

Assessment of sleep pattern and perception of sleep quality among medical residents and its correlation with anxiety and depression in a medical college in Haryana

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Abstract

Background: Medical residents or trainees frequently endure extended shifts of 24 hours or more, resulting in considerable sleep deprivation. The present study was conceptualized with the objective to determine the prevailing pattern of sleep and perception of sleep quality in medical residents of different specialties and also to assess the burden of anxiety and depression among them. **Methods:** In this cross sectional study, one hundred five medical residents from various years at MM Institute of Medical Sciences, Ambala volunteered to participate. The study population consisted of medical residents in their first, second, and third years of MD/MS, as well as Senior Residents. PSQI (Pittsburgh Sleep Quality Index) and HADS (Hospital Anxiety and Depression Scale) were used as study tools. **Results:** Overall 36.2% exhibited severe anxiety scores whereas two thirds of the individuals reported varying degrees of anxiety. 23.8% residents reported severe depression ratings. PSQI values indicated that around 43.8% of the residents had poor sleep quality. Nearly three-quarters of all residents exhibited some degree of disrupted sleep patterns. **Conclusion:** The findings of this study indicate that residents across different specialties experience inadequate sleep and suffer from sleep deprivation. They experience persistent stress and exhibit symptoms of anxiety and depression.

Key Words: residents, sleep quality, anxiety, depression, sleep pattern

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Introduction

Sleep is essential for our existence and directly influences an individual's physical, mental, and psychological well-being [1]. Insufficient sleep is regarded as a significant and emerging public health issue. The prevalence of inadequate sleep is increasing in both emerging and developed societies [2,3]. Individuals who consistently obtain 7-8 hours of sleep over a 24-hour period have enhanced physical health and a reduced risk of premature mortality, as well as lower incidences of diabetes and cardiovascular disease, compared to those who sleep less hours [4]. Consequently, adequate sleep is essential for the preservation of optimal health.

Medical residents or trainees frequently endure extended shifts of 24 hours or more, resulting in considerable sleep deprivation. This causes diurnal somnolence and may result in arrhythmias, mood decline, and dehydration [5]. Medical students experience elevated stress levels, which are associated with prolonged study durations, extensive study hours, clinical rotations, emotional strain, and a demanding lifestyle [3,6,7].

Anxiety is a sense of discomfort typically stemming from a non-specific or unknown source to the individual [8]. A significant prevalence of mental and psychological disorders, including depression, anxiety, and stress, has been observed among first-year medical students at a medical college in Egypt [9]. This may be ascribed to a lack of desire and learning difficulties, which can result in a sense of ineptitude. Sleep deprivation and anxiety can result in the habitual intake of alcohol and caffeinated beverages, exacerbating the condition [10]. The detrimental cycle of inadequate sleep, anxiety, and alcohol misuse results in compromised health among medical residents, ultimately affecting societal health at large.

With this background the present study was conceptualized with the objective to determine the prevailing pattern of sleep and perception of sleep quality in medical residents of different specialties and also to assess the burden of anxiety and depression among them. In addition to determine the role of alcohol and caffeinated beverages in deciding sleep quality patterns.

Methodology

This cross sectional study was performed at the MM Institute of Medical Sciences & Research in Mullana (Ambala) among the residents. Study site is a tertiary care teaching hospital associated with MM University. It delivers healthcare services to a population predominantly from the rural regions of Ambala district in Haryana. The study was carried out over a duration of two months, specifically from June to July 2020. One hundred five medical residents from various years at the institution volunteered to partake in the study. The study population consisted of medical residents in their first, second, and third years of MD/MS, as well as Senior Residents serving at MMIMSR. Purposive Sampling technique was adopted in this study. The inclusion criteria was residents and senior residents who consented to take part in the study. Individuals who did not provide their consent to participate in the study or were on antipsychotic medicine were excluded.

The sample size was calculated by using the formula $4pq/d$ where p is the prevalence and q is $100-p$ and d is allowable error which was set at 10%. Using a prevalence of 36 % [11] from previously published studies and 10 % non response rate the sample size was calculated to be 105.

A pre-designed, semi-structured questionnaire was used to collect the relevant information. The questionnaire was administered in English. Before administering the questionnaire, the inhabitants were informed about the aim and procedure of data collecting. They were notified that their involvement was voluntary. Questionnaires were delivered to participants only after obtaining informed consent. To preserve confidentiality, lecturers, professors, and faculty members were excluded from the processes of designing, obtaining consent, and collecting the surveys. The study population was categorized into five groups according to their specialties to analyze and correlate how different types of specialties and work hour patterns affected their depressive, anxiety and sleep scores.

The groups were categorized as follows:

- Group 1** General medicine, Respiratory medicine, Paediatrics, Radiology
- Group 2** General surgery, Anaesthesia, Otorhinolaryngology, Orthopaedics
- Group 3** Ophthalmology, Dermatology, Psychiatry, Radiotherapy
- Group 4** Obstetrics and Gynaecology
- Group 5** Pathology, Social and preventive medicine, pharmacology

A pretested semi structured questionnaire having three sections was used: Section A: It included information regarding socio-demographic profile of the participant viz name, age, sex and year of residency. Section B: This part evaluated sleep quality and the burden of anxiety and depression in medical residents using the PSQI (Pittsburgh Sleep Quality Index) and HADS (Hospital Anxiety and Depression Scale). The Pittsburgh Sleep Quality Index (PSQI) is an essential tool for assessing sleep quality in adults. It aids in differentiating "poor" from "good" sleep by evaluating seven criteria: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disruptions, utilization of sleep medicine, and daytime dysfunction over the preceding month. The client conducts a self-assessment of each of the seven sleep domains. The scoring of responses use a scale from 0 to 3, with 3 being the negative extreme on the Likert Scale. A cumulative score of "5" or higher signifies a "poor" sleeper. The PSQI scale is valid and reliable and has reported a sensitivity of 89.6% and specificity of 86.5% in distinguishing good and poor sleepers. The cronbachs alpha

score of the scale is 0.68 [12]. The Hospital Anxiety and Depression Scale (HADS) is a widely utilized self-assessment tool designed to evaluate psychological discomfort. It comprises two subscales: Anxiety and Depression [13]. The scale categorizes values as follows: 0-7 (Normal), 8-10 (Borderline abnormal- borderline), and 11-21 (Abnormal). The HADS questionnaire is valid with a sensitivity and specificity of 80% .Cronbach's alpha for HADS-A was 0.83 and for HADS-D was 0.83 and 0.82 respectively [14]. Section For PSQI scoring, score of <5 was taken as Normal (No Sleep Deprivation) category, 5-8 as Moderate (Sleep Deprivation) category whereas >8 was taken as Severely (Sleep Deprivation) category. C: Included a questionnaire that was used to assess consumption of substances that could potentially affect the sleep to further study variables associated with impaired sleep.

Data was fed into an Excel spreadsheet and subsequently imported into SPSS (Statistical Package for Social Sciences) version 20 for statistical analysis. The data was tested for normality and found to be normal. Percentages of the HADS anxiety and depression scores for normal, moderate, and severe categories were computed for the various groups. The chi-square test was employed to examine the association between specialty and anxiety, as well as depression. The PSQI score was classified as normal sleep, moderately impacted, and severely disturbed. The Chi-square test was employed to examine the relationship between PSQI categories and anxiety and depression. The relationship between alcohol consumption and coffee consumption with the mean scores of anxiety, depression, and PSQI was evaluated using an unpaired t-test. A p-value below 0.05 was deemed significant.

The study received approval from the Institutional Ethics Committee at MMIMSR, Mullana (Ambala) before its commencement. The study was designed to avoid any financial burden on participants while ensuring complete confidentiality throughout the process.

Results

A total of 105 medical residents from various years at the institution participated in the study. The current study population consisted of medical residents, including first, second, and third-year MD/MS students, as well as Senior Residents.

It was observed that majority (80%) of the group 4 with gynaecology residents had a severe HADS anxiety score followed by group 2 containing surgery and allied branches with overall others groups showing a relatively even distribution. The study population indicated that nearly one third of the inhabitants exhibited severe anxiety scores (36.2%), whereas two thirds of the individuals reported varying degrees of anxiety overall. Group 2, comprising General Surgery and related disciplines, exhibited 40% of participants reporting severe depression scores on the Hospital Anxiety and Depression Scale (HADS), followed by Groups 5 and 3. Group 4, including gynaecology residents, exhibited no severe scores; nevertheless, it also demonstrated the lowest percentage of normal scores at 20%. (Table 1)

A smaller proportion of residents reported severe depression ratings (23.8%). Nonetheless, one-third of the study sample continued to report moderate depressed scores on the HADS. Group 2 had the highest percentage of individuals with highly disrupted sleep, with 72% of them reporting this pattern, followed by Group 4, where half of the participants reported a severely disturbed sleeping pattern according to the PSQI. PSQI values indicated that around 43.8% of the residents had poor sleep quality. Nearly three-quarters of all residents exhibited some degree of disrupted sleep patterns.

Table1: Distribution HADS anxiety, depression and PQSI scores according to speciality groups

Variable	Group 1	Group 2	Group 3	Group 4	Group 5	Overall	p value
HADS anxiety score severity (%)							
Normal	25	32	33.3	10	42.9	28.6	0.096
Moderate	40.9	28	50	10	35.7	35.2	
Severe	34.1	40	16.7	80	21.4	36.2	
HADS depression score severity (%)							
Normal	54.5	24	33.3	20	57.1	23.8	0.010
Moderate	27.3	36	41.7	80	14.3	34.3	
Severe	18.2	40	25	0	28.6	41.9	
PSQI sleep severity (%)							
Normal sleep	38.6	8	16.7	20	42.9	27.6	0.035
Moderately disturbed	27.3	20	50	30	28.6	28.6	
Severely disturbed	34.1	72	33.3	50	28.6	43.8	

Table 2: Association of PSQI score with HADS anxiety and depression score

PSQI	Anxiety category			Total	P value
	Normal	Moderate	Severe		
Normal	13(44.8)	12(41.4)	4(13.6)	29(27.61)	0.013
Moderate	9(30.0)	11(36.7)	10(33.3)	30(28.57)	
Severe	8(17.4)	14(30.4)	24(52.2)	46(43.80)	
Total	30(28.6)	37(35.2)	38(36.2)	105	
PSQI	Depression Category			Total	P value
	Normal	Moderate	Severe		
Normal	20(69.0)	5(17.2)	4(13.9)	29(27.6)	0.001
Moderate	13(43.3)	13(43.3)	4(13.3)	30(28.57)	
Severe	11(23.9)	18(39.1)	17(37.0)	46(43.80)	
Total	44(41.9)	36(34.3)	25(23.8)	105(100)	

Table 2 illustrates a significant association between Sleep Deprivation in PG Residents (as indicated by PSQI Scores) and Anxiety (as measured by HADS Anxiety score), with a p value of 0.013. A significant association was identified between sleep deprivation and depression, as shown by the HADS depression score.

Table 3 represents significant association between PSQI based Sleep deprivation and Alcohol intake among PG Residents (p value = 0.016). However, no association was seen between alcohol intake and Anxiety/Depression.

Table 4 shows that coffee intake was significantly associated with sleep deprivation (based on PSQI scores).However there was no association between coffee intake and anxiety and depression.

Discussion

Sleep is fundamental to human health. Inadequate sleep adversely impacts health, elevating the risk of cardiovascular disease, accelerated aging, and obesity [15]. Inadequate sleep is correlated with diminished mental and cognitive performance [16]. Acute sleep deprivation results in a dose-dependent decline in mood, cognitive

Table 3: Relation of Alchohol intake to PSQI, HADS anxiety and HADS depression scores

Variable	Alcohol Category	N	Mean	Std. Deviation	p value
PSQI score	No	58	7.4483	3.46497	0.016
	Yes	47	9.1702	3.74351	
Anxiety score	No	58	9.224	3.9738	0.237
	Yes	47	10.213	4.5394	
Depression score	No	58	7.569	3.7888	0.073
	Yes	47	8.894	3.6549	

Table 4: Relation of coffee intake to PSQI, HADS Anxiety and HADS depression score

Variable	Alcohol category	N	Mean	Std Deviation	P value
PSQI score	No	46	7.26	3.28	0.018
	Yes	59	8.97	3.82	
Anxiety score	No	46	8.91	4.52	0.1080
	Yes	59	10.25	3.95	
Depression	No	46	7.52	4.15	0.1250
	Yes	59	8.66	3.39	

function, and motor abilities [17]. Resident physicians are mandated to work prolonged hours and shifts, as well as to be on call during their training. This may lead to both acute and chronic sleep deprivation, adversely affecting the well-being of resident physicians and the quality of patient care [18,19]. This study aims to investigate the relationship between sleep quality in residents and its correlation with mental health, anxiety, depression, and work performance. The objective was to assess the influence of alcohol and caffeinated beverage consumption on sleep patterns.

In the current study, gynecology residents exhibited elevated anxiety levels on the HADS, with nearly 80% indicating severe anxiety. This was succeeded by General Surgery and related disciplines, including anaesthesia residents, followed subsequently by physicians. Regarding depressive scores on the HADS, surgical branches exhibited severe ratings, with 40% of group 2 indicating symptoms, while group 4, including gynaecology residents, demonstrated even higher prevalence, with 80% expressing moderate depressive symptoms. This is probably associated with the nature of working hours, patient volume, emergency responsibilities, and perceived task intensity. This finding is corroborated by numerous research in which residents in surgical specialties have reported a higher degree of stress and burnout [20,21]. Comparable results were documented in a cross-sectional research involving 700 pupils. Elevated rates of depression (65%), anxiety (73%), and stress (59.9%) were documented. Stress scores were markedly elevated compared to depression and anxiety ($P=0.001$). 55.7% experienced inadequate sleep [22].

The present study examined two drugs, alcohol and coffee, in conjunction with tobacco use and smoking patterns. Consumption data indicated that 59 out of 105 residents reported coffee use, but nearly half of the participants reported alcohol use. The current study demonstrated a strong association between depression and tobacco smoking, as indicated by a chi-square analysis (p value =

0.042), while anxiety exhibited a correlation with coffee intake (p value = 0.012). The relationship may be bi-directional, as substance use can exacerbate depressed and anxious symptoms, or vice versa. In a recent longitudinal study by North et al. [23], heightened depressive symptoms were linked to an increased number of concurrently used tobacco products, persisting for at least six months thereafter.

Our study indicated that 43.8% of participants experienced significant sleep disturbances and suboptimal sleeping habits. Severe sleep deprivation is a significant concern among inhabitants. Chronic sleep disturbance and deprivation, resulting from residency training schedules, has been linked to diminished executive functioning and heightened impulsivity, as well as decreased morning cortisol levels and a tendency towards higher inflammation [24].

A research evaluating the impact of a 32-hour on-call shift for junior doctors in Dublin, Ireland, revealed that they averaged 4.5 hours of sleep. Residents who had five hours of sleep per night reported a significant change in weight, greater reliance on drugs to remain alert, and heightened alcohol intake [25].

The current research acknowledges certain limitations as well. This self-reported poll is susceptible to recency and recollection bias among the participants. The patterns of substance use were not thoroughly examined, as the primary focus was on sleep patterns and levels of depression and anxiety among the inhabitants. The sample size, while not insignificant, cannot be utilized to generalize findings to other contexts. Nonetheless, the current study enhances our understanding of contemporary sleep habits and their association with the development of depressed and anxiety symptoms within the framework of Indian hospital residency programs.

Conclusion and Recommendations

Sleep is essential for our existence and is directly linked to an

individual's physical, mental, and psychological well-being. The study's findings indicate that residents across different specialties experience inadequate sleep and suffer from sleep deprivation. They experience persistent stress and exhibit symptoms of anxiety and depression. This is exacerbated by their consumption of alcohol and tobacco. Although extensive study has been conducted on the impact of sleep on mood and performance, additional studies are required concerning residents employed in Indian hospitals. Given that sleep significantly influences patient outcomes, it is imperative to comprehend the factors that lead to poor sleep among these residents. This understanding will facilitate the development of programs that foster healthy sleep practices and improve both physical and mental well-being.

Conflict of Interest:	Author declare no COI
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