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ORIGINAL ARTICLE

Sleep Disorders among Rotating Shift and Day-Working Nurses in Public and Private Sector Hospitals of Peshawar

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ABSTRACT

Objective: To determine the effects of shift working in relation to sleep disorders among nurses working in public and private sector hospitals of Peshawar, Pakistan.

Methods: A cross-sectional study was conducted at Lady Reading Hospital and North West General Hospital Peshawar, Pakistan from May 2017 to August 2018. All nurses with at least 12 months of work experience and had been employed in the current shift for the last one month were consecutively enrolled. The Pittsburg Sleep Quality Index (PSQI) was utilized to collect data about sleep pattern. PSQI questions assessed following sleep pattern in the past four weeks; duration of sleep in hours/night, quality of sleep, trouble in sleep initiation, trouble in maintaining sleep, early morning awakening, use of sleep medications, and attention at work. The participant suffering from at least one complaint once or twice a week was considered positive for sleep disorder.

Results: Of 227 subjects, sleep disorder was found in 170 (74.9%) nurses. A significantly higher sleep disorder was found among females (p-value <0.001), nurses working in public sector hospital (p-value <0.001), having dual job (p-value 0.008), and monthly rotational duty (p-value <0.001). Furthermore, walking at night (p-value < 0.001), difficulty in day time concentration (p-value 0.005), and unsatisfied sleep quality (0.020), difficulty in day time concentration (<0.001) were the variables significantly higher in nurses with monthly rotational duty as compared to nurses with fixed day time duty.

Conclusion: These findings of the research provided evidence that nurses employed in shifts particularly throughout nights are significantly prone to sleep disorders.

Keywords: Nurses, sleep disorders, shift work, day work, public hospital, private hospitals.

INTRODUCTION

Shift working is an important part of novel culture and is applied worldwide. About 22% of males and 11% of females were involved in regular day shift work[1]. Some professions like security forces health care providers and fire fighters are also involved in shift working.[2] Shift work can be rightly defined as working hours that occur outside of the typical 0700 to 1800 working hours.[3]

Since nurses are the vital pillar of the health care system and their fundamental tasks are to deliver services around the clock, therefore shift work is significant aspect of their job description. Nurses are doing their duties in shift and are highly prone to the risk of shift work.[4] Irregular shift rotation may create physical and psychological conditions, decreasing productivity and capability ultimately causing negligence and hands-on mistakes.[5]

Literature revealed three major causes of stress linked to shift work: interruption in the diurnal rhythm disorder of sleep leading to tiredness and altered community and personal life.[6] A study conducted in Japan to assess the psychological well-being of nurses and examine the association between psychological well-being and malpractices. The rate of errors were substantially higher among mentally poor nurses than those who were mentally healthy.[7] Working throughout night interrupts the diurnal rhythm of the body which causes too many complications as well as sleep disorders.[8] A study conducted in Canada revealed that the incidence of shift work had major outcome on the degree of tiredness faced by the participants.[9] Sleep disorder can disturb the health and activities of daily life of employees and the quality of patients' care.[1,4]

Nurses who are working in shifts might be faced with many problems related to sleep in Pakistan. Nurses have a very significant part in provision of quality care to patients. There are limited studies which have explored

the importance of nurses' concerns in Pakistan. This study have explored the important concern of Nurses. The primary concern of this study was to address the effect of shift work in day and shift workers in relation to sleep disorders among nurses working in Public and Private sectors hospitals of Peshawar, Pakistan.

METHODS

This cross-sectional study was conducted in Lady Reading Hospital (public sector hospital) and Northwest General Hospital (private sector hospital), Peshawar, Pakistan from May 2017 to August 2018. At the time of data collection there were total 673 nurses working in these two hospitals. The Solvins formula [n = N/1+N (e)^2] was applied for the calculation of sample size estimated 252 nurses. The response rate was 90.1% as 227 questionnaires out of 252 participants were returned to the researcher. The sampling selection was performed by non-probability convenient sampling technique. All nurses with at least 12 months of work experience and had been employed in the current shift for the last one month were consecutively enrolled. Nurses appointed on the administrative post, student nurses, and those who were suffering from any chronic diseases were excluded.

The approval for the study was obtained from Advanced Studies and Research Board (AS&RB) and Ethical Committee of Khyber Medical University Peshawar (IRB # DIR/KMU-EB/DS/000273). A written informed consent was obtained from all the participants of the study through a well explained consent form. Approval and permission were also sought from heads of nursing departments of both hospitals.

All participants were nominated from the attendance registers given by the Head of Nursing Department. All the enlisted nurses were approached in their allocated departments through the last 5 days of their work.

Tools: A self-administered questionnaire was used to collect the demographic, educational occupational characteristics of the participants. These include age, gender, education, experience, working unit, working hospital (public/private), current shift, and dual job. The Pittsburg Sleep Quality Index (PSQI) developed by Buysse et al, having sensitivity of 89.6% and specificity of 86.5%, was utilized to collect data about sleep pattern of the participants.[10] The 7 questions were about the sleep pattern through the past four weeks; (1)duration of sleep in hours/night, (2) quality of sleep, (3) trouble in sleep initiation, (4) trouble in maintaining sleep, (5) early morning awakening, (6) use of sleep medications, (7) attention at work. The participant suffering from at least one complaint once or twice a week was considered positive for sleep disorder. Shift work means nurses working in rotating shifts.

Statistical Package of Social Science (SPSS) version 20 was used for data analysis. Statistics of frequency and percentages were used for demographic variables and the responses of the participants. The association between demographic, educational, and occupational variables with sleep disorders were analyzed through fisher-exact/chi-square test. P-value of ≤ 0.05 was considered statistically significant.

RESULTS

Of 227 subjects, 111 (48.9%) were from public hospital and 116 (51.1%) were from private hospital. The participants included were 96 (42.3%) males and 131(57.7%) females. Majority of the participants were presented with 20-25 years of age, i.e. 116 (51.1%). Dual job was reported by 43 (18.9%) participants. There were 108 (47.6%) participants with day shift duty only while 119 (52.4%) had monthly rotations.

Pattern of sleeping showed that 114 (50.2%) participants reported >6 hours of sleeping, 73 (32.2%) reported difficulty in sleep initiation, 46 (20.3%) reported walking at night, 29 (12.8%) reported early morning awakening, 69 (30.4%) reported difficulty in day time, 3 (1.3%) reported sleep medicine intake while 15 (6.6%) were unsatisfied with the sleep quality. (Figure 1). About 69(40.6%) day workers and 101(59.4%) shift workers were suffering with sleep disorders (p-value <0.001). (Table 1)

The results of sleep problem among nurses working in day or shifts at public and private sector hospitals are summarized along with different p-value. (Table 2) Nurses having monthly rotational duty working in public hospital reported significantly higher proportion of sleep disorders as compared to those with fixed day time duty, i.e. 55 (58.5%) and 39 (41.5%) respectively (p-value 0.002). Similarly, hours of sleep <6 hours (p-value 0.001), waking at night (p-value 0.003), difficulty in sleep initiation (p-value 0.002), difficulty in day time concentration (p-value 0.005), and unsatisfied sleep quality (p-value 0.006) were the variables significantly higher in nurses with monthly rotational duty as compared to nurses with fixed day time duty at public sector hospital. While nurses working at private hospital reported complains of less hours of sleep (p-value <0.001), difficulty in sleep initiation (p-value <0.001) and difficulty in day time concentration (p-value <0.001).

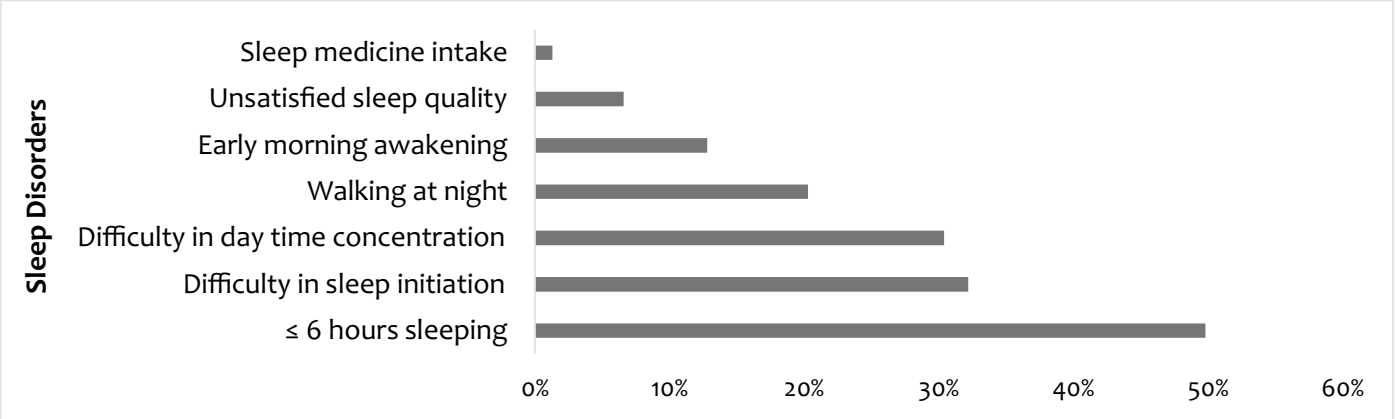

Figure 1: Pattern of sleeping disorders (n=227)

Table 1: Comparison of sleep disorders with respect to shift work and sleep characteristics (n= 227)

		Sleep Disorder		
Complaint		**Yes (n=170)**	**No (n=57)**	**p-value**
Shift	Day Shift	69 (40.6)	39 (68.4)	<0.001
	Rotating Shift	101 (59.4)	18 (31.6)	
Hours of sleep	≤6 hours	57 (33.5)	57 (100)	<0.001
	>6 hours	113 (66.5)	0 (0)	
Sleep Quality	Unsatisfied	15 (8.8)	0 (0)	0.020
	Satisfied	155 (91.2)	57 (100)	
Difficulty in Sleep Initiation	Yes	73 (42.9)	0 (0)	<0.001
	No	97 (57.1)	57 (100)	
Waking at Night	Yes	46 (27.1)	0 (0)	<0.001
	No	124 (72.9)	57 (100)	
Early Morning Awakening	Yes	29 (17.1)	0 (0)	<0.001
	No	141 (82.9)	57 (100)	
Difficulty in Day Time Concentration	Yes	69 (40.6)	0 (0)	<0.001
	No	101 (59.4)	57 (100)	
Sleep Medicine Intake	Yes	3 (1.8)	0 (0)	0.313
	No	167 (98.2)	57 (100)	

All data presented as number (%), Fisher-exact/chi-square test applied, p-value ≤0.05 considered significant

Sleep disorder was found in 170 (74.9%) nurses. Sleep disorder was found significantly higher in females 109 (83.2%) as compared to males 61 (63.5%) (p-value <0.001). Moreover, public sector hospital (p-value <0.001), dual job (p-value 0.008), and monthly rotational duty (p-value <0.001) were the variables found significantly associated with sleep disorders. (Table 3)

DISCUSSION

The study was conducted with the aim to find out the effects of shift working in relations to sleep disturbances among nurses working in public and private hospitals. The health care workers perform function on the basis of 24 hours service to provide appropriate care to their patients. Understandably

Table 2: Comparison of sleep disorders with sleep characteristics stratified based on public and private sector hospital (n= 227)

Variables		Sleep Disorders Among Public Sector Nurses (n= 111)			Sleep Disorders Among Private Sector Nurses (n= 116)		
		Yes (n= 94)	No (n= 17)	p-value	Yes (n= 55)	No (n=68)	p-value
Shift	Day Shift	39 (41.5)	14 (82.4)	0.002	46 (60.5)	15 (37.5)	0.018
	Rotating Shift	55 (58.5)	3 (17.6)		30 (39.5)	25 (62.5)	
Hours of sleep	≤6 hours	30 (31.9)	17 (100)	<0.001	27 (35.5)	40 (100)	<0.001
	>6 hours	64 (68.1)	0 (0)		49 (64.5)	0 (0)	
Sleep Quality	Unsatisfied	11 (11.7)	0 (0)	0.137	4 (5.3)	0 (0)	0.297
	Satisfied	83 (88.3)	17 (100)		72 (94.7)	40 (100)	
Difficulty in Sleep Initiation	Yes	40 (42.6)	0 (0)	0.002	33 (43.4)	0 (0)	<0.001
	No	54 (57.4)	17 (100)		43 (56.6)	40 (100)	
Waking at Night	Yes	34 (36.2)	0 (0)	0.003	12 (15.8)	0 (0)	0.008
	No	60 (63.8)	17 (100)		64 (84.2)	40 (100)	
Early Morning Awakening	Yes	18 (19.1)	0 (0)	0.069	11 (14.5)	0 (0)	0.011
	No	76 (80.9)	17 (100)		65 (85.5)	40 (100)	
Difficulty in Day Time Concentration	Yes	29 (30.9)	0 (0)	0.006	40 (52.6)	0 (0)	<0.001
	No	65 (69.1)	17 (100)		36 (47.4)	40 (100)	
Sleep Medicine Intake	Yes	2 (2.1)	0 (0)	0.544	1 (1.3)	0 (0)	1.00
	No	92 (97.9)	17 (100)		75 (98.7)	40 (100)	

All data presented as number (%), Fisher-exact/chi-square test applied, p-value ≤0.05 considered significant

rotating shift workers suffer higher sleep problems than worker engaged in regular working hours.[11]

In the current study, 74.9% nurses reported facing sleep problems. The findings of the study demonstrated that shift work is a risk factor to develop sleep disorders among nurses engaged in shift work (87% p-value <0.001). The previous though limited researches have also revealed that nurses working in shifts have reported no sleep complaints, though findings may differ among studies, working hours and professional environment.[12] The findings of current study are similar with results of other studies which demonstrate significant relationship between shift work and sleep problems.[13-16]

Public hospital nurses were more inclined to sleep disorders than the nurses working in the private hospital. The cause was not obviously revealed or investigated via questionnaire but the overall considerate indicates that patients commonly visit Government sector hospital in large number due to free treatment than private sector hospital, which increase the patient flow to government hospital and put burden on administration and nursing staff.[17] The magnitude of Sleep Disorders was higher among nurses below 30 years of age, but the statistical difference calculated was non-significant (p-value = 0.346). Previous research conducted in Iran also supported our findings of non-significant difference between age groups.[18] There were no significant associations between sleep disturbance and years of experience, age, marital status, education level and working unit, supported by other literature.[14] The findings of this present research indicated the percentage of sleep illnesses were significantly higher among female nurses (p-value = 0.001). Previous studies also support our findings, suggesting significant difference of sleep disorders among both genders.[12, 18] It is commonly believed that females are more prone to physical and mental stress than males because, beside their professional responsibilities, they have extra domestic

Table 3: Comparison of sleep disorders with demographic, educational, and occupational characteristics of the participants (n=227)

Variables	Stratification	Sleep Disorders		p-value
		Yes (n=170)	No (n= 57)	
Hospital	Public	94 (84.7)	17 (15.3)	<0.001
	Private	76 (65.5)	40 (34.5)	
Current Working Shift	Day Shift	69 (63.9)	39 (36.1)	<0.001
	Rotating Shift	101(84.9)	18 (15.1)	
Age, years	20-25	84 (72.4)	32 (27.6)	0.346
	26-30	74 (80.4)	18 (19.6)	
	31-35	9 (64.3)	5 (35.7)	
	35>	3 (60)	2 (40.0)	
Gender	Male	61 (63.5)	35 (36.5)	<0.001
	Female	109 (83.2)	22 (16.8)	
Marital Status	Single	114 (72.2)	44 (27.8)	0.150
	Married	56 (81.2)	13 (18.8)	
Educational Level	RN	120 (74.5)	41 (25.5)	0 .371
	Post RN BSN	23 (76.7)	7 (23.3)	
	Generic BSN	27 (77.1)	8 (22.9)	
	MSN	0 (0.0)	1 (100)	
Experience	1-3 years	71 (68.9)	32 (31.1)	0.210
	4-6 years	59 (83.1)	12 (16.9)	
	7-10 years	33 (75)	11 (25)	
	>10 years	7 (77.8)	2 (22.2)	
Working Unit	Emergency	31 (67.4)	15 (32.6)	0.095
	Critical Units	53 (76.8)	16 (23.2)	
	Medical Units	51 (85)	9 (15)	
	Surgical Units	35 (67.3)	17(32.7)	
Second Job	Yes	39 (90.7)	4 (9.3)	0.008
	No	131 (71.1)	53 (28.8)	

All data presented as number (%), Fisher-exact/chi-square test applied, p-value ≤0.05 considered significant

responsibilities, daycare and gravidity etc.[7]

The results of the current research indicated the prevalence of sleep disorders were much higher (p-value <0.01) amongst nurses employed in rotational shifts (84.9%) than day shift (63.9%). The findings were also supported by previous studies conducted by Hosseini and Roshandel.[4,18] Poor sleep quality and shorter sleep duration may lead to fatigue, drowsiness and difficulty in concentration on daily activities. Korompeli *et al*. also suggest that shift work decrease sleep quality and quantity ultimately leading to fatigue.[19]

The current study discovered that 38.7% of nurses involved in shift work reported difficulty in concentration to perform activities of daily life. A study conducted by Caruso found that people with inadequate sleep feel drowsy, sleepy, are less alert and can fall asleep involuntarily that can lead to dangerous situation in critical conditions like driving or providing care to the patient.[20] It was also discovered that nurses engaged in shift work were two times higher at risk to make errors or encounter work place injuries.[4] Furthermore, sleep disorders were significantly higher (p-value <0.01) among nurses practicing second job than those who were not. Nurses working in a rotating shift roster remained more prone to sleep and other physical and psychological ailments. Female nurses with dual duties were having the greatest effects of

sleep disorders. On the other side, Government sector nurses were likely having sleep problems.

Some limitations of the study need to be considered prior to making conclusions. There is no control group or data of general population to compare the difference of sleep problems between hospital staff and general population. The study has limitations in term of selection of two hospitals for the sample which might have caused sampling bias and affected the generalizability of the findings. Still the findings can be applied to the nurses in other hospitals of the country for being possessing the similar professional environment. Furthermore, the study did not clarified the type of work burden and it is difficult to include all the factors in a single study. Further investigations are required in order to fully understand the entire issues that can effect an individual's health and social life in health care settings in other cities and other sectors as well. A multicenter qualitative study is required to explore the differences between various shift-work schedules and consider other factors like social life, emotional health and chronic fatigue.

CONCLUSION

This study clearly supports the link between shift works and sleep problems among nurses. The prevalence of sleep problems was significantly higher among nurses engaged in rotating shift work than day shift workers. The Working around the clock in different shifts is undisputable, the management, staffs and legislatures should emphasize on well beings and welfare of nurses and patients. Since shift work is an essential part of modern world, further research using larger population is needed to explore the problem and develop strategies to reduce it. Shift work is undeniable, certain individual and institutional level recommendations may be applied along with policy making to reduce the burden sleep problems. Individual nurse should adopt healthy habits and ideal environment to promote sleep. Furthermore the schedule should be planned in such a pattern that body may adjust its natural circadian rhythm i.e. 48 hours rest after night shift.

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ETHICAL APPROVAL: The study protocol was approved by the Ethics Board of the Khyber Medical University, Khyber Pakhtunkhwa akistan.

AUTHORS' CONTRIBUTION: A Conceptualization, methodology, resources, formal analysis, writing. SA: Supervision, methodology. AK: Writing- review & editing, project administration. KK: Writing-original draft, formal analysis. MU: Investigation, visualization. HZ: Writing-review & editing.

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