleep quality among medical students of a tertiary care hospital: A descriptive cross-sectional study. *J Nepal Med Assoc*. 2020/04/27. 2020;58(222):76–9. Available from: <https://doi.org/10.31729/jnma.4813>
- Yassin A, Al-Mistarehi AH, Beni Yonis O, Aleshawi AJ, Momany SM, Khassawneh BY. Prevalence of sleep disorders among medical students and their association with poor academic performance: A cross-sectional study. *Ann Med Surg*. 2020/09/29. 2020;58:124–9. Available from: <https://doi.org/10.1016/j.amsu.2020.08.046>
- Quek TT-C, Tam WW-S, Tran BX, Zhang M, Zhang Z, Ho CS-H, et al. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health*. 2019 Jul;16(15). Available from: <https://doi.org/10.3390/ijerph16152735>
- Peluso MJ, Guille C, Sen S, Mata DA. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. *JAMA*. 2017;316(21):2214–36. Available from: <https://dx.doi.org/10.1001%2Fjama.2016.17324>
- Alotaibi A, Alosaimi F, Alajlan A, Bin Abdulrahman K. The relationship between sleep quality, stress, and academic performance among medical students. *J Fam Community Med*. 2020/02/08. 2020;27(1):23–8. Available from: [https://dx.doi.org/10.4103%2Fjfcmm.JFCM\\_132\\_19](https://dx.doi.org/10.4103%2Fjfcmm.JFCM_132_19)
- Al-Khani AM, Sarhandi MI, Zaghoul MS, Ewid M, Saquib N. A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. *BMC Res Notes*. 2019/10/23. 2019;12(1):665. Available from: <https://doi.org/10.1186/s13104-019-4713-2>
- Bogati S, Singh T, Paudel S, Adhikari B, Baral D. Association of the Pattern and Quality of Sleep with Consumption of Stimulant Beverages, Cigarette and Alcohol among Medical Students. *J Nepal Health Res Counc*. 2020/11/20. 2020;18(3):379–85. Available from: <https://doi.org/10.33314/jnhrc.v18i3.2633>
- Joseph S, Linley PA, Harwood J, Lewis CA, McCollam P. Rapid assessment of well-being: The Short Depression-Happiness Scale (SDHS). *Psychol Psychother Theory, Res Pract*. 2004; Available from: <https://doi.org/10.1348/1476083042555406>
- Allen RP, Kosinski M, Hill-Zabala CE, Calloway MO. Psychometric evaluation and tests of validity of the Medical Outcomes Study 12-item Sleep Scale (MOS sleep). *Sleep Med*. 2009; Available from: <https://doi.org/10.1016/j.sleep.2008.06.003>
- Cappelleri JC, Bushmakina AG, McDermott AM, Dukes E, Sadosky A, Petrie CD, et al. Measurement properties of the Medical Outcomes Study Sleep Scale in patients with fibromyalgia. *Sleep Med*. 2009; Available from: <https://doi.org/10.1016/j.sleep.2008.09.004>
- Ng Fat L, Scholes S, Boniface S, Mindell J, Stewart-Brown S. Evaluating and establishing national norms for mental wellbeing using the short Warwick–Edinburgh Mental Well-being Scale (SWEMWBS): findings from the Health Survey for England. *Qual Life Res*. 2017 May;26(5):1129–44. Available from: <https://doi.org/10.1007/s11136-016-1454-8>
- Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S, et al. The Warwick-Dinburgh mental well-being scale (WEMWBS): Development and UK validation. *Health Qual Life Outcomes*. 2007; Available from: <https://doi.org/10.1186/1477-7525-5-63>
- Kamthan S, Sharma S, Bansal R, Pant B, Saxena P. Happiness among second year MBBS students and its correlates using Oxford Happiness Questionnaire. *J Oral Biol Craniofacial Res*. 2019;9(2):190–2.
- Ayala EE, Berry R, Winseman JS, Mason HRC. A Cross-Sectional Snapshot of Sleep Quality and Quantity Among US Medical Students. *Acad Psychiatry [Internet]*. 2017/01/17. 2017 Oct 13;41(5):664–8.
- Dharmadhikari S, Harshe S, Bhide P. Prevalence and correlates of excessive smartphone use among medical students: A cross-sectional study. *Indian J Psychol Med*. 2019 Nov 1;41(6):549–55.
- Gupta R, Taneja N, Anand T, Gupta A, Gupta R, Jha D, et al. Internet Addiction, Sleep Quality and Depressive Symptoms Amongst Medical Students in Delhi, India. *Community Ment Health J [Internet]*. 2020/08/28. 2021 May 27;57(4):771–6.
- Awasthi AA, Taneja N, Maheshwari S, Gupta T, Bhavika. Prevalence of Internet Addiction, Poor Sleep Quality, and Depressive Symptoms Among Medical Students: A Cross-Sectional Study. *Osong Public Heal Res Perspect [Internet]*. 2020/10/30. 2020 Oct 31;11(5):303–8. Available from: <http://ophrp.org/journal/view.php?doi=10.24171/j.phrp.2020.11.5.06>
- Gupta S, Bhardwaj A, Nadda A, Gill A, Mittal A, Gupta S. A comparative study of sleep quality in different phases of the medical course: A study from Haryana (North India). *J Fam Med Prim Care*. 2020;9(4):2006. Available from: [https://dx.doi.org/10.4103%2Fjfmprc.jfmprc\\_1137\\_19](https://dx.doi.org/10.4103%2Fjfmprc.jfmprc_1137_19)
- Alsaggaf MA, Wali SO, Merdad RA, Merdad LA. Sleep quantity, quality, and insomnia symptoms of medical students during clinical years: Relationship with stress and academic performance. *Saudi Med J*. 2016/02/04. 2016;37(2):173–82. Available from: <https://doi.org/10.15537/smj.2016.2.14288>