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## Assessment of quality and pattern of sleep using Pittsburg sleep quality index among medical and paramedical health care workers in a tertiary health care centre in South India

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### Abstract

**Background:** Sleep regulates a huge variety of physical and mental processes sleep plays prime role in cardiovascular health, metabolism, and immune response and against risk for cancer. Change in sleep patterns along with inadequate and poor quality of sleep are common complaints identified among health care workers. It influences their quality of life and productivity. This study evaluates the sleep quality and pattern among health care workers and factors affecting the quality of sleep among them.

**Materials and Methods:** A health care centre based cross-sectional study was conducted in South Kerala, among medical and paramedical workers. Data was collected from 85 healthcare workers using a semi-structured, pre-tested, pre-designed, interviewer-administered questionnaire where Pittsburg sleep quality index (PSQI) was used to assess the sleep quality and pattern. Data were analyzed using SPSS statistical software, version 26.0 (trial). Qualitative data were summarized using frequency and percentages and Quantitative data using means and standard deviations.

**Results:** According to Global Pittsburg sleep quality index (PSQI) checklist, a majority of 72.9% of the study participants had good sleep in the past one month. It was observed that gender, hours of work, night shifts of duty and hours of sleep were significantly associated with quality of sleep

**Conclusion:** By addressing the various determinants of poor sleep quality and through tackling the underlying health conditions affecting sleep, a considerable improvement in sleep quality can be achieved.

**Keywords:** Pittsburg sleep quality index (PSQI), Medical and Paramedical health care workers, South India

### Introduction

Sleep is a period of rest for the body and mind, during which volition and consciousness are in partial or complete abeyance and the bodily functions partially suspended. A sleep cycle lasts about 90 min, and during that time we move through five stages of sleep. The first four stages makeup our non-rapid eye movement sleep (NREM) and the fifth stage is when rapid eye movement sleep (REM) occurs. NREM sleep constitutes 75-80% of total time spend in sleep, and REM sleep constitutes 20-25%. Obtaining healthy sleep is important for both physical and mental health, improving productivity and overall quality of life. It can be hypothesized that several lifestyle behaviors, environmental and psychological factors were associated with poor sleep quality and quantity<sup>[1]</sup>.

Sleep plays an important role in helping to regulate a huge variety of physical and mental processes. It impacts everything from cardiovascular health and metabolism to our immune response and risk for cancer. Sleep is directly implicated in regulating our mood states and is strongly related to mental health overall. Disturbances in sleep contribute to impairments in cognitive function, neurodegenerative diseases and dementia According to a study conducted in the United States, 70% of the health care workers reported insomnia symptoms<sup>[2]</sup>, whereas Insomnia prevalence was found to be 34% amongst health care workers using Insomnia Severity Index, from a study in India<sup>[3]</sup>.

According to a study conducted in Eastern India a significant proportion of health care workers (52.7%) were found to be poor sleepers. The presence of any addictive habit (adjusted odds ratio [AOR], 1.833; 95% CI, 1.12-2.8, and the presence of Generalized Anxiety Disorder (AOR, 5.57; 95% CI, 2.5-12.4) were found to be predictors of poor sleep quality among them<sup>[4]</sup>.

Health care workers in a tertiary care institution will have to face sudden workload in scenario like Covid19 pandemic. And Sleep quality disorders are very common among them. If not addressed properly and timely, not only it will result in the development of chronic conditions like Type II Diabetes Mellitus, CVS diseases and Depression but also affect the quality of the health care services they provide to patients so the main aim of this study is to assess the sleep quality among health care workers in a tertiary health care centre in South Kerala using Pittsburgh sleep quality index and determine the factors affecting the quality of sleep among health care workers in a tertiary health care centre in South Kerala.

## Materials and Methods

Institution based cross-sectional study was conducted. The study setting was Dr Somervell Memorial CSI Medical College and Hospital, Karakonam, a tertiary care centre in South Kerala, India

Study was done for a period of 3months from August to October 2022 among the study subject who were Health care workers including doctors, nursing staff and paramedical staff. Only those who gave consent to be a part of the research were included and those with clinically diagnosed sleep disorders, moribund obesity and with underlying metabolic syndromes were excluded from the study.

Sample size was calculated using the formula  $N = ((Z\alpha/2)^2 * p*)/d^2$  and after adding 10% nonrespondents, a total of 85 participants were included in the study. Non probability sampling method was used and the participants were selected purposively. Study was done only after obtaining approval from Institutional Ethics Committee, and Medical Superintendent. For the data collection, a pre-designed pretested semi-structured questionnaire with five sections dealing with Socio-demographic variables of the study participants, Nature of occupation of the study participants, Sleep related details of the study participant, Health related details of the study participants and Pittsburgh Sleep Quality Index was used<sup>[5]</sup>.

The Pittsburg sleep quality index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates poor and good sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and day time dysfunction over the last month. And the sleep was categorized based on the total score. With Score 0- very good, Score 1-fairly good, Score 2- fairly bad and Score 3 - very bad<sup>[5]</sup>. Data were collected by doing face to face interview method after obtaining written informed consent. It were entered into Microsoft Excel Sheet and analyzed using IBM SPSS Statistics trial version 26. Qualitative data were expressed using frequency and percentage. Quantitative data were expressed in means and standard deviations.

## Results

### Socio-demographic profile & occupation related details of the study participants

The Mean age of the study participants were observed to be 36.66±8.179 yrs. Majority of the health care workers who participated in the study were female (76%) and the rest were males (24%). Majority of the study participants belongs to nuclear family (82%), rest to extended family (18%) and no one belongs to joint family. More than half (54.11%) of the study participants were staff nurses and rest

were doctors (36.47%) and Paramedical workers (9.4%). They were working in various places within the hospital. Distribution of the study participants based on place of work is given in Table no: 1.

Mean working hours of study participant were 7.45± 1.468 hours. And (61%) of these study participants responded that they had night shifts in their duty schedule. On an average they worked for around 10±2 hours per night shift. Only 17.6% reported that they had more than 4 night shifts per month.

Majority of the study participants (89%) work for 9-12 hours per night shift.

### Sleep related details of the study participants

57.6% had on an average 6-8hrs sleep at night daily, 37.6% had less than 6hrs of sleep and the rest had more than 8hrs sleep at night daily. 55% of the study participants reported post sleep fatigue or tiredness. And 38 out of the total 85 participants reported disturbed sleep. Environmental disturbances (60.5%), Nightmares (15.8%), Caretaking of others (18.4%), Breathing difficulty (5.3%) were quoted as the reasons for disturbed sleep. The participants were asked to rate the overall quality of their sleep into fairly bad, fairly good and very good. 12.9% rated the quality of their sleep as fairly bad while 28.2% gave very good rating for quality of their sleep.

### Sleep quality assessment using PSQI checklist

Sleep quality of study participants is assessed based on PSQI checklist. Sleep related details during the past month are included. In PSQI checklist there are total of nine questions. First four questions are open ended. Fifth to ninth are graded questions. Fifth question has ten sub questions. These questions are regrouped into seven components and scores are allotted. Adding the total scores from all components together gives the global PSQI score of the study participants. Figure 1 shows the distribution of study participants based on Global PSQI score. Relationship between global PSQI scores and sociodemographic, occupation and sleep related variables were assessed using Chi Square as the test of significance (table 2). It was observed that gender, hours of work, night shift and hours of sleep were significantly associated with sleep quality ( $p<0.05$ ). Variables including age group, type of family, occupation, place of work and interruption of sleep did not show statistically significant association with sleep quality based on PSQI scores.

## Discussion

In the present study, the proportion of good quality sleep among the health care workers was found to be 72.9%. It is clearly more than the findings from an Iranian study were 56.9% were good sleepers and a study from Northeast India where the prevalence of sleep disturbance was 54% among the participants<sup>[6,7]</sup>.

Another Indian study observed that more than 50% of participants across all age categories reported poor sleep quality with a mean PSQI global score of 6.9±3.19 and in a study by Tanuja Yella the prevalence of poor sleep quality among health care workers were 35.09%<sup>[8,9]</sup>.

In our study the mean age of study participants was found to be 36.66±8.179 years. Similarly the mean age of the participants was 31.6 ± 6 years in one Indian study and the mean age of study participants was 34 ± 5 years in another study from South India<sup>[8,9]</sup>. In the current study, majority (76%) were females whereas in a study from Tripura 51.1% participants were females and 48.9% responders were

males. All the participants were females in the study from Andhra Pradesh [7, 9]. The majority (74.4%) of the study participants lived in a nuclear family in the study by Tanuja Yella similar to results from our study (82%)

Mean working hour of study participants were 7.45±1.468 hours in the present study. But in another Indian study the minimum number of working hours was reported as 8 hours and the maximum as 12 hours. And in this study 61% of these study participants responded that they had night shifts in their duty schedule, which is comparably similar to a study on Effect of Shift Work on Sleep, Health, and Quality of Life of Health-care Workers which was conducted by Evangelia Nena, Maria Katsaouni, and Grigorios Tripsianis in which 71.1% participants were having night shift for 1-2 days/week [10]. In this study 57.6% of the participants had on an average daily 7 to 9 hours of sleep at night whereas in the study from North east India it was 43.7% [7]. A similar study done by Attia-Attia in Egypt found that almost 70% of night workers complained of sleep disorders and most of the study participants complained of insufficient and unsatisfactory sleep [11]. In the current study 38 out of the total 85 participants reported disturbed sleep.

It was observed in the current study that gender, hours of work, night shift and hours of sleep were significantly associated with sleep quality but age group, type of family, occupation, place of work and interruption of sleep did not

show statistically significant association with sleep quality. In a study from Iran, the prevalence of sleep disorders among shift-workers (48%) was significantly higher than day-workers (40%). There was a significant association between sleep quality and age, female gender and shift-working [6].

In a study done in China among healthcare professionals revealed that being a nurse was related to poor sleep quality [12]. In another study from China, it was found that poor sleep quality increased with age, whereas a study conducted by Nag *et al.* in India did not find any association between sleep quality and age [13, 7].

As the study was done in a single tertiary care centre, there may be regional and cultural variations when compared to other populations, thereby limiting the use of this study for comparison in certain areas.

**Table 1:** Distribution of the study participants based on place of work (N=85).

Place of Work	Frequency (N) (Percentage (%))
Casualty	7 (8.2%)
Intensive Care Unit	4 (4.7%)
Lab	11 (12.9%)
Out Patient department	30 (35.3%)
Operation Theatre	8 (9.4%)
Inpatient Ward	25 (29.4%)

**Table 2:** Association between sleep quality related variables of study participants and global PSQI score (N=85).

Socio Demographic Factors		Sleep Quality		Chi Square (x <sup>2</sup> ) value	p-value
		Good	Poor		
Age Group	20-30 Years	4	14	3.774	0.460 (Fisher's Exact)
	31-40 Years	13	34		
	41-50 Years	6	8		
	51-60 Years	0	5		
	61-70 Years	0	1		
Gender	Male	2	18	3.856	0.05
	Female	21	44		
Occupation	Doctor	7	24	0.622	0.742 (Fisher's Exact)
	Nurse	14	32		
	Paramedical	2	6		
Place of Work	Casualty	2	5	2.332	0.845 (Fisher's Exact)
	Intensive care unit	2	2		
	Lab	2	9		
	Out Patient department	7	23		
	Operation Theatre	2	6		
	Ward	8	17		
Hours of work	Less than 8 hours	14	23	3.857	0.043
	8 hours and above	9	39		
Do you have night shift	Yes	18	34	3.875	0.049
	No	5	28		
How many hours do you sleep daily	Less than 6-8 hours	16	16	16.922	0.00 (Fisher's Exact)



**Fig 1:** Classification of sleep quality of the study participants based on the Global PSQI score

**Conclusion**

The current study revealed that majority of the study participants (72.9%) had good quality sleep based on Global PSQI Checklist. But the point to be noted is that 27.1% are not getting good quality sleep. It was observed that gender, hours of work, night shift and hours of sleep are significantly associated with quality of sleep. Exhausting night shift works has a variety of physical and mental health consequences, as well as workplace consequences such as accidents. Poor quality sleep can affect professionalism of the health worker and can result in a negative impact on their communication skills, both with patients and colleagues. Health institution should take an initiative to recruit more staffs, so that the frequency of night shifts will be reduced. Similarly adequate measures to provide psychological support for stress mitigation during work

hours, and implementing measures for facilitating adequate hours of good quality sleep are important steps to prevent consequences of poor quality sleep. All the health care workers should be provided with adequate health awareness session focusing on the need for good adequate sleep in leading a healthy life.

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### Conflict of Interest

Not available

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