

SLEEP AND HEALTH VARIABLES OF NURSING PROFESSIONALS IN THE DIFFERENT WORKING SHIFTS

SONO E VARIÁVEIS DE SAÚDE DE PROFISSIONAIS DE ENFERMAGEM NOS DIFERENTES TURNOS DE TRABALHO

EL SUEÑO Y LAS VARIABLES DE SALUD DE PROFESIONALES DE ENFERMERÍA EN DIFERENTES TURNOS LABORALES

Joice Araújo Marçal¹
Bruno Fernando Moneta Moraes¹
Sandra Soares Mendes¹
Milva Maria Figueiredo De-Martino¹
Jaqueline Girnos Sonati²

¹ Universidade Estadual de Campinas – UNICAMP, Faculdade de Enfermagem, Campinas, SP – Brazil.

² Universidade de Taubaté – UNITAU, Departamento de Enfermagem e Nutrição, Taubaté, SP – Brazil.

Corresponding author: Bruno Fernando Moneta Moraes
E-mail: bruno-fernando@uol.com.br

Author's Contributions:

Data Collection: Joice A. Marçal; **Funding Acquisition:** Joice A. Marçal; **Investigation:** Joice A. Marçal; **Methodology:** Joice A. Marçal, Sandra S. Mendes; **Project Management:** Milva M. F. Martino; **Resources Management:** Joice A. Marçal, Milva M. F. Martino; **Statistical Analysis:** Joice A. Marçal, Bruno F. M. Moraes, Milva M. F. Martino; **Supervision:** Joice A. Marçal, Milva M. F. Martino, Jaqueline G. Sonati; **Writing - Original Draft Preparation:** Joice A. Marçal, Bruno F. M. Moraes, Sandra S. Mendes; **Writing - Review and Editing:** Joice A. Marçal, Bruno F. M. Moraes, Sandra S. Mendes, Jaqueline G. Sonati.

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ABSTRACT

Introduction: the relationship between synchronizers and the internal temporal organization can be disturbed by changes caused by shift work, manifesting as cardiovascular, metabolic, and sleep disorders. **Objective:** to analyze the sleep pattern, anthropometric characteristics, blood glucose and blood pressure of 88 Nursing professionals, day and night shift workers. **Method:** a descriptive and cross-sectional study conducted in public emergency services of a city in the state of Minas Gerais, in which a sociodemographic questionnaire and a sleep diary were used. The measurements taken were blood glucose, blood pressure, body mass index and waist circumference. **Results:** the duration and the quality of the night sleep of the night-shift workers were statistically lower than those of their day-shift peers. However, there was no statistically significant difference between the other studied variables and the shifts. **Conclusion:** overweight and obesity were observed in 59.09% of the professionals and waist circumference changes in 70.46% of them. Knowledge of this reality may contribute to further studies, with possible programs for periodic monitoring of the workers' health.

Keywords: Shift Work Schedule; Nursing; Blood Pressure; Sleep; Body Mass Index.

RESUMO

Introdução: a relação entre sincronizadores e a organização temporal interna pode ser perturbada por mudanças causadas pelo trabalho em turnos, manifestando-se como distúrbios cardiovasculares, metabólicos e do sono. **Objetivo:** analisar o padrão de sono, características antropométricas, glicemia e pressão arterial de 88 profissionais de Enfermagem, trabalhadores de turnos diurnos e noturnos fixos. **Métodos:** estudo descritivo e transversal realizado em serviços públicos de pronto atendimento de um município do estado de Minas Gerais, no qual se utilizaram questionário sociodemográfico e o diário do sono. As medidas realizadas foram glicemia, pressão arterial, índice de massa corporal e circunferência da cintura. **Resultados:** a duração e a qualidade de sono noturno dos trabalhadores do turno da noite apresentaram-se com média estatisticamente inferior em relação aos funcionários do turno diurno. No entanto, entre as outras variáveis estudadas e turnos não houve diferença estatística significativa. **Conclusão:** observaram-se sobrepeso e obesidade em 59,09% dos profissionais e alterações da circunferência de cintura em 70,46% deles. O conhecimento dessa realidade pode contribuir para estudos adicionais, com possíveis programas de acompanhamento periódico da saúde do trabalhador.

Palavras-chave: Jornada de Trabalho em Turnos; Enfermagem; Pressão Arterial; Sono; Índice de Massa Corporal.

RESUMEN

Introducción: la relación entre los sincronizadores y la organización temporal interna puede verse alterada por los cambios causados por el trabajo en turnos, que se manifiestan como trastornos cardiovasculares, metabólicos y del sueño. **Objetivo:** analizar el patrón de sueño, las características antropométricas, la glucosa en sangre y la presión arterial

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de 88 profesionales de enfermería, trabajadores de turno diurno y nocturno. **Métodos:** estudio descriptivo de corte transversal realizado en los servicios públicos de emergencia de una ciudad del estado de Minas Gerais, que utilizó un cuestionario sociodemográfico y un diario del sueño. Las medidas tomadas fueron glucosa en sangre, presión arterial, índice de masa corporal y circunferencia de cintura. **Resultados:** la duración y la calidad del sueño nocturno de los trabajadores del turno nocturno fueron estadísticamente más bajas que las de los trabajadores del turno diurno. Sin embargo, entre las otras variables estudiadas y turnos no hubo diferencias estadísticamente significativas. **Conclusión:** se observó sobrepeso y obesidad en el 59,09% de los profesionales y alteración en la circunferencia de cintura en el 70,46% de ellos. El tener conciencia de esta realidad puede contribuir a futuros estudios, con posibles programas para el monitoreo periódico de la salud de los trabajadores.

Palabras clave: Horario de Trabajo por Turnos; Enfermería; Presión Arterial; Sueño; Índice de Masa Corporal.

INTRODUCTION

Shift work is necessary for a large portion of the population. These uninterrupted working hours, however, can impact individuals' sleep, resulting in its reduced quantity and quality.¹ Alternating times between day and night may lead the individual to a rupture of the circadian biological rhythms.²

The emergency department is characterized by acting in urgent and emergency situations in the most different conditions, diseases, and life cycles. The Nursing staff that works in this department, apart from professional preparation, needs to be in favorable physical conditions for the full accomplishment of their activities. In a study conducted in seven public emergency hospitals in the state of *Rio Grande do Norte*, Northeast of Brazil, it was observed that the health professionals in the sample recognize the importance of their work; however, they refer to its effects on the workers' physical and mental exhaustion due to stress, lack of healthy habits, and sleep disorders, among others.³

Sleep is an essential process for the functions of the body and its deprivation or irregularity is associated with hormonal changes and weight gain.⁴ The relationship between the synchronizers and the internal temporal organizations can be disturbed by shift work, manifesting as sleep disturbance, unwell sensation, mood variations and various other changes.⁵

The stability of the circadian rhythms reflects the existence of an internal temporal organization, considered an important factor for health and a biological system marker. However, when sleep patterns are irregular, as in the case of shift workers, there is a tendency to break the circadian biological rhythms, which may result in changes in sleep and drowsiness, which affect attention while working.^{2,6}

Sleep disorders, including poor quality sleep, correlate with anthropometric indicators such as body mass index and waist circumference.⁷

This study aimed to investigate the sleep, blood glucose, blood pressure and nutritional status of the Nursing staff during the day and night shifts, in public emergency services in a southern city of the state of *Minas Gerais*, Brazil.

METHODS

The sample was by convenience. 88 professionals participated in the research, of which 49 worked in the day shift and 39 in the night shift. Regarding the professional category, 19 were graduate nurses and 69 Nursing assistants. Data collection took place from September 2015 to January 2016.

All the Nursing team professionals were invited to participate in the study voluntarily. Pregnant women and subjects on vacation or away during the data collection period were excluded. Those who accepted signed the Free and Informed Consent Term, according to Resolution 466/2012 for research with human beings. The project was approved by the Research Ethics Committee of the *Faculdade de Ciências Médicas da Universidade Estadual de Campinas - Unicamp*, under number 1,085,785.

Sociodemographic data were collected through a semi-structured questionnaire to characterize the sample. Sleep was verified by the sleep diary, which consisted of 12 questions that subjectively assessed information about their sleep and wake up hours, the perceived quality of sleep and waking up, both of day and of night sleep.⁸ The sleep diary was self-answered and considered seven consecutive days.

Blood pressure was measured following the 2010 Brazilian Cardiology Society guidelines, reference literature at the time of data collection. Blood pressure cuffs suitable for the arm circumference of each subject were used. Blood pressure was measured in both arms. In the arm with the higher value, another two measurements were taken, with a one-minute interval between them, and the mean of the last two was considered as the real blood pressure. For the normality standards, we considered a systolic pressure of 130 mmHg or less and a diastolic pressure of 85 mmHg or less.⁹

Waist circumference was measured at the midpoint between the last rib and the iliac crest.¹⁰ The following WHO criteria were considered: men (white and black), normality values less than or equal to 94 cm, and for women (white, black, South Asian, Amerindian and Chinese) less than or equal to 80 cm, according to the 2011-2013 Brazilian Cardiology Society Guidelines¹¹. The BMI was obtained from the calculation of the body mass (kg)/height² (m). To measure the body mass, a previously Healthmeter-brand calibrated digital scale was used. The subjects were instructed to remove their lab coats, shoes, the stuff in their pockets, and excess clothing, keeping as few clothes as possible.¹⁰ The height was verified through a stadiometer. The subjects were instructed to leave their heads free of props,

remove their shoes and adopt the Frankfurt position.¹⁰ For the classification of the adults' nutritional status, the WHO criteria were used, which classify as underweight a BMI<18.5; as eutrophic 18.5≥BMI<24.9; as overweight 24.9≥BMI<30; and as obese a BMI≥30.0 for subjects up to 59 years old.¹² For the classification of individuals aged 60 years old or older, the specific classification was considered, which considers as low weight a BMI≤22; as eutrophic BMI>22 to <27; and as overweight BMI≥27.¹³

For the blood glucose measurement, a capillary blood sample was collected, and all the subjects were warned to fasting for eight hours from the fingertip puncture. This methodology was chosen because it is usual in Brazil's basic health units.¹⁴ Blood glucose was considered altered according to the criteria of the 5th Brazilian Guideline for Dyslipidemias and Prevention of Atherosclerosis, of the 2011-2013 Brazilian Cardiology Society Guidelines, when its fasting value is equal to or higher than 100 mg/dL.¹¹

For data analysis, the Mann-Whitney test for nonparametric variables and the Student's t-test for parametric variables were used to compare the groups. The Spearman's correlation test was applied to verify possible associations among the variables of the whole group. The significance level considered was p<0.05.

RESULTS AND DISCUSSION

Among the studied professionals, 87.50% were female, with a mean age of 40.01 years old and a mean salary income of US\$ 928. Of these subjects, 21.59% had a Nursing degree, and 78.41% were Nursing assistants, with 55.68% working in the day shift and 44.32% working in the night shift.

Regarding healthy habits, 97.72% declared themselves non-alcoholic and 72.73% non-smokers. However, not practicing physical activities was reported by 67.05% of the subjects.

The total of individuals that reported suffering from blood hypertension as of 21,59%, and from diabetes *mellitus*, 3.41%. The mean systolic blood pressure was 110.64 mmHg and the diastolic, 71.47 mmHg. The mean capillary blood glucose was 91.11 mg/dL.

Observing the day shift employees, 51.02% had BMI values above the ideal, 28.57% being classified as overweight and 22.45% as obese while, among the night shift workers, the value was 69.23%, with 35.9% overweight and 33.33% obese. The eutrophic individuals were 48.98% of the day shift subjects and 30.77% of the night shift Nursing professionals.

When the BMI data were associated with the work shifts of the Nursing professionals, there was no statistical significance (p=0.2155). When comparing the variables between the day and night workgroups, it was found that there was no statistically significant discrepancy; however, the highest means were found in the group of night-shift workers (Table 1).

Table 1 - Comparison among the values of body mass index, systolic and diastolic blood pressure and fasting glucose of Nursing professionals during work shifts

Variables	Day (n=49)		Night (n=39)		p-value*
	Mean	sd	Mean	sd	
BMI	26.39	4.67	27.84	4.78	0.1202
SBP	108.5	14.34	113.32	17.67	0.3014
DBP	70.76	10.42	72.37	11.14	0.6051
Glycemia	90.43	12.83	91.97	17.68	0.5283

*p-value obtained by the Mann-Whitney test.

Regarding waist circumference, 71.43% of the day shift subjects and 69.23% of the night shift showed increased values, with no great divergence between the shifts. When summing up the individuals of the two shifts with values above the recommended, it was found that 70.46% of the subjects presented measurements above the recommended.

The mean quality of night sleep was 5.83; and how they felt waking up after night sleep, 5.42. Daytime sleep was reported by 53.41% of the subjects, with a mean quality of 4.42; and 4.30 on how they felt upon waking up. Day shift workers reported taking a nap (53.06%), and the percentage of night shift employees reporting napping was higher (82.05%).

Still, regarding sleep, the analysis of the variables showed that the groups are different and also that night workers have the worst characteristics, which reflects a poor quality sleep (Table 2).

Table 2 - Comparison between the mean values of quality and sleep time (in hours) of Nursing professionals during work shifts

Variables	Day (n=49)		Night (n=39)		p-value*
	Mean	sd	Mean	sd	
Sleep quality	6.28	1.83	5.24	2.33	0.0225
Perception upon waking	5.86	1.82	4.85	2.04	0.0167
Sleep duration	7.38	1.22	6.23	1.23	<0.0001

*p-value obtained by unpaired Student's t-test.

Although weak, there was a positive correlation between the age of the Nursing professionals and the mean systolic blood pressure, and a moderate correlation with the BMI and blood glucose, indicating that the older the individuals the higher the values found for these variables (Table 3).

Table 3 - Correlation among the variables of age and BMI measurements, systolic and diastolic blood pressure and fasting glucose levels of Nursing professionals (n=88)

Variables	rs*	p-value**
Age x BMI	0.4716	<0.0001
Age x SBP	0.2463	0.0207
Age x DBP	0.1746	0.1037
Age x Glycemia	0.4101	<0.0001

*rs: Spearman's correlation coefficient. **p-value: significance.

In the present study, 87.50% of the workers were female. This data is consistent with the latest survey on the Brazilian national profile, which shows 90% of women occupying this profession.¹⁵

Regarding the obesity rate, the 27.27% found among the subjects is similar to the study conducted with American nurses (27.5%).¹⁶ Weight gain among the Nursing professionals has been observed in several countries with levels higher than those found in the general population, and night shift individuals are those with the highest prevalence of overweight and obesity. Waist circumference, which in the present study was altered in 70.46% of the subjects, has also been observed more frequently among the nurses.^{17,18}

67.05% of the respondents reported not practicing any physical activity. Although health professionals are aware of all the health benefits of physical activity, 49.15% of the intensive care units' employees in Brazil's Northeast cities were inactive.¹⁹ Sleep and fatigue resulting from night work may also be factors that make it difficult for these professionals to practice physical activities.²⁰ This condition, combined with eating low-quality, high-calorie foods, a common strategy among night workers to stay awake, can further aggravate health changes, contributing to the emergence of comorbidities.²⁰

It can be seen that the day workers' night sleep was of better quality compared to night workers', even though the latency period did not present a statistically significant difference. This is data that was not found by some authors. In a national shift worker sleep survey, night shift workers' sleep was better compared to day shift workers', possibly related to the long hours and more exhaustive daytime hospital routine.²¹

The implementation of labor gymnastics and the investigation of the eating habits of these subjects, with subsequent nutritional orientation, may be necessary. The reduction of body mass and its control and the prevention of metabolic diseases are important factors observed with the practice of physical activity, as well as its assisting process in the synchronization of the circadian rhythmicity of the shift workers.²²

A study on the eating behavior of shift workers in Southern Brazil showed that night shift workers had a higher number of meals a day, but at more inadequate times. Thus, it was concluded that the night shift can negatively influence food consumption in the workers.²³

The health conditions most cited by these participants were systemic arterial hypertension and diabetes *mellitus*, but the mean blood pressure value found in the study was within the optimal value classification, as well as the mean blood glucose value. The mean age of the studied professionals was 40.01 years old. In Brazil, people older than 60 are considered elderly, but the declines to work due to age begin gradually and start to be noticeable at the age of 40. Thus, the aging process can influence as well as be influenced by the relationship

between work and worker. As an institution's workforce ages, the development of measures to prevent disease and to promote the health of these workers becomes important.²⁴

CONCLUSION

The study observed the prevalence of overweight and obesity without any difference for day and night workers. The night sleep of the night workers was statistically lower in quality and duration compared to that of the day workers. No changes in blood glucose levels and blood pressure were found. However, it is important to note that this was a predominantly female sample, with a mean age of 40.01 years old and low adherence to physical activity, characteristics that, added to the stressful shift work, can lead to the development of chronic diseases and limiting for the work activity.

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