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Sleep analysis in emergency nurses' department

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SUMMARY

Shift work increases the risk of suffering physiological and psychological alterations, due to the sleep disorders that it usually produces in the staff with this type of workday.

OBJECTIVE: Analyze the influence of shift work on sleep quality in the nursing staff of the emergency department of the University Hospital of Leon.

METHODS: A total of 70 emergency department nurses aged between 24–56 years were divided into two groups (rotating shift and fixed morning or afternoon shift). The Pittsburgh sleep quality index was used for this purpose. In order to establish differences between the two groups, a bivariate analysis was performed using the χ^2 test.

RESULTS: The results showed that both groups had "rather poor" subjective sleep quality, with scores of 8.5 for fixed shift *versus*. 6.3 for a rotating shift. The group of nurses' rotating shifts slept an average of 5.39 hours compared to 7.47 hours for a fixed shift. Significant differences were found in sleep latency, sleep disturbances, and the use of sleep medication, with more negative results for the rotating shift.

CONCLUSIONS: Rotating shift produces a poor quality of sleep compared to a fixed morning or afternoon shift, and it would be interesting for the center itself to establish sleep improvement and sleep hygiene programs.

KEYWORDS: Sleep wake disorders. Nursing. Emergencies. Health.

INTRODUCTION

Human beings live in constant change, experiencing variations in both psychological and physiological functions daily, with sleep quality being an essential element in this. The concept of sleep quality is a complex construct to define, made up of quantitative and qualitative factors[1].

Chronobiology is the science that deals with the study of biological phenomena expressed in a rhythmic pattern[2]. Three variants of chronotypes have been established based on preferences in the performance of daily tasks, in this sense, we distinguish between morning (refers to people who prefer to sleep early and get up early without difficulty, being already at that time perfectly fit for work and showing a good level of alertness, physical and mental performance in the morning)[3]; evening (people who prefer to sleep and wake up late, with better mood and performance in the afternoon and early evening); and indifferent (people who prefer to sleep and wake up late, with better mood and performance in the afternoon and early evening). Finally, the indifferent, typical of individuals with greater flexibility, who choose intermediate schedules according to the needs of their routine and the undifferentiated[4].

If we focus on the work performed by the nursing staff, we can observe how it is carried out continuously, without interruptions, being able to affirm that the work schedule is twenty-four hours throughout the year[5]. This leads to a fragmented schedule in different shifts within the specialized care centers.

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The rotating shift, developed by the nursing profession, alters the natural rhythms of the organism, which leads to a series of negative consequences for the health of professionals. It is in this sense where the alteration of the natural sleep pattern, family reconciliation problems, stress, and anxiety can be appreciated[6].

The National Institute of Safety and Hygiene at Work reflects that rotating shift has negative effects on the quality and/or quantity of sleep for workers, causing, among others, feelings of drowsiness, tiredness and can affect work performance, increasing the risk of accidents due to fatigue[7].

It has been described how the quality perceived by nurses is poor, where the average number of hours of sleep is between 5.5–7[8]. There are various tools for assessing the quality and perception of sleep, the Pittsburgh Sleep Quality Index Questionnaire being the most widely used worldwide (PSQI)[9]. It is a questionnaire of 19 items that allows the assessment of sleep quality. On the other hand, after obtaining the total score, each subject is given a score ranging from 21 points, with scores above five being considered as poor sleep quality.

The work carried out in the hospital emergency department requires continuous patient care 24 hours a day. For this reason, there is a staff working on rotating shifts, fixed morning shifts and night shifts. It is an area of continuous entry and exit of patients. In this sense, it is important to point out that the work role developed in this service implies a continuous alertness[10].

The workload of this staff is higher than in other services, where workers refer to "the amount of work I have", they receive a greater "burden of responsibility", "rushing and being overwhelmed due to lack of time to do my job" and "stress" according to the perceived quality assessment[11]. Another aspect that may lead to reflection is the perception that their work has moderate negative consequences for their health[12].

All professionals often have to face complicated decisions, which have ethical implications in the practice of care. In this sense, nursing has become a special type of staff, a risk team because it involves personal, professional, and institutional factors that are potential causes of sleep disturbances[13].

According to all of the information presented, this study aims to analyze the quality and pattern of nurses' sleep in the emergency department and to determine whether there are significant differences between the pressures, depending on the shift they work.

METHODS

A descriptive, observational and cross-sectional study was carried out. The data extracted in this study were obtained from February–September 2020. A total of 70 nurses from the emergency department of the University Hospital of Leon (CAULE), aged between 24 and 56 years, participated in the study. The sample was divided into two groups: fixed mornings or afternoons (28 nurses) and rotating (42 nurses).

The inclusion criteria established were: to be active in the emergency department during the time established for data collection, not to have been on sick leave in the last month and to have been in the department for at least 15 days before the study.

All participants gave written informed consent. On the other hand, the study followed the guidelines for observational studies in epidemiology (STROBE), and the project was approved by the Clinical Research Ethics Committee of the Hospital of León, receiving the favorable opinion of this Committee with the number 19181: Chronobiology and sleep disorders concerning shift work in the nursing staff of the University Hospital of Leon.

The instrument used to assess the sleep quality of the nurses was the Pittsburgh Sleep Quality Index[8], Spanish version[14]. It is a questionnaire of 24 questions that allows the assessment of seven components (efficacy of regular sleep, sleep latency, total sleep duration, sleep quality, use of sleep medication, daytime dysfunction, and sleep disturbance), 19 of them provide the final score[13]. On the other hand, the morning and evening sleepiness of the participants was analyzed using the Adam and Almirall questionnaire[15].

Data collection was carried out by a single responsible researcher to provide all participants with the same instructions for completing the questionnaires. First of all, we had the approval of the nursing management of the CAULE, and then we informed the supervisor's unit on the aim and purpose of the study.

Statistical analyses were analyzed using the SPSS v 22.0 statistical package (Inc., Chicago, IL, USA) for Windows, setting the level of significance at $p<0.05$.

Descriptive data were presented as mean values, quantitative variables of standard deviation (SD) and qualitative variables of percentages, and frequencies. To establish the differences between the different work shifts, the χ^2 (chi-square) test was performed, setting the significance level at $p<0.05$.

When analyzing the reasons for having had problems sleeping in the last month and based on the fact that it was an open-ended question, the ATLAS ti v.9 program was used, allowing us to analyze large volumes of text by segmenting the different quotes.

RESULTS

If we consider the sex of the sample, we can see that 57 (81.4%) of the sample were women compa red to 13 (18.6%) men. With an average age of 35±2.31 years and an experience of 9.9±3.64 years in the emergency department.

As for the Pittsburg sleep quality index, it was 6.3±1.82 for the fixed morning or afternoon shift and 8.5±2.36 for the rotating shifts, showing this as both groups perceive poor sleep quality by showing values above five as established by the index used (scores ≥5 are considered poor sleepers as established by the index).

When assessing the different components of the Pittsburg sleep quality index, significant differences were observed between the two groups in different components such as sleep quality (χ^2=28.1; p=0.006; R^2=0.12), duration of sleep (χ^2=31.2; p=0.032; R^2=0.16), the efficacy of regular sleep (χ^2=11.3; p=0.048; R^2=0.21) and medication use (χ^2=10.8; p=0.021; R^2=0.13) (Table 1), showing these values as the perception of sleep is of worse quality in rotating shift nurses.

If we analyze the different factors that make it difficult for staff to sleep, we can see that there are significant differences in four of the items evaluated, with the most negative results for the rotating shifts, with the following data: not sleeping in the first half-hour (χ^2=6.32; p=0.045; R^2=0.78); waking up during the night or early morning (χ^2=5.36; p=0.034; R^2=0.23) and sleep disturbances (χ^2=4.23; p=0.031; R^2=0.36) (Table 2).

Table 1. Descriptive data of the PSQI according to the components analyzed.

	Very good (%)	Good (%)	Bad (%)	Quite bad (%)	χ^2	gL	p	Effect size R2
Subjective sleep quality								
Rotating shift	12.4	16.3	42.6	28.7	28.1	4	0.006	0.12
Fixed shift	29.6	38.3	18.9	13.2				
Sleep latency								
Rotating shift	7.9	32.1	14.6	22.6	11.5	4	0.531	0.02
Fixed shift	22.6	62.9	7.1	7.4				
Sleeping duration								
	>7 hours	6–7 hours	5–6 hours	<5 hours				
Rotating shift	11.2	23	63.2	2.6	31.2	4	0.032	0.16
Fixed shift	15.9	42.1	35.2	6.8				
Efficacy of regular sleep								
	>85	75–84	65–74	+65				
Rotating shift	2.2	26.3	2.3	51.2	11.3	4	0.048	0.21
Fixed shift	60.9	18.1	16.2	4.8				
	Never	Less than once a week	Once or twice a week	Three or more times a week	χ^2	gL	p	Effect size: R2
Sleep disturbances								
Rotating shift	9.4	46.2	18.2	26.2	9.3	4	0.571	0.16
Fixed shift	12.3	51.2	10.3	26.2				
Use of sleep medications								
Rotating shift	18.1	37.1	36.2	8.6	10.8	4	0.021	0.13
Fixed shift	26.7	53.8	16.1	3.4				
Daytime dysfunction								
Rotating shift	15.2	46.2	21.4	17.2	29.5	4	0.054	0.31
Fixed shift	26.5	56.8	9.6	7.1				
	Rotating shift				Fixed shift			
Total PSQI	6.3				8.5			

χ^2: chi-square; gL: degrees of freedom; p: signification; PSQI: Pittsburgh sleep quality index.

Table 2. Sleeping problems.

	Rotating shift				Fixed shift				χ^2	gL	p	Effect size: R2
	None in the last month (%)	Less than once a week (%)	Once or twice a week (%)	Three or more times a week (%)	None in the last month (%)	Less than once a week (%)	Once or twice a week (%)	Three or more times a week (%)				
Causes of sleep problems												
Not sleeping in the first half hour	17.1	30.5	36.2	16.2	36.2	37.2	18.5	8.1	6.32	4	0.045	0.78
Waking up during the night or in the early morning hours	24	18.9	42.1	14.9	22.8	36.1	26.1	15	5.36	4	0.034	0.23
Getting up to go to the toilet	26.7	6.3	65.8	1.2	35.1	11.3	52.3	1.3	3.26	4	0.564	0.57
Sleep disturbances	16.4	4.6	78.4	0.6	22.1	6.8	69.7	1.4	4.23	4	0.031	0.36
Unable to breathe properly	98.1	1.9	–	–	99.3	0.7	–	–	6.12	4	0.654	0.65
Coughing or snoring noisily	1.5	26.9	26.4	45.2	2.4	10.4	36.2	51	5.21	4	0.647	0.87
Feeling cold	3.2	78.6	18.2	–	55.2	16.4	26.1	2.3	4.32	4	0.612	0.81
Feeling too warm	25.5	26.2	48.3	–	24.3	22.3	53.4	–	6.21	4	0.712	0.78
Having nightmares	78.3	12.3	6.4	3	81.2	16.2	2.6	–	4.23	4	0.654	0.64
Suffering pain	89.5	9.3	1.2	–	72.4	27.6	–	–	6.2	4	0.611	0.54
Medication use in the last month												
Drowsiness while driving in the last month	23.9	36.4	26.3	13.4	64.3	28.2	7.5	–	3.4	4	0.036	0.32

χ^2: Chi-square; gL: degrees of freedom; p: signification.

As for the most common open-ended responses expressed by the study participants when it comes to being able to sleep, we found the following: "worry about the work situation", "increased workload", "tachycardia", and "chest tightness".

When analyzing the morning and evening routine of the nurses in the service through the Adam and Almirall questionnaire, 78.4% of the sample is "very tired" during the first half-hour after getting up in the morning. As for the time of night when they are most tired and feel the need to sleep, the rotating shift shows that it is after one am when they have this need, compared to the group of workers on fixed shifts who express this need at 11 pm. There are also differences in the time at which the staff feel better during the day, with 9 am being the time for the fixed shift workers and midnight for the rotating shift.

Finally, when asked whether they consider themselves to be morning or afternoon commuters, both groups consider themselves to be "more morning than afternoon".

DISCUSSION

Sleep problems among shift nurses have been increasingly recognized as an important problem at both individual and organizational levels. The results obtained show that nurses have a poor perception of sleep quality regardless of the shift they work. Both the groups, rotating shift and fixed shift workers obtained total scores in the Pittsburg sleep quality index of more than five, a value that shows that both groups are considered to be poor sleepers. Data very similar to those obtained in the work developed by Galera and Lopez[16] where they analyzed a sample of nurses and nursing assistants who work 8-hour shifts versus others who work 12-hour shifts, showing how the values obtained in the total score of the Pittsburg sleep quality index were 8.3 hours vs. 6.3 hours. In this same sense, our data are in line with what was analyzed in the work of Medina and Sierra[17] where they show how rotating shifts have a poorer perception of sleep quality regardless of the work performed. On the contrary, those who work with fixed and conventional shifts have total scores below five[17].

If we focus on the service, we can see that the total score obtained by the rotating shift is 8.5, a number higher than what was found by Rodriguez and colleagues[18], who obtained a score of 7.8 where most of the sample belonged to the emergency department, intensive care unit and internal medicine. Despite these results, it is important to point out that few studies deal exclusively with the quality of sleep of emergency staff, since most of the existing studies analyze nursing staff as a whole.

Regarding the components of the Pittsburg sleep quality index, significant differences were found in the quality of sleep, duration of sleep, use of sleep medication, and frequent sleep efficacy. These components coincide with those found in the study by Galera and López[16], where the same was found, except for habitual efficacy where no significant difference was found. It has also been pointed out in several studies that sleep quality, duration of sleep, and use of medication are the most altered components in rotating shifts[11,19,20].

One of the aspects, where we found significant differences between both groups, is in the difficulty that rotating shifts have in falling asleep in the first half-hour (χ^2=6.32; p=0.045; R^2=0.78), an aspect that was analyzed in the work of Sun and collaborators[20], where they analyzed various effective interventions to improve the sleep patterns of shift nurses and the quality of sleep in order to improve their health (15–30 minute nap breaks, social support and an adequate working environment).

Finally, it is important to point out that the sample indicates to be more alert in the evening, being this a factor that influences sleep disturbances when working shifts, so it would be of great interest to establish measures to improve the quality of sleep[21].

CONCLUSIONS

The nursing staff perceives a poor quality of sleep, a factor that is aggravated in workers who have a rotating shift, where it is appreciated how the hours of rest and problems and/or difficulties in falling asleep are greater. This may be due to the fact that the human being usually follows a routine operation, which in shift nurses is altered, resulting in a constant change of schedules of daily life, and consequently in the habits and schedules of rest.

For all these reasons, it is essential for health care managers to consider improvements in shifts, as well as the development of programs to improve the sleep of their health care staff.

AUTHORS' CONTRIBUTION

CJG: Conceptualization, Data curation, Formal Analysis.
MPC: Conceptualization, Data curation, Formal Analysis.
NFM: Conceptualization, Data curation, Formal Analysis.

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