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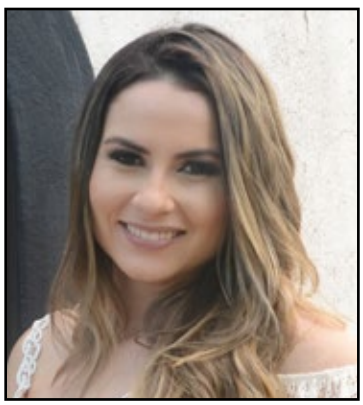

Relationship between work shifts and quality of sleep of nurses: a descriptive study

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ABSTRACT

Aim: to analyze the sleep-wake cycle and the quality of sleep of nurses working in shifts in a university hospital. **Method**: a cross-sectional and descriptive study with a quantitative approach. **Results**: the sleep-wake cycle of a total of 104 nurses with a mean age of 39 years was evaluated through a sleep log diary. To measure sleep quality, we calculated the Pittsburgh Sleep Quality Index (PSQI). The perception of self-reported sleep quality measured by the Visual Analogue Scale (VAS) was 6.79 points on average for daytime sleep and 5.36 points for the group recording night time sleep, with a statistical difference. The group scored an average of 7 points in PSQI. **Conclusion**: the data allowed us to evaluate nurses' sleep as being of poor quality for the nocturnal group. The lack of sports activities and the shift work schedule may have influenced the quality of sleep.

Descriptors: Sleep; Shift Work; Nurses; Circadian Rhythm; Occupational Health.

INTRODUCTION

Sleep, like all physiological functions, follows a circadian rhythm characterized by periods of 24h ± 4h. Environmental stimuli collectively known as "*zeitgebers*", such as light-dark cycles, temperature and, above all, the presence of light, can influence circadian rhythms[1-2]. The absence of light stimulus on the biological clock results in a loss of synchrony between the normal 24-hour sleep rhythm and the light-dark cycle. When individuals are kept in constant darkness and temporal isolation, the biological clock reverts its endogenous periodicity to a free-flowing rhythm, which is generally greater than 24 hours[3].

Shift work is currently a problem for most workers and a huge challenge for occupational health, especially for nursing staff. The practice of night work became common after the Industrial Revolution, in which factories began to operate continuously for 24 hours[4].

Changes in working periods led to increased daytime sleepiness, especially for those who work on a day shift and wake up too early to go to work, and those who work at night and sleep for a few hours or do not sleep at all, due to their work time[5-2].

Nurses constantly deal with the effects of these changes in the sleep-wake cycle, which can lead to an increased risk of work-related accidents and a compromised quality of life[5].

Various studies have shown that nurses who work both during the night and in the day undergo physical and mental changes after performing their service. The research noted poor sleep quality in night shift workers and gastrointestinal problems and stress in daytime workers[5].

Thus, this study aimed to analyze the characteristics of the sleep pattern of nurses who work in the day and/or on night shifts, and to relate the work pattern with their sleep quality.

METHOD

This was a cross-sectional, descriptive and observational study with a quantitative approach.

The research population comprised nurses from both day and night shifts, totalling 104 subjects. Individuals who had been working in the hospital for less than six months were excluded from the study, and also those on sick leave or vacation.

The work regime of the nursing team of the University Hospital Onofre Lopes (HOUL), part of the Federal University of Rio Grande do Norte, consists of six hours daily for the day shift, with one weekly day off, and for the night shift 12 hours of work per 36 hours off.

The instruments used were: a questionnaire for sociodemographic population data, a sleep log diary, the Visual Analogue Scale and the Pittsburgh Sleep Quality Index Questionnaire (PSQI).

The development of the study met national and international standards of research ethics involving human subjects. All the subjects involved signed Informed Consent Terms. The data were collected, in full, in the period between January and September 2015. During this period the nurses recorded the following daily observations about their sleep during a period of seven days: bedtime, sleep time, waking time, sleep latency, total amount of daytime and nocturnal sleep, naps, sleep quality and how they woke up. Subsequently, they responded to the Pittsburgh Sleep Quality Index Questionnaire.

The level of significance was $p<0.05$. We used the non-parametric Mann-Whitney test

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to compare work groups and sleep patterns, and to make the associations in Chi-Square and Spearman's Correlation Test between the PSQI variables and the sleep patterns.

The research data were collected after evaluation and approval of the Research Ethics Committee of the institution under opinion number 751,579, respecting all ethical aspects. In order to ensure the confidentiality of the interviewees' identities, subjects were identified by order of inclusion with a sequential Arabic number preceded by the initials of their full names.

RESULTS

The first stage consisted of the characterization of the population. The final sample comprised 104 nurses, divided into two sectors, as follows: hospital, which corresponded to 65.40% of the sample, and in this, 33.70% were in the day shift and 31.70% in the night shift, and ambulatory, which corresponded to 34.60% of the nurses, 27.90% of the day shift and 6.7% of the night shift.

Female subjects predominated in general (n=94), distributed in the day shift (n=58) and night shift (n=36). When grouped in relation to their age, 73% of the subjects were between 24 and 45 years of age, and, of these, 41.30% belonged to the day shift and 31.70% to the night shift. We observed that, in relation to the marital status of the subjects, 52.90% were married and 32.1% were single.

As for their time in the nursing profession, the subjects were distributed as follows: those who had between 1 and 25 years of experience comprised 80.80% of the sample, and of these 48.10% were currently working a day shift and 32.70% were in the night shift group. Those who had worked between 26 and 48 years corresponded to 19.30% of the sample in the two work shifts. Of the total number of nurses, 55.70% reported having another job. Of the nurses working on a double shift, 26.90% worked on the morning shift and 28.80% on the night shift.

Of the total participants, 76.90% reported the use of stimulants. Of these, 51.90% were in the day shift group and 25% in the night shift group. The preferred time for ingesting stimulants was during the daytime period, totalling 43.30% of respondents. With regard to the intake of medication in general, we noted that 51% of the subjects used some type of drug and of these, 27.90% worked on the day shift and 23.10% on the night shift. In respect of social drink consumption, we observed that 52.90% of the nurses reported no use of alcohol, although the group with most reports of alcohol use was the day shift (35.60%).

No practice of any physical activity was reported by 56.70% of the participants. Comparing the sociodemographic variables between the work shifts, we noted that there was a statistical difference, verified by the Chi-square test, for the following variables: hospitalization and outpatient departments ($p=0.003$) during the day shift, having more than one job ($p=0.002$) on the night shift and use of stimulant drinks ($p=0.021$) for day shift workers. For the average of the sleep pattern variables, when comparing the day shift with the night shift, a statistical difference was observed through the Mann-Whitney test with a value of ($p> = 0.005$), according to Table 1.

Table 2 shows that 39 (60.94%) nurses in the day shift had poor sleep quality while 25 (39.06%) had a good quality score. According to the classification obtained with the PSQI, 34 (85%) night-shift nurses presented poor sleep and only 6 (15%) reported good sleep.

Table 1. Characteristics of nurses' sleep patterns according to their work shifts. Natal / RN, 2016.

Variables	Day		Night		p-value
	Average	Std. Deviation	Average	Std. Dev.	
Nap time (min.)	14.00	15.48	39.16	47.11	**0.003**
Latency of sleep (min.)	27.05	21.29	36.27	24.12	**0.013**
Sleep time (hours)	6.97	1.02	5.97	1.04	**<0.001**
How was feeling after waking up (0-10)	6.61	1.87	5.57	1.76	**0.017**
Night sleep quality (0-10)	6.79	1.93	5.36	1.85	**0.001**

**Mann-Whitney test, p value <0,05.*
Source: Authors' study, 2016.

The Chi-square test showed a statistically significant difference (p=0.0091) between work shifts and PSQI, indicating that the night-shift nurses' population presented poor sleep quality.

In the variables studied, the data showed that there was a significant correlation between sleep quality and sleep pattern variables: sleep latency (p=0.010), total sleep (p=0.002), how the participant felt after waking up (p<0.001) and quality of night sleep (p<0.001).

DISCUSSION

The study's participants included daytime nurses who worked in the morning or afternoon with hours from 7:00 a.m. to 1:00 p.m. or from 1:00 p.m. to 7:00 p.m., respectively, and those working at night had hours from 7:00 p.m. to 7:00 a.m. of the following day. With regard to gender, there was a predominance of women. Other studies also highlighted the predominance of women in the practice of nursing. This can be explained by the fact that, even today, modern women make their professional choice influenced by family and social history, which reflects their socializa-

Table 2. Association of work shifts and sleep quality (PSQI). Natal / RN, 2016

Variable	PSQI reports				p-value*
	Good		Poor		
	n	%	n	%	
Shift					
Day	25	39.06	39	60.94	**0.0091**
Night	6	15.00	34	**85.00**	

**p-value obtained through chi-square test.*
Source: Authors' study, 2016.

Table 3. Correlation between the PSQI sleep quality score and the Sleep log diary standard variables. Natal / RN, 2016

Variables	Latency	Sleep total	How was feeling on waking up	Night sleep quality
PSQI score	0.2506*	-0.2950*	-0.4564*	-0.4276*
p-value	**0.0103**	**0.0024**	**< 0.0001**	**< 0.0001**

** Spearman's correlation coefficient*
Source: Authors' study, 2016.

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tion to play the female roles, as in the case of nursing[6-7].

When grouped according to the individual's age, 73% of the subjects were in the 24–45 years of age range. Another study also showed that the nurses' age group consisted predominantly of adults between 20 and 49 years of age, a result similar to the findings of this research[6].

We observed that, in general, the nurses had poor sleep quality when measured by PSQI, both for the daytime and night time groups. Some studies have correlated shift work with changes in sleep habits in nursing professionals, indicating that night work may impair their sleep quality[3-6].

In a study of 1,360 nurses, it was observed that those who worked the night shifts or in alternated shifts with night-time prevalence presented poor quality sleep when compared to those who worked only during the daytime[6-8].

Another study, conducted in northern Norway with 1,968 nurses, showed an association between night work and poor sleep quality. These data corroborate the results found in the present study, in which similar results were observed for both groups of nurses' work shifts[9].

Research studies with pediatric nurses, using the PSQI, showed that nurses of the night shift presented poorer sleep quality when compared to daytime workers, as also mentioned in other studies[10-11].

After correlating the total PSQI score of the nurses studied, we observed a poor quality of night sleep with a significant tendency (r=-0.4276, p=0.009), explained by the act of taking naps during the day.

Normally, naps last 15 to 60 minutes and can occur several times a day. However, when nurses increase the frequency or duration of naps, this may interfere with their night time sleep, as described in another study in which night-shift nurses slept in naps, on average, 39.16 minutes during the day, causing impairment of the quality and duration of sleep at night[12, 13, 14].

The results showed that the total sleep time of the nurses of day shift was greater when compared to the time of the night shift group. Chrono-biological and physiological factors, such as increased secretion of cortisol, reduction of melatonin and increase in central temperature in the morning, do not favor the sleep pattern of those who work at night, hindering and consequently reducing their total sleep time[15].

Total sleep time (TST) comprised the period between the time that the subject slept at night until the time that they woke up the next morning. An adult requires an average of 7 to 8 hours of sleep per day. In this study, nurses in the daytime group were considered normal, with 6.97 hours being their average total sleep time. The night-shift nurses presented less sleep hours, resulting in an average considered below the ideal[16].

In a comparative study between the day and night shift groups, this difference was evident, and concluded that the stages of daytime sleep are not the same as night sleep[15-16]. The correlations between PSQI and the sleep log diary variables demonstrated poor sleep quality, with a longer sleep latency period and shorter sleep time compared to the day shift group, which demonstrated good sleep quality[17-18].

CONCLUSION

The data allowed us to conclude that nurses' sleep was of poor quality in the night

shift group, and also demonstrated changes in all sleep pattern variables with statistical differences. The lack of sports activities and the shift work schedule may have influenced the quality of sleep. We conclude, then, that night work can have a negative impact on workers' health.

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