


REPERCUSSIONS OF NIGHT SHIFT WORK ON NURSING PROFESSIONALS' HEALTH AND SLEEP QUALITY

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ABSTRACT

Objective: to analyze the association between sleep quality, health symptoms and the physical, psychological and social effects of work in Nursing professionals working the night shift.

Method: a cross-sectional study conducted with Nursing professionals working the night shift of a hospital institution. The instruments used were a socio-occupational and health symptoms questionnaire, the Assessment Scale for Work-Related Harms, and the Pittsburgh Sleep Quality Index. Data were collected between September 2017 and April 2018. The analysis was performed by means of descriptive and analytical statistics.

Results: a total of 139 workers took part in the study and a statistical difference was identified between poor sleep quality and the female gender and physical illness variables and health symptoms such as appetite disorder, sensation of indigestion, flatulence, insomnia, difficulty concentrating, unhappiness, sensation of decreased self-esteem and mood lability.

Conclusion: it was verified that Nursing professionals working the night shift experienced poor sleep quality, and that this relationship exerts an impact on physical, psychological and social health. Interventions targeted at raising awareness about sleep hygiene can promote better outcomes in these individuals' health.

DESCRIPTORS: Work in shifts. Night shift work. Sleep. Health. Worker's health. Nursing.

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REPERCUSSÕES DO TRABALHO NOTURNO NA QUALIDADE DO SONO E SAÚDE DE TRABALHADORES DE ENFERMAGEM

RESUMO

Objetivo: analisar a associação entre a qualidade do sono, sintomas de saúde e os efeitos físicos, psicológicos e sociais do trabalho em trabalhadores de enfermagem que atuavam no turno noturno.

Método: estudo transversal, realizado com trabalhadores de enfermagem que atuavam em instituição hospitalar no turno noturno. Utilizaram-se como instrumentos questionário sociolaboral e de sintomas de saúde, Escala de Avaliação dos Danos Relacionados ao Trabalho e o Índice de Qualidade do Sono de Pittsburgh. Os dados foram coletados entre setembro de 2017 e abril de 2018. A análise foi realizada por meio da estatística descritiva e analítica.

Resultados: participaram 139 trabalhadores e identificou-se diferença estatística entre qualidade do sono ruim e as variáveis sexo feminino, adoecimento físico e sintomas de saúde como distúrbio de apetite, sensação de má digestão, flatulência, insônia, dificuldade de concentração, infelicidade, sensação de diminuição autoestima e labilidade de humor.

Conclusão: constatou-se que os trabalhadores de enfermagem que atuavam no turno noturno experimentavam qualidade do sono ruim, e essa relação impacta na saúde física, psicológica e social. Intervenções visando à conscientização sobre a higiene do sono podem promover melhores resultados na saúde dessas pessoas.

DESCRITORES: Trabalho em turnos. Trabalho noturno. Sono. Saúde. Saúde do Trabalhador. Enfermagem.

REPERCUSIONES DEL TRABAJO NOCTURNO EN LA CALIDAD DEL SUEÑO Y LA SALUD DE PROFESIONALES DE ENFERMERÍA

RESUMEN

Objetivo: analizar la asociación entre la calidad del sueño, síntomas de salud y los efectos físicos, psicológicos y sociales del trabajo en profesionales de Enfermería que se desempeñaban en el turno nocturno.

Método: estudio transversal, realizado con trabajadores de Enfermería que se desempeñaban en el turno nocturno de una institución hospitalaria. Se utilizaron los siguientes instrumentos: un cuestionario sociolaboral y de síntomas de salud, la Escala de Evaluación de los Daños Relacionados al Trabajo y el Índice de Calidad del Sueño de Pittsburgh. Los datos se recopilaron entre septiembre de 2017 y abril de 2018. El análisis se realizó por medio de la estadística descriptiva y analítica.

Resultados: se contó con la participación de 139 trabajadores y se identificó una diferencia estadística entre calidad de sueño deficiente y las variables sexo femenino y padecimiento físico, síntomas de salud como trastornos del apetito, sensación de indigestión, flatulencia, insomnio, dificultad para concentrarse, desdicha, sensación de disminución de la autoestima y labilidad en el estado de ánimo.

Conclusión: se verificó que los trabajadores de Enfermería que se desempeñaban en el turno nocturno presentaron calidad de sueño deficiente, y esa relación afecta la salud física, psicológica y social. Intervenciones con el objetivo de generar conciencia sobre la higiene del sueño pueden promover mejores resultados en la salud de estas personas.

DESCRIPTORES: Trabajo en turnos. Trabajo nocturno. Sueño. Salud. Salud laboral. Enfermería.

INTRODUCTION

The need for continuous assistance demanded organizing the Nursing work in shifts. Work in shifts can encompass any work schedule that deviates from the traditional day shift and is usually categorized with fixed morning, afternoon, evening or rotating shifts, requiring the professionals to work at times when sleep normally occurs¹. A number of studies point to the physical², psychological and social illness³ of Nursing professionals who work in shifts.

When it comes to the night shift, diverse evidence signals a relationship with altered body weight⁴⁻⁵, increased chance of developing breast cancer⁶ and consequences in sleep quality⁷⁻⁸, as well as short sleep duration.

Short sleep duration is due to insufficient rest and inversion of the sleep and wake schedules, causing an imbalance between the endogenous circadian rhythm and the working hours. This causes adverse consequences that affect the professionals' health, as the workers try to sleep at a time when their biology is prepared to be active and alert (morning or afternoon)^{1,9-10}.

Sleep influences physiological functions, such as the immune system, body metabolism, hormone balance, mental and emotional health, and learning and memory processes. Changes in sleep quality can cause fatigue, difficulties concentrating and in attention and memory, mood lability, physical and psychosocial illness, and risk for work-related accidents¹¹.

In addition, a study that evaluated sleep, quality of life and mood in Nursing professionals evidenced low scores in the social aspect of night shift workers when compared to day shift workers⁸, which can be a response to decreased social interaction.

These situations indicate the need to deepen the studies about this work shift and variables that may alter workers' health since, although there are publications about this topic^{4-5,12-13}, no studies associating sleep quality, self-reported health symptoms and the physical, psychological and social effects on Nursing professionals working the night shift have been identified to the present day.

Thus, the following research question is formulated: Which is the relationship between sleep quality, health symptoms and the physical, psychological and social effects of work on Nursing professionals working the night shift? This study aims at analyzing the association between sleep quality, health symptoms and the physical, psychological and social effects of work on Nursing professionals working the night shift.

METHOD

A cross-sectional study conducted in a teaching hospital that serves patients exclusively through the Unified Health System. Located in the state of Rio Grande do Sul, it has 403 inpatient beds and the work process takes place during the day shifts (from 7 am to 1 pm; and from 1 pm to 7 pm) and the night shift (from 7 pm to 7 pm). Regarding the work regime, workers governed by *Empresa Brasileira de Serviços Hospitalares* (Brazilian Hospital Services Company) have a regular working day: 8 daily hours and/or a special regime: 12 consecutive hours for 36 rest hours, totaling 36 hours a week¹⁴; and those governed by the Single Legal Regime enjoy a flexible workday, totaling 30 hours a week.

Data collection took place between September 2017 and April 2018, individually and at the workplace, and a five-day period was established for returning the completed questionnaires. The sectors were the following: medical clinic, nephrology, adult and pediatric emergency room, adult and pediatric intensive care unit, pediatric inpatient unit, tocogynecological unit, obstetric center, surgical center, anesthesia recovery room, and treatment center for children with cancer.

The population at the time of data collection was 960 Nursing professionals (333 nurses, 500 nursing technicians, and 127 nursing assistants), working the day and night shifts. The following inclusion criteria were defined: being a nurse, nursing technician or assistant, and providing direct assistance to the users. The exclusion criteria were as follows: being on leave or distanced from work in any way during the data collection period.

Sample size calculation was stratified by professional category (nurse, nursing technician, and nursing assistant), using a 95% confidence level and a 5% sampling error, which produced a minimum sample size of 277 Nursing professionals. The following was obtained when verifying the proportion of each professional category in the population: 35% nurses, 52% nursing technicians and 13% nursing assistants. For this study, it was decided to analyze the data referring to the workers who were working the night shift during the data collection period.

The data collection instrument chosen was a socio-occupational questionnaire with closed questions (age, gender, children, marital status, health treatment, medication use, practice of physical activity, use of free time for leisure, position in the institution, time working in the sector, other job, work shift, choice of work shift, involvement with work-related accidents, absence from work due to illness) and on health-related aspects, assessing symptoms (appetite disorder, sensation of indigestion, heartburn or burning sensation, weight gain, irritability, insomnia, headaches, difficulty concentrating, feeling of depression or unhappiness, sensation of decreased self-esteem and mood lability, understood as involuntary emotional swings)¹⁵. The options were dichotomized into one or more times/week and not once/week.

To assess the harms, the validated Assessment Scale for Work-Related Harms (*Escala de Avaliação dos Danos Relacionados ao Trabalho*, EADRT) was used, and data analysis was performed from the overall mean values of the factors (physical, psychological and social harms). Physical harms is defined as pain in the body and biological disorders; psychological harms, as negative feelings about oneself and life in general; and social harms, as isolation and difficulty in family and social relationships¹⁶.

The evaluation can be classified in levels: bearable (below 1.9), which produces pleasure at work; critical (between 2.0 and 3.0), which points to a borderline situation, indicating distress at work and signaling a state of alert; severe (between 3.1 and 4.0), which produces distress and indicates a significant risk of illness; and presence of occupational diseases (above 4.1). Illness can be considered when there is a classification at the critical level; therefore, this classification was grouped into non-illness (bearable) and illness (critical, severe, and presence of occupational diseases)¹⁶.

Pittsburgh Sleep Quality Index, in its version validated for Brazilian Portuguese (PSQI-BR), was used to assess sleep quality. Its overall score can vary from 0 to 21 points, with the following classification: good sleep quality (≤ 4), poor sleep quality (5-10), and presence of sleep disorder (≥ 11)¹⁷. The variable was categorized into "good" (≤ 4) and "poor" (≥ 5 points) sleep quality, as previously verified¹⁸⁻¹⁹.

The data were double typed into *Excel for Windows/7 (Microsoft Office 2007)* and statistically analyzed with the aid of *Predictive Analytics Software*, from SPSS, version 18.0. The categorical variables are presented by means of absolute (N) and relative (%) frequencies and the quantitative variables, by using mean values and standard deviations. The Chi-square test was used for the associations between the categorical variables, considering a 5% significance level ($p < 0.05$); in cases where a global association was found, the adjusted residuals were calculated.

The ethical aspects of research with human beings set forth by the National Health Council were respected, with approval by the Research Ethics Committee.

RESULTS

Among the 139 Nursing professionals who participated in the study, 29.5% (n=41) were nurses; 54.7% (n=76), nursing technicians; and 15.8% (n=22), nursing assistants. The workers' mean age was 42.6 years old (SD±9.47) (minimum: 23; maximum: 69 years old) and the mean working time in the sector was 9.7 years (SD±8.12) (minimum: 5 years; maximum: 38 years).

There was predominance of female workers (86.3%; n=120), with a partner (82.7%; n=115) and with children (79.9%; n=111). Most of the workers (92.8%; n=129), chose to work in the night shift and 19.4% (n=27) had another job. A percentage of 35.3% (n=49) corresponded to accident victims, and 18% (n=25) had been away from work due to illness in the six months prior to collection.

In relation to health, 29.5% (n=41) of the workers were undergoing some health treatment and 40.3% (n=53) were taking medications; 50.4% (n=70) reported practicing physical activity and 93.5% (n=130) used their free time for leisure one or more times a week. The "sensation of decreased self-esteem" symptom presented the highest percentage for the "not once during the week" frequency (60.4%; n=84). A percentage above 50% corresponds to those who report presenting the health symptoms described below (Figure 1) with a frequency of one or more times a week.

There was predominance of poor sleep quality in the workers (80.6%, n=112) and a mean of 2.19 (SD±1.18) for physical harms, corresponding to the "critical" classification. A significant association was verified between sleep quality, health symptoms and physical, psychological and social illness (Table 1).

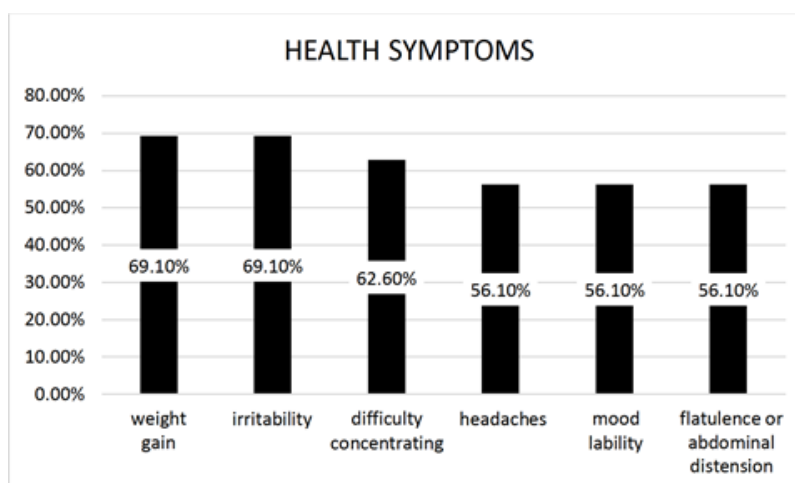


Figure 1 – Prevalence of the health symptoms presented by night shift Nursing workers. Santa Maria, RS, Brazil, 2018. (n=139).

Table 1 – Sleep quality, health symptoms and physical, psychological and social illness presented by night shift Nursing workers. Santa Maria, RS, Brazil, 2018. (n=139).

Health symptoms	Illness						Sleep quality			
	Physical		Psychological		Social		Good	Poor		
	n (%)	p	n (%)	p	n (%)	p	n (%)	n (%)	p	
Appetite disorder										
One or more times/week	43 (54.4)	<0.001*	19 (59.4)	0.012*	20 (52.6)	0.069	3 (11.1)	53 (47.3)	0.001*	
Not once during the week	36 (45.6)		13 (40.6)		18 (47.4)		24 (88.9)	59 (52.7)		

Table 1 – Cont.

Health symptoms	Illness						Sleep quality		
	Physical		Psychological		Social		Good	Poor	
	n (%)	p	n (%)	p	n (%)	p	n (%)	n (%)	p
Sensation of indigestion									
One or more times/week	53 (67.1)	<0.001*	20 (62.5)	0.065	22 (57.9)	0.161	7 (74.1)	60 (53.6)	0.010*
Not once during the week	26 (32.9)		12 (37.5)		16 (42.1)		20 (25.9)	52 (46.4)	
Heartburn or burning sensation									
One or more times/week	40 (50.6)	0.004*	18 (56.3)	0.036*	23 (60.5)	0.003*	7 (74.1)	49 (43.8)	0.0903
Not once during the week	39 (49.4)		14 (43.8)		15 (39.5)		20 (25.9)	63 (56.2)	
Flatulence/ Abdominal distension									
One or more times/week	56 (70.9)	<0.001*	22 (68.8)	0.101	20 (52.6)	0.612	9 (33.3)	69 (61.6)	0.008*
Not once during the week	23 (29.1)		10 (31.3)		18 (47.4)		18 (66.7)	43 (38.4)	
Weight gain									
One or more times/week	58 (73.4)	0.203	27 (84.4)	0.033*	30 (78.9)	0.122	15 (55.6)	81 (72.3)	0.091
Not once during the week	21 (26.6)		5 (15.6)		8 (21.1)		12 (44.4)	31 (27.7)	
Irritability									
One or more times/week	65 (82.3)	<0.001*	30 (93.8)	0.001*	37 (97.4)	<0.001*	15 (55.6)	81 (72.3)	0.091
Not once during the week	14 (17.7)		2 (6.3)		1 (2.6)		12 (44.4)	31 (27.7)	
Insomnia									
One or more times/week	45 (57.0)	0.006*	20 (62.5)	0.042*	23 (60.5)	0.046*	5 (18.5)	60 (53.6)	0.001*
Not once during the week	34 (43.0)		12 (37.5)		15 (39.5)		22 (81.5)	52 (46.4)	
Headaches									
One or more times/week	55 (69.6)	<0.001*	25 (78.1)	0.004*	26 (68.4)	0.073	11 (40.7)	67 (59.8)	0.073
Not once during the week	24 (30.4)		7 (21.9)		12 (31.6)		16 (59.3)	45 (40.2)	
Difficulty concentrating									
One or more times/week	57 (72.2)	0.008*	28 (87.5)	0.001*	30 (78.9)	0.015*	11 (40.7)	76 (67.9)	0.009*
Not once during the week	22 (27.8)		4 (12.5)		8 (21.1)		16 (59.3)	36 (32.1)	

Table 1 – Cont.

Health symptoms	Illness						Sleep quality		
	Physical		Psychological		Social		Good	Poor	
	n (%)	p	n (%)	p	n (%)	p	n (%)	n (%)	p
Feeling of depression/unhappiness									
One or more times/week	41 (51.9)	0.005*	26 (81.3)	<0.001*	21 (55.3)	0.047*	5 (18.5)	53 (47.3)	0.006*
Not once during the week	38 (48.1)		6 (18.8)		17 (44.7)		22 (81.5)	59 (52.7)	
Sensation of decreased self-esteem									
One or more times/week	42 (53.2)	<0.001*	26 (81.3)	<0.001*	17 (44.7)	0.445	2 (7.4)	53 (47.3)	<0.001*
Not once during the week	37 (46.8)		6 (18.8)		21 (55.3)		25 (92.6)	59 (52.7)	
Mood lability									
One or more times/week	57 (72.2)	<0.001*	29 (90.6)	<0.001*	32 (84.2)	<0.001*	10 (37.0)	68 (60.7)	0.026*
Not once during the week	22 (27.8)		3 (9.4)		6 (15.8)		17 (63.0)	44 (39.3)	
Total	79 (100)		32 (100)		38 (100)		27 (100)	112 (100)	

*Chi-Square Test *p<0.05 = Significant association

A significant difference was identified between poor sleep quality and appetite disorder, sensation of indigestion, flatulence or abdominal distension, insomnia, difficulty concentrating, feeling of depression or unhappiness, sensation of decreased self-esteem and mood lability (p<0.05). Poor sleep quality was also associated with physical illness (p<0.001) and with the female gender (p=0.046).

Regarding illness, there was a significant association between physical, psychological and social illness and symptoms of heartburn or burning sensation, irritability, insomnia, difficulty concentrating, feeling of depression or unhappiness and mood lability (p<0.05).

Based on the analysis of the results, it is extremely important to deepen the discussion about the theme of night shift work, in order to provide information that can assist in the planning of actions that promote better sleep quality and health for Nursing professionals.

DISCUSSION

The results show that, as effects of working the night shift, Nursing professionals had poor sleep quality significantly associated with female gender and physical illness. There was a statistical difference between physical, psychological and social illness and symptoms of heartburn or burning sensation, irritability, insomnia, difficulty concentrating, feeling of depression or unhappiness and mood lability. These data indicate that working the night shift affects sleep quality and potentiates Nursing professionals' physical, social and psychological illness.

Data analysis revealed predominance of Nursing workers who chose to perform their professional activity in the night shift. This choice can be justified by the possibility of having more time to attend to other personal demands, by finding a lower flow of people at work, and by the night shift bonus, which

is added to the salary. However, a number of studies evidence that night shift work can imply harms to workers' health, such as changes in sleep⁷ and affect family life due to reduced social interaction, time with children and mood disturbance¹³.

An association between poor sleep quality and physical illness was evidenced. This data indicates an impaired health status of this population and points to the need to devise and implement strategies aimed at improving the work context, characterized by the conditions, organization and socio-professional relations, in order to reduce harms to health and improve sleep quality. The work context exerts an influence on the relationship between the health-disease process and the worker's illness²⁰.

A higher number of female workers was identified, which reinforces the trend for the predominance of women working in the health area. However, due to the domestic and family tasks still prevalent for them, this hegemony can overburden the workers, influence sleep and work activities, and result in harms to health²¹. In relation to this, the evidence of association between female gender and poor sleep quality identified in the results resembles data from a Greek survey conducted in a university hospital with health professionals that identified sleep and well-being problems among female participants ($p=0.040$)²².

Poor sleep quality influences symptoms of insomnia, difficulty concentrating, feeling of depression or unhappiness, mood lability and physical, psychological and social illness, which suggests that inadequate sleep has repercussions on the health of night shift workers. People who work in shifts, especially at night, can experience bio-psycho-social obstacles, wear out imposed by the working hours, and significant changes in sleep and diet¹⁹.

A research study conducted in Italy evidenced that nurses working night shifts presented lower mean scores on sleep quality and duration, with a higher frequency of chronic fatigue and psychological and cardiovascular symptoms when compared to day shift workers ($p<0.05$)¹².

Sleep disorders in shift work consist of symptoms of insomnia or sleepiness, difficulty concentrating, lack of energy and headaches, causing poor balance between personal and professional life, errors and work-related accidents²³. Changes in sleep can impair physical, mental, cognitive and emotional aspects, affect the immune system and cause metabolic disorders¹¹.

In addition, concentration, attention and memory, fundamental in the Nursing work process, can be impaired by sleep alterations, overloading mental work and increasing the stress level. Such factors, allied to the high workload and non-recovery of sleep, contribute to the workers' psychological illness. Poor sleep quality, overwork and interpersonal relationships, which are the main cause of stress in the work context²⁴, can influence psychological and social illness in Nursing professionals.

The change in the sleep pattern can be due to the increase in stress-related hormones such as cortisol, influencing gastrointestinal problems, body weight, susceptibility to infections and bone diseases²⁵, which can be related to the workers' physical and psychosocial illness. In this regard, a research study carried out with Norwegian nurses identified that the Body Mass Index increased significantly among night shift workers when compared to day shift workers⁵.

It is worth mentioning that it is common for night shift workers' meals to be snacks, an eating habit that provides little nutritional value, which contributes to the increase in gastrointestinal symptoms. Diverse scientific evidence suggests a relationship between sleep and obesity¹¹ and the development of Type II diabetes *mellitus*²⁶. Higher food intake is associated with changes in hormones responsible for controlling hunger and appetite, especially leptin (produced by the adipocytes and which sends satiety signals) and ghrelin (produced by the stomach during fasting and which sends signals to the hypothalamus, stimulating the hunger centers). Reduced sleep can lead to decreased leptin and increased ghrelin, which contributes to weight gain and dysfunctions¹¹. The increased risk for developing Type II diabetes *mellitus* was evidenced in a study that identified an association

between sleep deprivation and poor sleep quality and reduced insulin sensitivity and resistance and decreased glucose tolerance²⁶.

Despite the identification of workers with poor sleep quality and falling ill, there was no predominance of workers distanced from work, suggesting presenteeism. Presenteeism is defined as the physical presence of a worker in the workplace in biological and psychological conditions that are inoperable for the effective performance of their activities, resulting in harms to the worker's health²⁷, increasing the occurrence of work-related accidents, which in this study presented a relevant percentage.

Thus, there is a need for policies and actions to improve the work contexts and promote health and quality of life for Nursing professionals²⁷⁻²⁸, considering the particularities related to sleep during the night shift, such as resting places and naps, as well as diet and training during the shift.

It is important to ensure a favorable work environment with the objective of minimizing job-related harms. An environment with sufficient and adequate material and human resources, reducing environmental and ergonomic risks, favoring interprofessional relationships and health promotion. Workers' satisfaction is related to their behavior in the work environment, exerting an influence on the roles performed and on productivity²⁹.

Undoubtedly, Nursing is a demanding profession, inherently associated with certain level of psychological distress. Support from supervisors and task orientation is a factor in the organizational climate that can make the work environment healthier, reflecting positively on workers' health by reducing psychological distress. This issue has recently been highlighted by Australian researchers as a potential way to mitigate the adverse health outcomes experienced by shift workers³⁰.

Night work can exert a negative impact on workers' health⁷ and, given the scarcity of evidence on the repercussions of night shift work on sleep quality and on physical, psychological and social illness, new evidence is needed to improve our understanding of the impact of night work on the health of Nursing professionals.

The limitation of this study is its cross-sectional design, which precludes analyzing sleep, the harms to health and the symptoms over time and establishing causal relationships. The participants' memory bias in relation to the health symptoms must be added to the aforementioned. It is worth conducting more studies with this population, considering its specificities, choosing longitudinal and intervention surveys. This study did not consider workers on leave or distanced from work in any way, which is a selection bias and is characterized as another limitation.

This research provided information about sleep quality, illness and health symptoms in Nursing professionals working the night shift, which implies advances in knowledge in order to use it to support the creation and reformulation of public policies and strategies aimed at adequate working conditions. Among them, reduction in the workload, provision of adequate places to eat and rest, considering that sleep influences worker safety, education in health and appropriate staff resizing, promoting Nursing workers' health.

CONCLUSION

It was evidenced that Nursing professionals who worked the night shift had poor sleep quality, and this relationship exerts an impact on physical, psychological and social health.

Interventions aimed at raising awareness about sleep hygiene on days when there is no work activity during the night shift, such as avoiding the consumption of caffeinated drinks before bedtime and contact with stimulating devices like cell phones, can promote better health outcomes for these individuals.

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