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Relationship between napping during night shift work and household obligations of female nursing personnel

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Abstract: Night shift employment involves displacing sleep to the daytime. For female workers, the opportunity for daytime sleep is influenced by routine housework demands, which aggravates sleep deprivation. Allowing naps to be taken during the night shift of work is a frequent practice at some hospitals and can help reduce the effects of sleep deprivation. We hypothesize that an association between domestic work and the length of naps during night work exists for nursing professionals. To test this hypothesis, two cross-sectional studies were conducted in two different hospitals. In Study 1, female workers answered questionnaires regarding sleeping habits, professional work, and housework demands. In Study 2, data regarding napping during shifts was obtained by actigraphy, a noninvasive method of monitoring the human sleep–wake cycle. The demand for the performance of housework was measured by (i) domestic work hours (total time spent performing domestic work per week), and (ii) domestic workload, which considers the degree of sharing domestic tasks and the number of people living at home. The populations from the two studies were subdivided into groups, based on the duration of napping at work. Data on naps were analyzed according to domestic demands, using the Mann–Whitney and Chi-squared tests. Among the two study populations (Studies 1 and 2), those in Study 2 were older, had shorter professional weekly work hours, worked more night shifts, and dedicated more time to housework. Significant associations were only found in Study 2, where greater time napping at work was associated with both greater time spent doing housework and greater domestic workload. The known benefits of napping during night shifts seem to be especially relevant for female workers who are more sleep-deprived from working more night shifts and who have higher demands for housework.

Keywords: gender, night work, domestic work, sleep, women

Introduction

Night shift work is essential to some professions but burdens those who must remain awake during time that should be devoted to sleep. Sleep deprivation during the night forces sleeping to occur during the daytime and interferes with the normal progression of the sleep–wake cycle. Several studies associate working during the night shift and/or working prolonged periods of time with health and sleep problems.[1–3] Shorter sleeping times have also been associated with cardiovascular diseases,[4] type 2 diabetes,[5] hypertension,[6] and obesity.[7]

One strategy to deal with sleep deprivation associated with working night shifts is to allow napping or resting during the shift.[8] Many hospitals in Brazil allow nursing workers to sleep or rest during night shifts.[9,10] Napping during night shifts has been shown to offer some alleviation of the effects of sleep deprivation in nursing teams.[9] In a group of female workers, napping 2–3 hours during night shifts was associated with

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better recovery after work compared with that in nurses who did not nap, so long as housework did not exceed 10 hours a week.[11] These studies show that housework interferes with the relationship between napping at night and recovery, in female nurses working night shifts.

Housework performed by female workers during the day tends to hinder recovery from night shift work.[12] Portela et al[13] showed that for females working night shifts, there was an association between domestic workload and increased complaints regarding lack of time for routine self-care. These authors verified that more than 50% of female workers did household chores following night shift of work and that only 22% reported sleeping immediately after the night shift. This suggests that women prioritize housework over resting.[13] For nursing teams, this behavior may aggravate sleep deprivation, since nurses' work schedules frequently combine night shifts with a high number of weekly work hours.[14]

As housework is a continual everyday activity, the time dedicated to it may contribute to the reduction of diurnal sleep time among night shift workers. In the present study, it was hypothesized that the sleep deprivation from night work is intensified by performance of housework and negatively influences daytime sleep. From this perspective, napping during night shifts would impact females differently and be influenced by the magnitude of sleep deprivation. This study investigated the potential association between the performance of housework and the length of napping during night shifts, in nurses at two different hospitals.

Methods

Two cross-sectional substudies examined female nursing workers working night shifts at two public hospitals in Brazil. Napping up to 3 hours during a night shift was allowed in these hospitals, according to the workload. Study 1 employed a comprehensive questionnaire that investigated sociodemographics, work schedules, the number of positions of employment, the number of hours dedicated to home and professional work, and aspects of sleep. In Study 2, workers answered the questionnaire, underwent actigraphy (to obtain detailed information on sleep), and completed protocols of daily activities.

At both hospitals, the adopted night shift was from 7 pm to 7 am, but the interval between night shifts was different: 60 hours for Hospital 1 and 36 hours for Hospital 2. Therefore, the following work schedules were adopted: 7 am to 7 am, followed by 60 hours off (Hospital 1); and 7 pm to 7 am, followed by 36 hours off (Hospital 2). In sum, at Hospital 1, nurses worked every three nights, whereas at Hospital 2, they worked every other night. Considering differences in work schedules between Study 1 and 2, the calculation of working nights was based on a two-week interval, so as to better represent the number of night shifts for each study.

Sample, data collection, and analysis

Study 1

The study surveyed 619 night workers. The group was reduced to 467 workers after excluding data from women who reported complaints concerning falling asleep, maintaining sleep, or early morning awakening (n = 152). We considered that these reported sleep abnormalities could be relevant to sleep behavior on the job. The final sample was further reduced to 247 after excluding workers who did not sleep during the night shift or who had different sleep patterns at different hospitals (a high number of moonlighters was observed in the sample).

Two variables were used to analyze housework: the domestic work hours and the domestic workload. The evaluation of domestic work hours was based on the question "Last week, how many hours did you dedicate to house chores"? The interviewer recorded the time spent performing domestic work in the day before the interview, then two days before the interview, and so forth for seven consecutive days. This procedure allowed the calculation of the total time spent performing domestic work per week.

The domestic workload considers the degree of sharing of domestic tasks, as well as the number of people living at home.[15] Workers were asked to answer to the question "When you are at home, is it your responsibility to do laundry? cleaning? cooking? and ironing clothes? For each question, possible answers were: Yes, entirely (coded as 4), Yes, most of chore (coded as 3), Divide equally (coded as 2), Yes, the lower part of the chore (coded as 1), and No (coded as 0). To calculate the domestic workload, the four scores were summed to obtain a total score, which was multiplied by the number of people at home, excluding the worker herself.[16]

Study 2

The initial sample comprised 206 female nursing professionals working night shifts in all hospital departments except the Neonatal Intensive Care Unit (ICU) and the Surgical Operating Rooms. Those departments did not allow devices to be worn on hands or arms, preventing the use of actigraphy. Workers that reported sleep complaints (Pires et al)[15] and those who had worked night shifts for less than 1 year (n = 127) were excluded from the sample. Workers who refused actigraphy (n = 30) were also excluded. The final sample comprised 49 nurses.

The actigraphy was used in this study in order to provide detailed information on sleep. The data collection was based on two simultaneous recordings: actigraphy and reported activity/rest from the questionnaires manually completed by the workers. The participants used the actigraphy device on their nondominant wrist and completed an activity log for up to 10 consecutive days. The actigraphy data regarding the duration of napping on night shifts was divided in two categories, using the median as cutoff point: (1) napping up to 2.3 hours; (2) napping more than 2.3 hours. The time spent performing housework and the domestic workload was evaluated the same way as in Study 1.

Data analyses used SPSS®, Version 18 (IBM®, Armonk, NY, USA) to perform Mann–Whitney and Chi-square tests.

Ethical considerations

The study was approved by the appropriate committees and officials at the Oswaldo Cruz Foundation, the School of Public Health at the University of São Paulo, and at each hospital. The study was explained to participants, and they were informed that involvement was voluntary and that they could withdraw at any time without consequence. Participants signed consent forms.

Results

The studied populations differed distinctly regarding some characteristics. In Study 1, the female workers were significantly younger; worked fewer nights per fortnight, with longer weekly work hours (including day work at another hospital); dedicated less time to household chores; and had lower domestic workloads compared with the workers from Study 2 (Table 1).

In Study 1, the duration of napping during night shifts showed no association with sociodemographic variables or professional work variables (Table 2). Significant associations between nap length and housework were only observed in Study 2, where longer napping was associated with greater domestic workload and more hours spent doing housework (Table 3).

In Study 2, the majority of participants (87%) indicated napping during night shifts on all nights they worked (Table 3). The average nap length during night shifts was 2.3 hours (SD = 0.7 hours).

Discussion

An association between napping during night shift work and housework, in terms of hours per week and domestic workload, was observed in Study 2. The subjects in Study 2 were potentially more sleep deprived than those in Study 1, since they worked more night shifts, had less time off between night shifts, and spent more time performing housework.

The different outcomes between the two studies may have been influenced by the different circumstances of the participants. Dedicating time to housework reduces the time available for self-related activities, like sleeping and leisure.[3–17] The participants in Study 2 worked more nights per week and both spent more hours performing housework and had greater domestic workloads. These factors make daytime sleeping more difficult and may have contributed

Table 1 Description of study populations for each hospital in relation to sociodemographic and work-related variables

	Study 1		Study 2		*P*
	Mean (SD)	Median	Mean (SD)	Median	
Professional work (hours/week)	56.8 (21.5)	54	49.7 (19.1)	48	0.031
Number of nights/fortnight	5.8 (5.6)	5	6.6 (2.1)	6	0.001
Age (years)	36.0 (11.9)	35	40.0 (10.2)	38	0.009
Domestic work (hours/week)	12.9 (13.9)	8	23.3 (15.5)	21	0.000
Domestic workload*	15.4 (14.9)	12	40.2 (20.5)	36	0.000
	n	%	n	%	
Number of jobs					
One job	107	43.3	28	57.0	0.076
Two or more jobs	140	56.7	21	43.0	
Job title					
Registered nurses	71	28.7	13	27.0	0.978
Nursing aides/assistants	176	71.3	36	73.0	
Marital status					
Married/living with partner	99	40.2	23	47.0	0.840
Single	101	41.1	14	29.0	
Divorced/separated/widowed	46	18.6	12	24.0	

Note: *Domestic workload considers the degree of sharing domestic tasks and the number of people living at home.
Abbreviation: SD, standard deviation.

Table 2 Comparison of nap duration during night shifts and sociodemographic and work variables among female nursing professionals – Study 1

	Napping during night shifts		*P*
	Up to 2 hours n (%)	2.1–3 hours n (%)	
Job title			
Registered nurses	26 (32.1)	45 (27.1)	0.416
Nursing aides/assistants	55 (67.9)	121 (72.9)	
Number of jobs			
One job	37 (45.7)	70 (42.2)	0.601
Two or more jobs	44 (54.3)	96 (57.8)	
Marital status			
Married/divorced	46 (56.8)	99 (60.0)	0.631
Single	35 (43.2)	66 (40.0)	
	Mean (SD)	Mean (SD)	
Professional work (hours/week)	54.7 (20.3)	57.8 (21.9)	0.303
Number of nights/fortnight	6.5 (9.3)	5.4 (2.2)	0.320
Domestic work (hours/week)	12.8 (14.5)	13.1 (13.6)	0.580
Domestic workload	16.02 (15.6)	15.1 (14.6)	0.742
Age (years)	35 (12.3)	37 (11.7)	0.247

Abbreviation: SD, standard deviation.

to greater sleep deprivation in this group, leading to longer naps during their night shifts.

Previous studies have investigated relationships between daytime sleep and housework, in women working night shifts. Estryn-Behar et al[18] observed that loss of daytime sleep for female nurses working night shifts was attributed to time spent doing housework. Rotenberg et al[19] showed that after night shifts by factory workers, women prioritized housework, while men prioritized sleeping and resting.

In this study, the performance of housework during the day possibly hindered daytime sleeping, which should increase the propensity to sleep during night shifts and could explain the greater napping observed during night shifts. This would occur because of physiological preference for sleep at night[20] and the greater sleep deprivation from disrupted daytime sleep.

Female workers who napped for longer periods during night shifts tended to have greater total sleep compared with those who napped for shorter time. For those who napped longer, the reduced sleep deprivation following night shifts increased the available time to accommodate housework demands during the day.

The different work schedules of the subjects in the two studies (with 36 or 60 hours of time off between shifts) should also be considered as factors that interfere with total sleep duration, recovery from work,[21] and, consequently, the available time to meet household demands. The workers in Study 2 had shorter time off between night shifts and could be more sleep deprived and, therefore, prone to longer napping during night shifts.

In short, it is not possible to define a unique direction to the association discussed in the present article. It is possible that workers tend to become sleep-deprived during night shift work and that this is further aggravated by a loss of daytime sleep due to housework. However, female workers who nap for longer periods at work end up less sleep-deprived and are better able to accomplish housework during the day.

Napping during night shifts has been linked to better work performance,[22] better synchronization of circadian rhythms, being able to function as anchor sleep,[23,24] and higher tolerance for night shift work.[25] Although the present study was limited by a small sample size, which made adjustment by covariables impossible, the results presented are consistent with previous studies that found benefits of napping during night shifts.[22–26] However, these benefits are related to demands outside the workplace, and dedicating substantial time to housework may further increase sleep deprivation.

Table 3 Comparison of nap duration during night shifts and sociodemographic and work variables among female nursing professionals – Study 2

	Napping during night shifts		*P*
	Up to 2.3 hours n (%)	More than 2.3 hours n (%)	
Job title			
Registered nurses	8 (34.8)	5 (18.2)	0.208
Nursing aides/assistants	15 (65.2)	17 (81.8)	
Number of jobs			
One job	10 (43.5)	14 (63.6)	0.175
Two or more jobs	13 (56.5)	8 (36.4)	
Marital status			
Married/divorced	16 (69.6)	15 (68.2)	0.873
Single	7 (30.4)	7 (31.8)	
	Mean (SD)	Mean (SD)	
Professional work (hours/week)	54.6 (20.0)	46.9 (18.2)	0.108
Number of nights/fortnight	6.7 (2.3)	6.4 (2.1)	0.384
Domestic work (hours/week)	16.4 (13.1)	28.6 (15.8)	0.005
Domestic workload	32.9 (15.5)	43.3 (20.9)	0.027
Age (years)	38.0 (10.6)	41.4 (9.9)	0.219

Abbreviation: SD, standard deviation.

Conclusion

Nighttime napping at work serves as a synchronizer of circadian rhythms and compensates for sleep deprivation among night shift workers, and is especially important for women that have rigorous household demands outside of work. Many women face long hours and high workloads

of housework in addition to their professional work. The association between greater household work demands and the length of naps during night shifts in Study 2 was manifested after a certain level of sleep deprivation.

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Disclosure

The author reports no conflicts of interest in this work.

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