

Screening for sleep deprivation and mood states among staff nurses of tertiary care hospital in central India



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ABSTRACT

Background: A Nurse's fatigue raises significant concerns for individual and patient safety. The impact of sleep deprivation on the quality of patient care is an important consideration in today's health-care environment. **Aims and Objectives:** The aim of this study was to find the proportion of sleep deprivation among nurses in a tertiary care hospital and to find the association between sleep deprivation and mood states among staff nurses. **Materials and Methods:** It was a cross-sectional design done in a duration of 2 months from September to October 2022. The study group consisted of nurses working in a tertiary care hospital located in Jabalpur district. A sample size of 70 nurses was calculated through the statistical formula. The questionnaire has three sections: Demographics (nine questions), Epworth sleep scale (eight questions), and Profile of mood states (65 questions). The collected data were tabulated and analyzed using MS Office Excel and SPSS version 21. **Results:** Interviews were conducted with 70 nurses and 8.6% of them were found to be excessively sleepy and should seek medical attention. Significant results have been obtained for the association with tension, depression, anger, fatigue, and confusion with sleep deprivation. **Conclusion:** The findings suggest that sleep deprivation exists in a considerable state. Some workplace interventions need to be done to make the efforts of nurses worthwhile and to increase their vigor and positive mood.

Key words: Nurses; Sleep; Deprivation; Mood

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INTRODUCTION

Sleep deprivation is a condition where an individual fails to get enough sleep to support their body's needs, leading to a range of physical and mental health problems. This can be due to various factors, including sleep disorders, lifestyle choices, work schedule, and environmental factors. Chronic sleep deprivation can have long-term consequences on an individual's cognitive function, emotional well-being, and physical health. The amount of sleep needed for each person varies, but generally, adults require 7–9 h of sleep per night, while teenagers and children require more.¹

Sleep deprivation is a global problem that affects people of all ages, genders, and cultures. In fact, sleep disorders affect

more than 45% of the world's population.² The prevalence of sleep deprivation varies by region and demographic factors, but it is generally more common in urban areas, among shift workers, and in people with certain medical conditions. Sleep deprivation is a common problem among nurses worldwide, particularly among those who work in hospitals and other health-care settings. Nurses often work long and irregular hours and may be required to work night shifts, which can disrupt their sleep patterns and lead to chronic sleep deprivation.

Sleep deprivation among nurses has been linked to a range of negative health consequences, including increased risk of accidents, impaired cognitive function, and decreased job performance. A study done in

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Ethiopia showed that poor sleep quality among nurses is around 75%.³

Sleep deprivation and poor sleep quality are common problems among nurses in India, particularly, those who work in hospitals and other health-care settings. Nurses often have demanding work schedules, including long hours and night shifts, which can disrupt their sleep patterns and lead to chronic sleep deprivation.

According to a study done in Imphal, the prevalence of poor sleep quality among nurses was as high as 43% whereas it was 70% in a study done in Tamil Nadu.^{4,5}

Factors contributing to poor sleep quality and sleep deprivation among nurses in India include high workload, work-related stress, poor sleep hygiene, and environmental factors such as noise and light pollution.

Sleep deprivation can lead to excessive daytime sleepiness, which is a feeling of overwhelming drowsiness or fatigue during the day. This can interfere with daily activities and lead to a range of negative consequences, including decreased productivity, impaired cognitive function, and an increased risk of accidents and injuries. The main cause of daytime sleepiness is a lack of sufficient sleep during the night, which can be due to a range of factors, including work schedules, sleep disorders, and lifestyle factors. Chronic sleep deprivation can also lead to a condition called hypersomnia, which is characterized by excessive daytime sleepiness and an increased need for sleep.⁶ Daytime sleepiness can be particularly problematic for individuals who work in safety-critical occupations, such as healthcare workers, pilots, and truck drivers. In these cases, the risk of accidents and errors is significantly increased when individuals are not well-rested and alert.

Mood is a temporary state of mind or feeling that reflects a person's emotional state or disposition.⁷ It is the subjective experience of how a person is feeling at a particular moment in time, which can be influenced by a variety of factors, such as environment, thoughts, behaviors, and physiological changes. Moods can be positive or negative and can range from a sense of happiness, excitement, or contentment to feelings of sadness, anxiety, or anger. Moods can also be described as being calm, relaxed, energetic, or irritable. Moods can have an impact on a person's perception, behavior, and overall well-being.

In this study, we are trying to find out how lack of sleep is affecting mood states and data on such study is not available in this study area. Only a few studies have specifically screened sleep deprivation and mood states on shift work nurses.

Aims and objectives

Study Aims to find the proportion of sleep deprivation among nurses in a tertiary care hospital and to determine the association between sleep deprivation and mood states among staff nurses.

MATERIALS AND METHODS

The present study was a cross-sectional study conducted in September–October 2022 in the tertiary care hospital of Jabalpur city. The study subjects were the staff nurses of the hospital working in a shift of 8 h.

Sample size calculation

Using the formula for sample size calculation for finite population:

$$n = N * z^2 * p(1-p) / e^2 * (N-1) + z^2 * p(1-p)$$

Considering 95% of confidence interval ($z=1.96$), 10% margin of error (e), (p) population proportion 70%,⁵ and (N) population size 400. Sample size came out to be $68 \approx 70$.

Sampling technique

Systematic random technique was used in the study. Every fifth study participant was selected to reach the required sample size.

Inclusion and exclusion criteria

All permanent and temporary nursing staff working in the tertiary care hospital and who were willing to participate in the study and could provide consent before the study were included in the study. Nurses on extended leave, such as maternity leave, childcare leave, or sick leave, and non-availability during the time of interview were excluded from the study. Nurses who were actually ill at the time of data collection were also excluded from the study.

Data collection tools and procedure

The data were collected using pre-designed self-administrated questionnaire. The questionnaire was both in English and Hindi. The questionnaire was pre-tested among ten nurses and necessary changes were made before its administration. The questionnaire has three sections: Sociodemographics details (nine questions), Epworth sleep scale (eight questions), and profile of mood states (POMS) (65 questions). Epworth sleepiness scale consists of eight questions, each scored on a scale from 0 to 3, with 0 indicating no chance of dozing and 3 indicating a high chance of dozing. The total score ranges from 0 to 24, with higher scores indicating greater levels of daytime sleepiness. A score of 10 or higher is considered to be indicative of excessive daytime sleepiness and may be a sign of a sleep disorder or other underlying medical condition. POMS questionnaire consists of 65

items, which are rated on a five-point scale from “not at all” to “extremely.” The items are designed to assess six different mood states: Tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. Study participants were explained about the study and informed verbal consent was obtained.

Statistical analysis

The collected data were tabulated and analyzed using MS Office Excel and SPSS version 21. Generation of descriptive statistics was done; ANOVA test was applied to obtain a significant difference between more than two groups.

Ethical clearance

The ethical clearance was taken from the Institutional Ethical and Review Committee of Netaji Subhash Chandra Bose Medical College Jabalpur. The study was done in accordance to the World Medical Association Declaration of Helsinki.

RESULTS

A total of 70 nurses participated in the study. Table 1 shows the characteristics of the study subjects (n=70).

Table 1: Sociodemographic characteristics of study participants

S. No.	Characteristics of subjects	Frequency n=70	Percent
1.	Mean age (years)	29.21	
2.	Gender-wise distribution of study participants		
	Females	62	88.6
	Males	8	11.4
3.	Education-wise distribution of study participants		
	Diploma	12	17.1
	Graduate	56	80.0
	High school	2	2.9
4.	Marital status		
	Divorced	2	2.9
	Married	35	50.05
	Unmarried	33	47.1
5.	Nursing position		
	Nurse intern	9	12.9
	Nursing supervisor	1	1.4
	Sister in charge	11	15.7
	Staff nurse	49	70.0
6.	Duty shift		
	Afternoon	27	38.6
	Morning	16	22.9
	Night shift	27	38.6
7.	Work department		
	Emergency	8	11.4
	Intensive care unit	13	18.6
	Medical	24	34.3
	Obstetrics and gynecology	11	15.7
	Pediatrics	6	8.6
	Surgical	8	11.4
8.	Mean hours of sleep (h)	7	

The mean age of the participants was 29.21 years. Among the study participants, 11.4% were male and 88.6% were female. In terms of education, 80% of the participants were graduates, 17.1% had a diploma, and only 2.9% had a high school education. On average, the study participants reported sleeping for 7 h per night.

Table 2 displays the descriptive statistics for different emotional states, including tension, depression, anger, vigor, fatigue, and confusion. For tension, the mean score was 11.77, with a standard deviation of 5.76. The mean scores for depression, anger, vigor, fatigue, and confusion were 22.6, 18.12, 14.97, 13.08, and 8.12, respectively. The standard deviations for depression, anger, vigor, fatigue, and confusion were 9.41, 7.35, 4.96, 6.14, and 3.37, respectively. The results suggest that the participants had higher levels of depression and anger compared to other emotional states, while confusion had the lowest mean score among the emotional states.

Table 3 presents the results of a statistical analysis that was performed on six different variables: Tension, depression, anger, vigor, fatigue, and confusion. For each variable, the

Table 2: Descriptive statistics of subscales of POMS

Subscale POMS	Epworth sleep scale	n	Mean±SD
Tension	no chance of dozing	29	9.37±4.80
	Slight chance of dozing	24	11.50±4.38
	moderate chance of dozing	11	15.00±6.60
	High chance of dozing	6	18.50±6.53
	Total	70	11.77±5.76
Depression	No chance of dozing	29	17.62±7.57
	Slight chance of dozing	24	23.91±7.63
	Moderate chance of dozing	11	26.45±9.54
	High chance of dozing	6	34.33±10.13
	Total	70	22.60±9.41
Angry	No chance of dozing	29	14.24±6.23
	Slight chance of dozing	24	19.41±5.68
	Moderate chance of dozing	11	19.36±7.67
	High chance of dozing	6	29.50±3.01
	Total	70	18.12±7.35
Vigor	No chance of dozing	29	14.89±5.08
	Slight chance of dozing	24	15.08±3.80
	Moderate chance of dozing	11	16.36±7.24
	High chance of dozing	6	12.33±3.32
	Total	70	14.97±4.96
Fatigue	No chance of dozing	29	8.89±4.57
	Slight chance of dozing	24	14.37±4.69
	Moderate chance of dozing	11	16.45±5.62
	High chance of dozing	6	2.00±2.89
	Total	70	13.08±6.14
Confusion	No chance of dozing	29	6.20±2.35
	Slight chance of dozing	24	8.33±2.82
	Moderate chance of dozing	11	10.81±3.45
	High chance of dozing	6	11.66±3.61
	Total	70	8.12±3.37

POMS: Profile of mood state

table shows the sum of squares, degrees of freedom (df), mean square, F-value, and significance level (Sig). The table shows that for the variables of tension, depression, anger, fatigue, and confusion, there is a significant difference between groups. The F-values for these variables are all greater than 1, and the significance levels are all <0.05, which suggests that the differences between groups are not due to chance. However, for the variable of vigor, there is no significant difference between groups. The F-value is <1, and the significance level is >0.05, which suggests that any differences between groups are likely due to chance.

The majority of nurses not experiencing significant levels of daytime sleepiness, as the majority of them reported no chance of dozing (41%), and a slight chance of dozing (34%) as shown in Figure 1. However, a notable proportion of the sample reported moderate (16%) or high (9%) chances of dozing in certain situations, which could indicate some degree of daytime sleepiness. About 59% of nurses have mild-to-high sleep deprivation.

The information given in Figure 2 represents the relationship between six different emotions and their corresponding chances of affecting one’s ability to fall asleep. The emotions are tension, depression, anger, vigor, fatigue, and confusion. For each emotion, there are four levels of chance of sleeping – no chance, slight chance, moderate chance, and high chance. The percentage values represent the likelihood of experiencing each level of chance of sleeping when one is experiencing a particular

emotion. For instance, if someone is experiencing tension, there is a higher chance of not being able to fall asleep (9.38%) compared to when they are experiencing vigor (12.33%), where the chance of sleeping is comparatively higher. Similarly, depression, anger, fatigue, and confusion are also more likely to affect one’s ability to fall asleep compared to vigor. The information suggests that negative emotions such as tension, depression, anger, fatigue, and confusion are more likely to cause sleep disturbances, while positive emotions like vigor have a lower impact on sleep.

The total mood disturbance score is a measure of overall emotional distress, and a higher score indicates a greater degree of emotional distress (Figure 3). The TMD score is

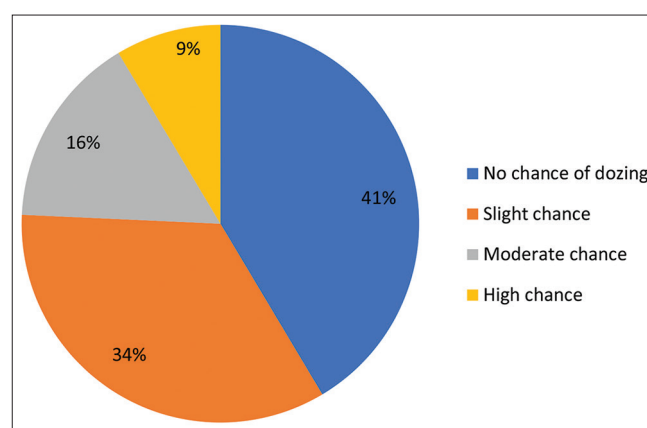


Figure 1: Proportion of chances of daytime sleepiness using Epworth sleep scale

Table 3: ANOVA test analyzing the difference in six different mood states					
Mood States	Sum of squares	df	Mean square	F	*P-value
Tension					
Between groups	554.015	3	184.672	7.020	0.000
Within groups	1736.328	66	26.308		
Total	2290.343	69			
Depression					
Between groups	1750.078	3	583.359	8.813	0.000
Within groups	4368.722	66	66.193		
Total	6118.800	69			
Angry					
Between groups	1270.654	3	423.551	11.340	0.000
Within groups	2465.189	66	37.351		
Total	3735.843	69			
Vigor					
Between groups	63.541	3	21.180	0.854	0.469
Within groups	1636.402	66	24.794		
Total	1699.943	69			
Fatigue					
Between groups	1150.444	3	383.481	17.418	0.000
Within groups	1453.042	66	22.016		
Total	2603.486	69			
Confusion					
Between groups	262.781	3	87.594	11.053	0.000
Within groups	523.062	66	7.925		
Total	785.843	69			

*(P<0.05 is considered to be Statistically significant)

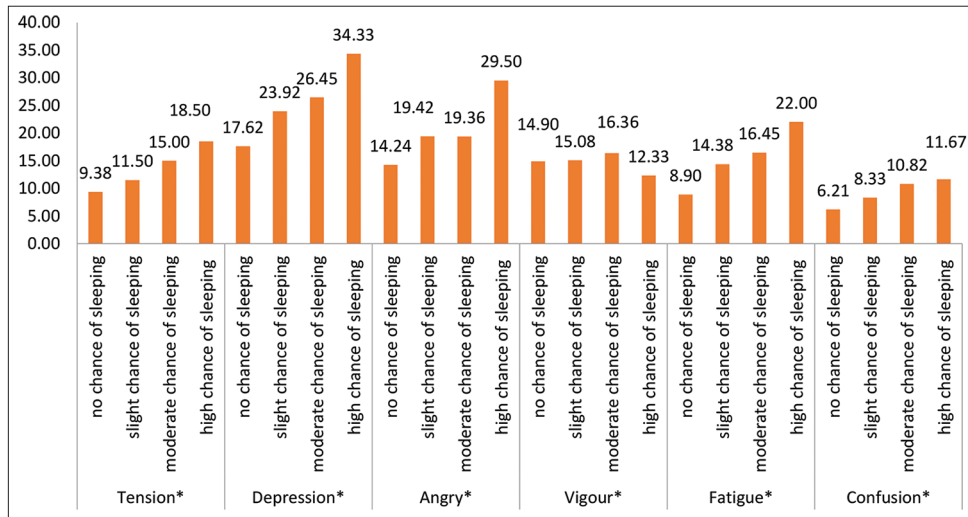


Figure 2: Epworth sleep scale and profile of mood state-subscale

calculated by subtracting the vigor-activity subscale score from the sum of the other five subscale scores.

Based on the data, the department of medicine had the highest number of TMD with a total of 1251, which indicates that the nurses working in this department experienced the highest level of perceived emotional disturbance or mood disturbance (Figure 4). The department of intensive care unit had the second-highest TMD with 809, which suggests that the nurses in this department also experienced a high level of emotional demands. The obstetrics and gynecology department had the third-highest TMD with 697, while the surgical department had a TMD of 429, the pediatrics department had 373, and the emergency department had 509.

In general, the higher the TMD, the higher the mood disturbance experienced by the nurses in a particular department. The data could be used by the hospital management to identify areas where emotional support and resources may be needed to promote the emotional well-being of the nurses and improve their work satisfaction.

DISCUSSION

The results of the study conducted among South Indian nurses indicate that a significant proportion of nurses experience daytime sleepiness, with 25.26% of the sample reporting such symptoms.⁸ This finding is consistent with previous studies that have identified nurses as a population at high risk for sleep disorders due to their long work hours and shift work schedules.

However, the present study also suggests that the majority of nurses assessed in the study are not experiencing significant

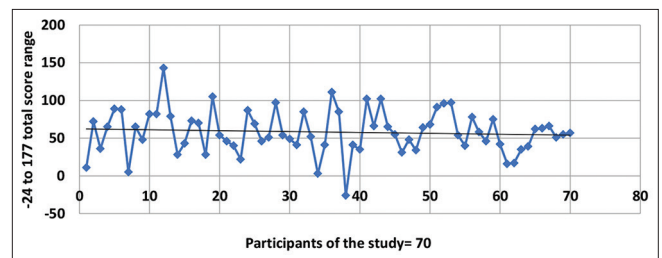


Figure 3: Total mood disturbance using profile of mood state

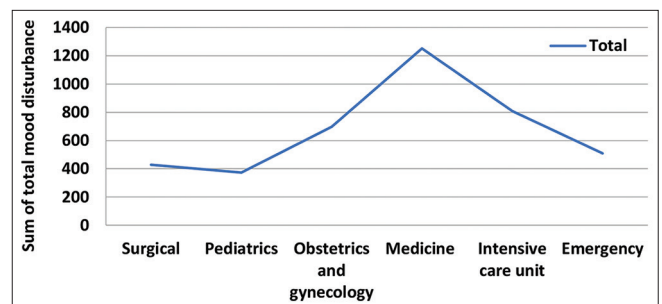


Figure 4: Department-wise mood disturbance

levels of daytime sleepiness. This is reflected in the responses of the majority of the sample, who reported no chance (41%) or only a slight chance (34%) of dozing in certain situations.

Despite this, a notable proportion of the sample reported moderate or high chances of dozing (9%) in certain situations, which could indicate some degree of daytime sleepiness.

In addition, this study found that 59% of nurses had mild-to-high sleep deprivation.

The results of the study conducted among nurses in palliative care indicate that tension, anxiety, fatigue, and

confusion were statistically significant.⁹ In the present study, tension, depression, anger, and fatigue were found to be statistically significant among the nurses assessed, with the exception of vigor. This suggests that the nurses may be experiencing significant levels of psychological distress and emotional exhaustion, which could have implications for their own well-being and patient care outcomes.

The positive correlation between tension, depression, fatigue, and sleep deprivation is also a concerning finding. Sleep deprivation is a known risk factor for the development of psychological distress and burnout among healthcare professionals, and the results of the present study suggest that it may be contributing to the tension, depression, and fatigue experienced by the nurses in this sample.

Limitations of the study

As it was a cross sectional study it was not able to notice the changes in sleep and mood in the nurses in the present time. Longitudinal study is more useful for giving the insight.

CONCLUSION

According to the findings, 59% of nurses are experiencing mild-to-high levels of sleep deprivation. Among nurses, those working in the medicine department reported the highest total mood disturbance, while those in pediatrics had the lowest. The study also revealed a significant and positive correlation between sleep deprivation and various negative emotions, such as tension, depression, fatigue, and confusion (excluding anger). To ensure the effectiveness of nurses and promote their positive mood and energy, workplace interventions are necessary. These interventions could include encouraging breaks and implementing flexible scheduling.

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Authors Contribution:

AL- Concept, design of the study, data collection, review of literature, statistical analysis interpreted the results, and manuscript preparation; **PV-** Concept, study design, manuscript preparation, revision of the manuscript, and coordination; **AT-** Concept, design of the study, statistical analysis, revision of the manuscript, and coordination; **JSD-** Concept, design of the study, statistical analysis, and coordination; and **RT-** Concept, study design, and revision of the manuscript.

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