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Sleep Quality among Healthcare Professionals in a Tertiary Care Hospital

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ABSTRACT

Introduction: A person spends one third life in sleep, so the quality and quantity of sleep is of utmost importance. Health Care Professionals (HCPs) are more prone to inconsistency in sleep both in quality and quantity, which leads to deflection from health and well-being of themselves and care of others. This study aims to assess the various factors influencing sleep quality and daytime sleepiness among medical and nursing healthcare professionals.

Methodology: A cross sectional study was conducted using a structured questionnaire to collect socio-demographic and work-related information, co-morbidity and quality of Sleep using ESS (Epworth Sleepiness Scale) and PSQI (Pittsburgh Sleep Quality Index) scale.

Results: Among the 150 HCPs, 64.7% were medical and 35.3% were nursing professionals. 53.6% of medical and 66% of nursing professionals reported poor sleep quality. Increased coffee consumption influences sleep quality and it was found to be statistically significant. Nursing professionals had more excessive daytime sleepiness (58.5%) with significant p-value (p=0.01).

Conclusion: According to our study results, sleep quality was poor among nursing professionals which highlights the need for measures to improve their quality of sleep.

Key Words: ESS, PSQI, Epworth Sleepiness Scale, Pittsburgh Sleep Quality Index, Sleep deprivation

INTRODUCTION

"A good laugh and a long sleep are the best cures in the doctor's book" -Irish Proverb

Sleep is a state of transcendence wherein every human being is born anew every day. Humans can tolerate continuous sleeplessness, on expense of well-being and effectiveness; because insomnia even for a shorter period may lead to deteriorated functioning.[1] It has been said that a human adult needs about 7 to 9 hours of sleep per day, the loss of which results in fatigue, excessive daytime sleepiness etc.[2] Deprivation of sleep has its own consequences – both within short term and long run. Insufficient sleep predisposes an individual to premature mortality and morbidity. It can manifest from defects in judgement, mood to occurrence of chronic disorders such as diabetes, hypertension, cardiovascular diseases etc.[3] Deprivation of sleep is generally measured by three measures – defects in cognitive performance, defects in motor performance and mood.[4,5] Sleep deprivation (SD) has a check on alertness, attention and vigi-

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lance. It has been found that SD more commonly affects prefrontal cortex of the brain. It also leads to slowing of responses which results in impaired performance.[6]

Disturbances in cognition cause impaired performances in job where decision making is crucial. Healthcare profession is one among such, where insufficient sleep impairs work performance. It has been estimated that 10 to 40 % of healthcare professionals (HCPs) suffer from sleep disorders due to shift work. As per Johnson et al, 56% of HCPs are sleep deprived and they make errors in patient care.[7] They experience symptoms of insomnia and excessive daytime sleepiness since frequent shift works cause impairments with the natural circadian rhythms.[8]

Insufficient sleep-in healthcare professionals cause impairments in neurobehavioral performances which causes glitches in benefits of patients. Extended working hours predisposes to increased alcohol use and unethical behaviour. Frequent night shifts and change in working hours predisposes to psychological distress.[9,10] It was also reported that there were more cutaneous injuries and probability of falling asleep during academic activities and surgery was proportional to their increase in working hours.[11]

Insufficient sleep also causes emotional exhaustion and decrease in job satisfaction. Negative correlation was observed between extended working hours and effective learning of skills. [12] Healthcare professionals in clinical departments experience more SD.[13] Impaired sleep overall affects quality of patient care, patient dissatisfaction and also health and wellbeing of the concerned individuals. So, this study aims to assess the prevalence of quality of sleep and daytime sleepiness and its associated factors among healthcare professionals in a private medical college in a rural district.

MATERIALS AND METHODS

A cross sectional study was done among the health care professionals of private medical college after obtaining their written informed consent. The study was conducted for a period of 2 months.

Sample size: Sample size of 150 was calculated based on the prevalence of sleep deprivation as 39.9% among healthcare professionals in a previous study .[14] Using the sample size formula = $Z^2_{1-\alpha}\, pq/d^2$ ($Z_{1-\alpha}$ = 1.96 at 95% confidence interval=allowable error=8 %, p=prevalence of the condition=39.9 %, q= (100-p)). Assuming the non-response rate to be 5%, the sample size was calculated as 150.

A list of healthcare professionals (Doctors and nurses) was obtained and population proportion to size sampling was done to select the participants from each category. Then data was collected from the participants who gave informed consent. Ethical approval was obtained from Institutional Ethics Committee on Human Subjects.

Study tools: A structured and validated questionnaire was prepared with 5 sections with questions on Socio-demographic data and anthropometric measurements, work- related information like hours, night duty etc., questions related to lifestyle including the details of mobile phone usage were recorded.

The Epworth Sleepiness Scale:[15] It was used as a subjective measure of a patient's sleepiness. The test is a list of eight situations in which you rate your tendency to become sleepy on a scale of 0, no chance of dozing, to 3, high chance of dozing. The total score is 24, a score of greater than 10 means high daytime sleepiness and a score of lesser than 10 means low daytime sleepiness. The scale estimates whether you are experiencing excessive sleepiness that possibly requires medical attention.

Pittsburgh sleep quality index (PSQI):[16] It is an effective instrument used to measure the quality of sleep in the older adult. It is measured on seven domains-subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction, the global sum of which indicates sleep quality. These seven domains are self-rated by subjects on likert scale of 0 to 3, whereby 3 reflects the extreme negative on the Likert scale. Total score of 5 or greater indicates a poor sleep quality.

Descriptive statistics was represented in mean, frequency, standard deviation and percentage. The inferential statistics to find various associated factors was done by chi-square test, Fischer's exact test and independent t test/ Mann Whitney U test. Data was entered in MS Excel and analysed using SPSS software version 23 (trial version).

RESULTS

The mean age of the study participants was 33.3 years with standard deviation of 10.4. Majority of the participants was between 21-30 years (55.3 %). Among the participants, the proportion of females was 56% and 68.7% were married. The distribution of Body Mass Index (BMI) among the study participants was as follows: Underweight 9%, Normal weight 32.6%, Overweight 43.3%, 7.3% of participants belongs to Obese grade 1 and 10% of the participants belong to obese grade 2.

Regarding the Lifestyle factors, it was observed that habit of smoking and alcohol was present in 3% and 12% of the participants respectively. Chronic illness was present in 12% of the participants.

According to Epworth Sleepiness Scale, 6.7% of the participants had lower normal daytime sleepiness. 48 % of the participants had higher normal, 23.3% of them had mild excessive, 21.3% moderate excessive and 0.7% had severe excessive daytime sleepiness.

Table 1: Distribution of socio-demographic characteristics and nature of work among the study participants (n=150)

Characteristics	Participants (%)
Age group (in years)	
21-30	83 (55.3)
31-40	47 (31.3)
41-50	6 (4.1)
>50	14 (9.3)
Profession	
Medical professionals	97 (64.7)
Nursing professionals	53 (35.3)
Hours of travel	
Less than 30 minutes	128 (85.3)
≥ 30 minutes	22 (14.7)
Department	
Clinical	128 (85.3)
Non-clinical	22 (14.7)
Working hours	
Less than 8 hours	53 (35.3)
≥ 8 hours	97 (64.7)
Frequency of night duties per week	
Nil	45 (30)
≤3 duties	88 (58.7)
More than 3 duties	17 (11.3)

Table 2: Distribution of personal habits of the study participants (n=150)

Characteristics	Participants (%)
Consumption of coffee cups per day	
Nil	12 (8)
Less than 3 cups	98 (65.3)
≥3 cups	40 (26.7)
Hours of physical activity	
Nil	86 (57.3)
30 minutes – 1 hour	59 (39.3)
More than 1 hour	5 (3.3)
Hours of mobile phone usage before bedtime	
Nil	11 (7.3)
≤1 hour	136 (90.7)
More than 1 hour	3 (2)

When daytime sleepiness was calculated separately for medical and nursing professionals, 38.1% of the medical professionals and 58.5 % of nursing professionals had excessive daytime sleepiness.

Sleep Quality using Pittsburgh Sleep Quality Index, 42 % of the participants had good sleep quality and 58 % with poor sleep quality. When sleep quality was observed separately for two groups, 53.6 % of medical professionals and 66 % of nursing professionals had poor sleep quality.

The socio-demographic details, working pattern and personal habits of the participants was analysed for statistical significance with excessive daytime sleepiness and sleep quality. Participants who work more than 8 hours per day (p=0.000), those who had increased night duties (p=0.000) and participants from clinical department (p=0.000) experience more daytime sleepiness and was found to be highly significant. The participants in the age group of 21 to 30 years (p=0.016) had more daytime sleepiness when compared to other age groups and it was found to be statistically significant. When compared to medical professionals, the nursing professionals (p=0.017) had excessive daytime sleepiness and it was statistically significant.

People who consume more than 3 cups of coffee per day are found to have poor sleep quality when compared to the participants who had less than 3 cups and the difference between the groups was statistically significant (p=0.015). The PSQI has seven domains: Comparison of the domains of PSQI is analysed between medical and nursing professionals. Values of the domains are expressed in median and inter quartile range. The medical and nursing professionals was observed in domains such as Habitual sleep efficiency (p=0.03) and daytime dysfunction (p=0.02) and it was found to be statistically significant. The nursing professionals had more daytime dysfunction and less efficient sleep when compared to medical professionals.

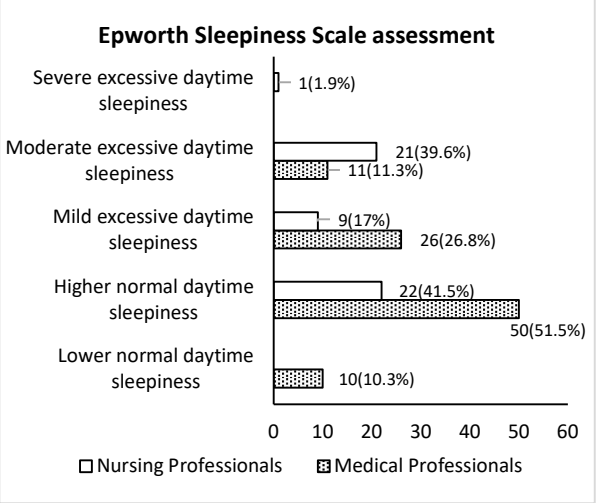

Figure 1: Prevalence of daytime sleepiness among the study participants (medical and nursing professionals) (n=150)

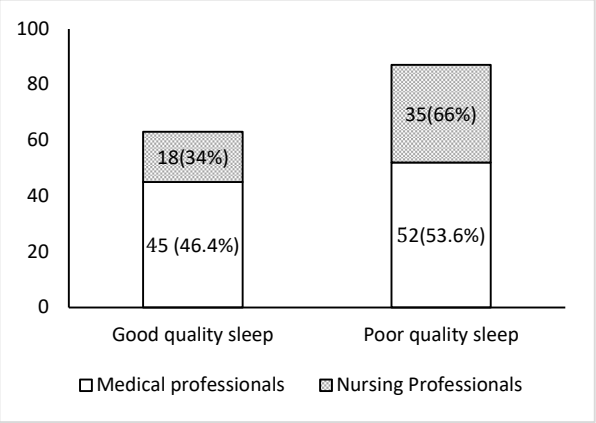

Figure 2: Assessment of Sleep quality by Pittsburgh Sleep Quality Index among the study participants (medical and nursing professionals) (n=150)

Table 3: Association of age, working hours and frequency of night duties with normal and excessive daytime sleepiness (n=150)

Characteristics	Normal daytime sleepiness (n=82) (%)	Excessive daytime sleepiness (n=68) (%)	Table value	P value	Odds ratio (95% C.I)
Age (in years)					
21-30	39 (47)	44(53)	10.277[f]	0.016*	1.565
31-40	34 (72.3)	13 (27.7)			(0.607 – 4.034)
41-50	4 (66.7)	2 (33.3)			
>50	5 (35.7)	9 (64.3)			
Type of profession					
Medical professionals	60 (61.9)	37 (38.1)	5.725[c]	0.017*	2.285
Nursing professionals	22 (41.5)	31 (58.5)			(1.154 – 4.524)
Working hours					
< 8 hours	42 (79.2)	11 (20.8)	19.979[c]	0.000*	5.441
>8 hours	40 (41.2)	57 (58.8)			(2.501 – 11.837)
Frequency of night duties					
Nil	39 (86.7)	6 (13.3)	29.047[c]	0.000	9.372
≤3	39 (44.3)	49 (55.7)			(3.649 – 24.075)
>3	4 (23.5)	13 (76.5)			
Type of department					
Clinical	61 (47.7)	67 (52.3)	17.307[c]	0.000	0.043
Non clinical	21 (95.5)	1 (4.5)			(0.006 – 0.332)

[c] – Chi square test, [f] – Fischer exact test, * - p value < 0.05 is considered statistically significant

Table 4: Association of coffee consumption with poor quality sleep (n=150)

Consumption of coffee	Good quality of sleep (n=63) (%)	Poor quality of sleep (n=87) (%)	Table value	P value	Odds ratio (95% C.I)
Nil	8 (66.7)	4 (33.3)	8.360[c]	0.015*	3.018
≤3 cups	45 (45.9)	53 (54.1)			(0.867 – 10.510)
>3 cups	10 (25)	30 (75)			

[c] – Chi square test, p value < 0.05 is considered statistically significant

Table 5: Comparison of Pittsburgh Sleep Quality Index (PSQI) and its respective domains between medical and nursing healthcare professionals (n=150)

Components of PSQI	Medical professionals (%)	Nursing professionals (%)	P-value
Global Score PSQI*			
Good quality (<5)	45(71.4)	18(28.6)	0.14*
Bad quality (≥5)	52(59.8)	35(40.2)	
Subjective sleep quality**	1(1,2)	1(1,2)	0.11**
Sleep Duration**	1(1,1)	1(1,1)	0.46**
Habitual sleep efficiency**	0(0,1)	1(0,1)	0.03**
Sleep disturbances**	0(0,1)	1(0,1)	0.19**
Daytime dysfunction**	1(0,1)	1(0,2)	0.02**

*Chi Square **Mann Whitney U Test; Values are expressed in (median, interquartile rang

DISCUSSION

According to our study, 38.1% of medical professionals and 58.5% of nursing professionals had excessive daytime sleepiness. When observed for sleep quality, 53.6 % of medical professionals and 66 % of nursing professionals had poor sleep quality. In a study done by Joseph et al[14], it was observed that 39.9% of healthcare workers had insomnia and 19.8% had excessive daytime sleepiness. In study conducted by Haile et al [17], among nurses, it was found that 25.6% of nurses had shift work sleep disorder. Increased night duties and length of night shifts was found to be associated with shift work disorder. The high prevalence in our study may be due to the use of objective measurement of sleep such as Epworth sleepiness and Pittsburgh sleep quality index. A study done in a tertiary care hospital by Aliyu et al [18] observed that 47% of doctors had excessive daytime sleepiness but majority of doctors had better sleep quality. With daytime sleepiness, the prevalence was almost similar to our study which proves that daytime sleepiness has been a huge concern among medical care professionals.

Nursing professionals are found to be at high risk for sleep deprivation. According to Di Muzio M et al [19] workloads in particular, significantly affects the risk of making medication errors in 36.4% of the analysed cases. Although the personal factors (knowledge, attitude and behaviour) are essential to prevent nursing errors, this research shows that the main reasons for medical errors are: stress, fatigue, increased workload, night shifts, and workflow inter-

ruptions. Adverse events occur more frequently during reduced staff shifts (where the number of nursing staff in particular is little) and when the working hours exceed 12 hours per shift and 40 hours per week. Even the prevalence of daytime sleepiness and poor sleep quality was higher among nursing professionals in our study. This shows that tiredness and lack of rest play a critical role in increasing the possibility of medication errors. Nurses working night shifts and rotating shifts struggle more to stay awake during their work activities and they are twice as likely to make errors, compared to nurses' working day/evening shifts.

According to Verma et al[19], a study conducted among nurses showed that the nurses had more sleep disturbances and they also showed lower scores in job satisfaction. Female gender was significantly associated with sleep disturbances. The statistical significance of gender may be due to the female predominance of the profession particularly nursing. Liu et al [20], in 2019 assessed sleep problems among healthcare workers in China, it was found that demographics such as sex and salary were significantly associated with participant's sleep problems. It was also found that sleep deprivation was more among healthcare workers in clinical departments (OR = 1.53 at 95% C.I (1.15 – 2.04)). In our study, there was no association with gender but the participants from clinical department had more sleep deprivation since they will be frequently posted for night duties. Whereas in the previous study, sleep disorders were inversely associated with regular diet and physical exercise. In our study, duration of physical exercise did not show any significance with daytime sleepiness or poor sleep quality.

As per study done by Kolo et al[21] among 155 healthcare workers using PSQI, it was found that 54.2% had poor sleep quality and nurses had more poorer sleep quality compared to clinicians. When looked for predictors of poor sleep quality among the participants, it was found that age, sex and frequency of night duties was significantly associated with poor sleep quality. Similarly, in our study the association of age, frequency of night duties with daytime sleepiness was found to be statistically significant. The increased coffee consumption (>3 cups/day) was significantly associated with poor sleep quality.

LIMITATIONS

Face to face interviews might have created a social desirability bias which would have made the results shallow. The non-assessment of psychological wellbeing of the subjects and implication of other determinants of health like economy and environment might have limited the results.

The study recommends comfortable sleeping environment such as dark room, appropriate room temperature for the individual, non-interruption of any noise (or) sound and restriction of mobile phone usage one to two hours before bedtime for an individual to acquire sufficient sleep. Restriction of daily intake of caffeine and adequate physical activity also helps to maintain a good, sufficient night sleep. The above recommendations are essential for a good and quality sleep for all individuals but it is more significant for healthcare professionals, who play a vital role in taking care of wellbeing of the community.

CONCLUSION

The study revealed that daytime sleepiness and poor-quality sleep was more among nursing professionals (45.3 % excessive daytime sleepiness and 58 % poor sleep quality). Increased working hours, frequent night duties and increased coffee consumption have found to be the major causes for poor sleep quality among the health care professionals. Small naps after a continuous 6-hour work schedule and short breaks may help to reduce fatigue and errors. Early bed time and uninterrupted sleep of 6 to 8 hours may help to avoid daytime sleepiness and improve sleep quality. Reduced coffee consumption and avoiding screen time at least 2 hours before bed may lead to better quality of sleep.

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