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Night work and self-perceived body weight changes among nursing professionals

Trabalho noturno e alterações de peso corporal autopercebidas pelos profissionais de enfermagem

Trabajo nocturno y alteraciones en el peso corporal según los trabajadores de enfermería

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ABSTRACT
Objective: to evaluate body weight changes in nursing workers on the night shift. **Methodology:** this quantitative, exploratory, descriptive study, conducted at a large federal hospital in Rio de Janeiro, after approval of the institution's research ethics committee, considered socio-demographic variables, influence of the night work on the organism, and body mass index. **Results:** average weight gain among the 89 nursing workers was approximately 20kg since admission to night work, and nurses reported greater influence of lack of sleep on the body, and greater exhaustion as compared with data on the other categories. **Conclusion:** considering the hormonal disorders and social impacts of night work, it is essential to implement changes towards a culture of prevention, through either institutional programs or interventionist research able to develop measures that lead to self-recognition and promotion of nursing workers' physical, mental and social wellbeing.
Descriptors: Night work, night care, health promotion, occupational health.

RESUMO
Objetivo: avaliar as alterações de peso corporal em trabalhadores de enfermagem do turno noturno. **Metodologia**: estudo quantitativo, exploratório, descritivo, realizado em um hospital federal de grande porte do Rio de Janeiro. Foram estudadas variáveis sóciodemográficas; influências do turno noturno sobre o organismo e índice de massa corporal, após aprovação do Comitê de Ética em Pesquisa da instituição. **Resultados:** os 89 trabalhadores de enfermagem apresentaram ganho de peso médio de aproximadamente 20Kg a partir da admissão no turno noturno, sendo que os enfermeiros referiram maior influência da ausência de sono sobre o organismo, e maior exaustão quando comparados aos dados das demais categorias. **Conclusão:** considerando as desordens hormonais e os impactos sociais do serviço noturno, é imprescindível a implementação de mudanças para uma cultura prevencionista, seja por programas institucionais ou pesquisas intervencionistas, capazes de desenvolver medidas que conduzam ao autorreconhecimento e à promoção do bem-estar físico, mental e social dos trabalhadores de enfermagem.
Descritores: Trabalho noturno; assistência noturna; promoção da saúde; saúde do trabalhador.

RESUMEN
Objetivo: evaluar las alteraciones de peso corporal en trabajadores de enfermería del turno nocturno. **Metodología:** estudio cuantitativo, exploratorio, descriptivo, realizado en un gran hospital federal en Río de Janeiro. Se estudiaron las variables sociodemográficas, la influencia reportada de la guardia nocturna en el organismo y el índice de masa corporal, tras la aprobación del Comité de Ética de Investigación de la Institución. **Resultados:** Los 89 trabajadores de enfermería tuvieron un aumento de peso promedio de aproximadamente 20 kg desde el ingreso en el turno nocturno, y los enfermeros informaron una mayor influencia de la falta de horas dormidas sobre el cuerpo y un mayor agotamiento en comparación con los datos de las otras categorías. **Conclusión:** Teniendo en cuenta los trastornos hormonales y los impactos sociales del servicio nocturno, es esencial implementar cambios hacia una cultura de prevención, ya sea a través de programas institucionales o de investigación intervencionista, capaces de desarrollar medidas que conduzcan al auto reconocimiento y a la promoción del bienestar físico, mentales y social de los trabajadores de enfermería.
Descriptores: Trabajo nocturno, cuidados nocturnos, promoción de la salud, salud laboral.

INTRODUCTION

It is known that, in the health care system, shift work is considered to be necessary and indispensable to ensure the continuity of care 24 hours a day. In particular, night-shift work is one of the most frequent causes of interruption of circadian rhythms, leading to significant changes in sleep and biological functions. As a result, a significant impact on workers' physical and psychological well-being is observed, which negatively conditions performance at work[1-3].

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There are different levels of adaptation and tolerance to night work that can cause health changes to varying degrees of intensity at different time intervals. The repercussions of the different influences from night-shift work can vary widely among workers, being related to individual factors, such as age, personality traits and physiological characteristics[4-5]. In addition, adaptation to work, including working hours and social conditions, such as the number of jobs one holds, one's children's ages, housing, duration and form of transportation are also determinant for possible psychophysiological changes[4].

Night-shift workers are prone to sleep deprivation and misalignment of circadian rhythms, with consequent sleepiness and performance deficits related to sleep[5]. The night time is the phase in which vital mechanisms and systems are deactivated or attenuated in order to prevent exhaustion. It is also the moment when processes of recovery and compensation for energetic or biochemical wastage occurring during the period of activity are performed. When sleep deprivation is excessive and persistent, there may be an imbalance in the circadian rhythm structure, with the occurrence of malaise, fatigue, decreased alertness, drowsiness, insomnia, irritability and impairment of mental agility, performance and efficiency, which contributes to error during patient care[4,6,7].

Thus, in order to ensure patients' and workers' safety, especially on night shifts, the implementation of rest intervals should be coordinated in appropriate places so as to increase the recovery potential during or after long work shifts. There is evidence of a greater chance of recovery after work for nurses who sleep up to 2.1 to 3 hours during the night shift when compared to nurses who do not sleep[8].

In addition to safety-related issues in health care, weight gain has been reported to be higher among night-shift workers, increasing the risk for cardiovascular disease, metabolic disease and cancer[9-11].

Variation in night weight may be related to age and the length of work in the profession[12]. Losses in sleep dynamics can also be related to the high prevalence of overweight and obesity. Animal and human studies indicate that changing night-sleep patterns can negatively influence food intake and, consequently, the nutritional status[13,14].

Hence, this study[VII] is justified from the ergonomics point of view, considering the need to identify improvement in labor conditions in the work environment[15], that is, to ergonomically adapt nursing work to the night shift by taking into account that the differences in attributions in hospital settings can determine different degrees of adaptation to night work. In such scenario, this study aimed at evaluating body-weight changes in night-shift nursing workers.

METHOD

This is an exploratory, descriptive study with a quantitative approach conducted on nursing professionals from a large high-complexity federal hospital in the city of Rio de Janeiro. Probability sampling with a finite sample was used[16], that is, a sample whose size (n) was greater than or equal to 5% of the total population of nursing professionals (n=443). Based on the evaluation by an independent statistician, with a 95% confidence interval, the participation of at least 89 nursing workers was established.

Professionals from all nursing categories who voluntarily accepted to participate and worked night shifts were included. Those who were on any type of leave of absence or on vacation at the time of data collection were excluded.

Data were collected from August to September, 2016 by using a self-applied form designed by the researchers and based on a previous study related to the topic[17]. According to the perceptions of the participants in the study, which was structured on open-ended and closed-ended questions, data concerning their demographics, education, income, length of work, work hours, economic dependents, self-reported weight and influences from night-shift work on their bodies were obtained. Weight and height measurements were self-reported, and their body mass index (BMI) was then calculated. The cut-off point for obesity was ≥30 kg/m²; overweight 25 to 30 kg/m² and normal weight from 20 to 25 kg/m².

The data were tabulated on the *Microsoft Excel*® software and analyzed by the *Statistical Package for Social Science for Windows* (SPSS®). The sociodemographic variables and anthropometric information were presented by means of descriptive statistics. Absolute and relative frequencies were presented for the nominal variables. The evaluation of weight variation was analyzed by the variance test (ANOVA), with the formation of three analysis groups and without a normality pattern of the results.

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The associations between body-weight alterations, night-shift time and age were analyzed by inferential statistics using the chi-square - Pearson test, a non-parametric test with the purpose to find a dispersion value for two qualitative variables, thus evaluating whether or not the proportions observed for these events show significant differences or whether they differ significantly as to the proportion of such occurrences, evaluating the association between them[18]. A 95% confidence interval with a p-value <0.05 was considered to assume the hypothesis that there was no association between the studied variables.

The research project was approved by the institution's Research Ethics Committee under registration number 066/2012, according to the requirements set forth by the National Health Council Resolution 466/12.

RESULTS

Based on the sample size calculation, 150 forms were distributed in the various hospitalization units to be filled out by the night-shift nursing workers. Of these, 95 were returned after completion. However, six were excluded because they were improperly completed or incomplete. The participants' profile, as obtained from the sociodemographic, work and education data, is shown in Table 1.

Among the participants, 36 were nurses (40.45%), 19 nursing technicians (21.35%) and 34 nursing assistants (38.20%). The nurses' mean age was 37.8 (± 6.5) years while that of the nursing technicians was 43.8 (± 8.1) and that of the nursing assistants was 42.1 (± 11). 61.80% of the professionals in the sample reported being married, which was the most frequent marital status, a tendency found in the three categories as well as being a female (73.5%). As regards education, high school graduates were most frequently found among the nursing technicians (63.16%) and assistants (41.18%) while most nurses had post-graduation degrees (77.78%).

Concerning employment, 58.43% of the total number of professionals had other jobs (n=52). However, 59 other work shifts were identified, which leads to the conclusion that some of the professionals had three or more jobs. Such reality reflects a net income of more than R$ 3.001,00 (US$ 772.00) for most of this population.

Among the professionals, the nurses showed the shortest length of time (in years) in nursing work (13.7 ± 7.3), followed by the nursing technicians (15.1 ± 6.4) and the nursing assistants (17.4 ± 9.4). The nursing assistants were also those who had been working the night shift the longest (8.9 ± 6.2 years). The number of hours dedicated to the profession, as reported for the two previous weeks, was larger for the nurses (79.9 ± 35.4 hours).

BMI before and after commencing night-shift work, as calculated from the reported anthropometric measurements, is shown in Figure 1.

All the categories showed increased mean BMI; however, the nurses showed a greater mean numeric variation (24.7 - 29.7kg/m^2), moving from the normal range to overweight. Nevertheless, the nursing technicians and assistants moved from the overweight range to obesity.

Analysis of variance (ANOVA) showed difference between the means for weight difference at the moment of the study (p=0.049). There was a mean variation of 12.4kg, with a median of 11kg, as 77 people showed increase (86.52%), seven showed loss (7.86%) and five presented weight stagnation (5.62%).

The chi-square test did not show association between the variables: weight variation x length in years of night-shift work, weight variation x age, weight variation x professional category, weight variation x weekly working hours (p<0.05).

Even so, the influence of night-shift work on weight control was self-reported more often by the nurses. They also reported difficulty in relaxing after work, which resulted, at the end of their shifts, in exhaustion in 50% of them, followed by the nursing technicians (70%). Among the nursing technicians, 47.4% reported being able to relax only on their second day off. The nursing assistants felt more difficulty in concentrating after the first day off (32.4%) and only 47.1% felt completely recovered after eight hours of rest. The nurses' performance already showed impaired performance at the end of their working day (38.9%).

DISCUSSION

The nursing staff members develop their professional activities of integral care provision in a hospital environment for 24 hours, in uninterrupted shifts, in order to help individuals with health problems; therefore, they have incontestable importance[19].

The concentration of female professionals was expected, as it is observed in practice and reported by the literature[7,12,20-22]. In this study, it was possible to observe that this profile is beginning to be deconstructed by the increasing concentration of male professionals, particularly among nursing assistants (26.5%). This can explain the larger

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concentration of males on the night shift as compared to that on the day shift. Although a previous study showed a lower frequency of males in nursing, whenever they are present, they are mostly assigned to the night shift[23].

Table 1: Sociodemographic, work and education data of night-shift nursing professionals at a large hospital. Rio de Janeiro, Brazil, 2016.

Variables	Nurse (n=36)		Technician (n=19)		Assistant (n=34)		Total (n=89)	
	n	%	n	%	n	%	n	%
Sex								
Male	4	11.11	4	21.05	9	26.47	17	19.10
Female	32	88.89	15	78.95	25	73.53	72	80.90
Age								
20-30	1	2.79	0	0	5	14.70	6	6.74
31-40	25	69.44	7	36.84	15	44.12	47	52.81
41-50	7	19.44	8	42.11	7	20.59	22	24.72
51-60	3	8.33	4	21.05	7	20.59	14	15.73
Marital Status								
Married	25	69.44	10	52.63	20	58.82	55	61.80
Single	10	27.78	3	15.78	8	23.53	21	23.59
Widowed	1	2.78	2	10.53	2	5.89	5	5.62
Separated or divorced	0	0	2	10.53	4	11.76	6	6.74
Indeterminate	0	0	2	10.53	0	0	2	2.25
Education								
High School Graduate	0	0	12	63.16	14	41.18	26	29.21
College or university graduate	8	22.22	4	21.05	10	29.41	22	24.72
Post-graduation degree (*Lato/Stricto Sensu*)	28	77.78	3	15.79	10	29.41	41	46.07
Other employment								
Yes	20	55.56	12	63.16	20	58.82	52	58.43
No	16	44.44	7	36.84	14	41.18	37	44.57
Shift worked in other employment								
Night	7	35	3	25	3	15	13	25
Day	13	65	9	75	8	40	30	57.7
Others	0	0	0	0	9	45	9	17.3
Approximate net income								
From R$ 500 (US$ 129) to R$ 1.000 (US$ 257)	0	0	1	5.26	3	8.82	4	4.49
From R$ 1.001 (US$ 258) to R$ 2.000 (US$ 514)	0	0	2	10.52	2	5.88	4	4.49
From R$ 2.001 (US$ 515) to R$ 3.000 (US$ 771)	13	36.11	2	10.52	4	11.76	19	21.35
From R$ 3.001 (US$ 772) to R$ 5.000 (US$ 1,285)	8	22.22	14	68.44	16	47.07	38	42.69
Over R$ 5.000 (US$ 1,285)	14	41.67	1	5.26	9	26.47	24	26.98
Length of nursing work in years (SD)	13.7(± 7.3)		15.1(± 6.4)		17.4(± 9.4)			
Length of night-shift work in years (SD)	8.9(± 6.2)		6.5(± 4.5)		12.9(± 6.9)			
Weekly hours dedicated to the profession (SD)	79.9(± 35.4)		71.8(±38.5)		66.4(± 30.2)			

Legend: DP = standard deviation

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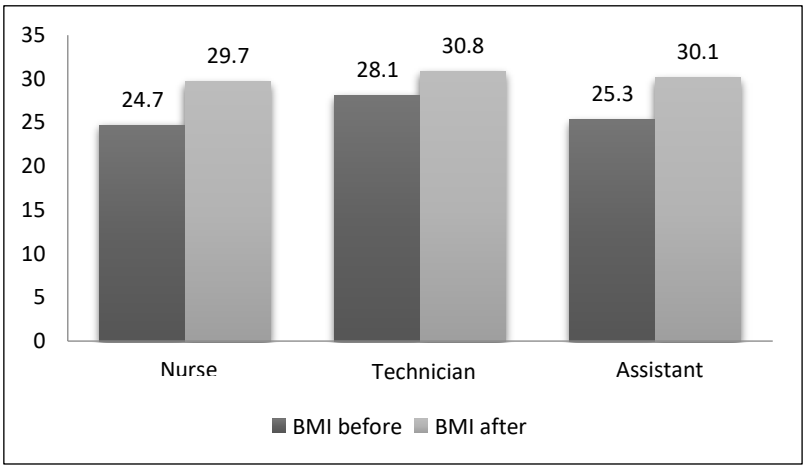

Figure 1: Comparison of the Body Mass Index (BMI) before and after commencing night-shift work of nursing professionals at a large hospital. Rio de Janeiro, Brazil, 2016.

As regards employment, the differences in adapting to shift work vary according to each individual. The continuous exposure to irregular schedules affects one's biological rhythmicity, and sleep, mood, gastrointestinal and cardiovascular disorders can occur[3]. The accumulation of different jobs does not necessarily leads to higher income. Most of the nurses showed a net income lower than R$ 5.000,00 (US$ 1,286.00). These disparate results are also found in the literature, with the prevailing salary range between R$ 2.001,00 (US$ 515.00) and R$ 3.000,00 (US$ 771.00), which can be considered low for the number of hours worked in a schedule between 21 and 40 hours per week[21].

The body weight increase observed was similar to that reported by a previous study in which night-shift work had been associated with weight gain greater than 0.24 kg/m² and day-shift work with one of 0.15 kg/m²[12]. It is known that being awake for longer periods, in addition to promoting hormonal changes that increase caloric intake, also provide more opportunities for food intake[24].

Studies suggest that total body fat may be associated with increased sleep latency, thus contributing to a reduction in total rest time. This fact is very common mainly where night-shift workers who do not have their meal available on site consequently seek high energy density food for a shift that presents a lower concentration of routines and high energy expenditure[25,26].

Work overload and the scarcity of nursing human resources together are also important aspects that directly influence the overload increase itself as well as fatigue[27]. Regarding the influences of the night shift on the workers' body, it is noteworthy that the working hours and the difficulties related to resting after leaving work can lead to disturbances of the circadian rhythm, with the onset of psychological, gastrointestinal and metabolic changes and the occurrence of obesity and other chronic diseases[28].

The effects on the social aspects were more often perceived by the nurses when compared to the other nursing professionals. It is noteworthy that night-shift nurses often accumulate functions directed to supervision in addition to more complex care activities. These are factors that can increase physical and mental loads[22].

However, in a study conducted on intensive care unit workers, night-shift work was not seen only as the cause of illness and disturbances to their well-being. Even with reports of work overload, aspects such as greater availability of time, attention to the family, economy and the possibility of qualification were elements considered satisfactory to those who work in this period[29].

As regards the aspects perceived in relation to the conditions of rest on the night shift, all the nursing professionals reported that they were allowed to rest for at least three hours. Most of them considered the resting site to be appropriate, which is an uncommon factor when compared to the rest of the country, where this type of condition for night rest is not observed. It is noteworthy that the professionals who napped for at least two hours on the night shift increased their recovery after work[8].

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CONCLUSION

From the self-reported weight data, BMI increase was observed among the workers of all nursing categories, with the nurses moving from the normal range to overweight and technicians and assistants from overweight to obesity. Furthermore, there was a difference between the means for weight difference.

It is noteworthy that the night-shift nursing worker is subject to endocrine changes and adaptive processes due to the absence of sleep. Therefore, there is a need to promote night rest from two to three hours.

It is necessary to implement changes for a prevention culture, which can take place either by means of institutional programs or intervention research that can develop measures leading to the self-acknowledgement of body changes in addition to the promotion of nursing workers' physical, mental and social well-being, including food, leisure and sleep promotion. Control and surveillance measures against the disorders of alert conditions must be promoted in addition to effective adjustments in order to protect the cycle of biological rhythms based on an educational approach and taking into account the workers' routines that will meet the efficacy needs of nursing coordination.

These actions will result in the promotion of professionals' well-being, health and satisfaction, thus ensuring care quality, patient safety and the productivity of nursing activities.

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