

Effects of shift work on the quality of sleep and psychological health of the professional nurses

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Abstract

Introduction: In modern society, shift work is very common, and health professionals, especially nurses, are bound to work in shift duties to provide round-the-clock health care to their patients throughout the year. Shift work disorder is a circadian rhythm disorder that is associated with sleep problems and sleepiness that usually occurs with the shift work.

Objective: To identify the effects of shift work on the quality of sleep and psychological health of professional nurses.

Methodology: The research was conducted in different public and private hospitals of Karachi, Pakistan, on nurses with shift schedules.

Results: Presently around 65.8% nurses performed eight night shifts per month and around 34.2% do more than eight night shifts per month. Various problems come across by nurses during shift work, which include physical, social, economic, psychological, and physiological health issues. Problems vary from individual to individual. Sleep quality of nurses was evaluated by using Pittsburgh Sleep Quality Index and majority of nurses (56.3%) experienced poor sleep quality due to night shifts.

Conclusion: The results of the study suggest that shift duties caused physiological and psychological stress to nurses who work in shifts. Only few nurses preferred to work in shift duties. Thus, it was concluded that sleep evaluation strategies should be formulated to improve the quality of sleep and improve the process in delivering of quality of care to sick patients.

Keywords: Nurses, Shift schedule, Mental health status, GHQ, PSQI.

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Introduction

In modern society, shift work is very common. About 17% European workforce appoints for shift work and about 39% have irregular working hours. Shift work exerts harmful effects on workers that include health, sleep, family, and social life problems and other issues such as accidents and errors in workforce life¹.

Health-care professionals are bound to work in shifts to meet the health needs of the individuals throughout the world². Nurses as health-care providers are bound to work in shift duties to furnish the needs of their patients round the clock throughout the year. Shift work as well as prolonged duty hours has been shown to have great impact on the social, physical, and psychological health of a nurse³. Female nurses with family responsibilities and those who are pregnant can greatly worsen their health doing night shifts. Various studies have suggested that shift work can pessimistically affect the nurses' performance; sleep; physical, social, emotional, and family life; and can affect the level of job-related pressure. Thus, this can negatively impact the workplace and decrease the performance at job⁴.

Shift work is associated with many psychometric disorders that include neurocognitive and other systemic complications. The symptoms vary from increased tiredness to decreased alertness, motivation levels and productivity at work, changes in mood, irritability, and other health issues such as gastrointestinal, musculoskeletal, and cardiovascular problems⁵. Many physiological activities including metabolism and appetite are also affected^{6,7}. An increased risk of developing breast cancer in female nurses or staff working in night shifts has also been documented⁸.

Sleep disturbance is the most frequently observed symptom in shift workers⁹. An altered pattern of sleep and wakefulness and irregular working hours of nurses working in shift duties cause desynchronization in physiological systems of the individual and disturb circadian rhythm¹⁰, which leads to several short- and long-term effects¹¹. Shift work disorder (SWD) is a circadian rhythm disorder that is associated with sleep problems and sleepiness during working hours among shift workers. Other factors that affect sleep for the night shift workers include noise, daylight, or conditions resulting in chronic pain such as arthritis, gastroesophageal reflux disease, premenstrual syndrome, stress, anxiety, and depression¹². Pain and discomfort like many other sleep disruptions limit the depth of sleep and allow only brief episodes of sleep between awakenings.

The study was conducted on nurses working in public and private hospitals in Karachi, Pakistan, to identify the sleep-related problems associated with shift work and variable work schedules and to determine the effects of shift work on work performance and psychological health and well-being of professional nurses.

Methodology

It was a cross sectional study conducted on professional nurses of public and private hospitals of Karachi working in shift duties. A total of 250 questionnaires were distributed among nurses through nonprobability purposive sampling, of which 18 were incomplete and 10 were not returned. Thus, the total response rate was 88.8% (222 responses). Professional nurses working in shift duties of both the genders were included in the study whereas those who worked only in the day shift along with student nurses and worked part time were excluded from the study.

Data collection was completed from April to July 2014. General Health Questionnaire (GHQ) and Pittsburgh Sleep Quality Index (PSQI) were used to measure the effects of shift work on quality and psychological health of nurses.

GHQ comprised 12 items on a Likert scale of 0–3. Scores greater than 15 suggest evidence of distress whereas scores greater than 20 suggest presence of some serious problem and psychological distress^{13,14}. PSQI comprised 10 questions that were related to sleep habits during the past month only, also on a Likert scale of 0–3. Seven factors of PSQI were assessed that include duration of sleep, sleep latency, sleep disturbance, sleep efficiency, overall sleep quality, need for medicine, and day dysfunction due to day sleepiness¹⁵.

The statistical analysis was performed using SPSS software, version 16. A written informed consent was obtained from all the participants and confidentiality and anonymity was ensured.

Results

Table 1 shows that the maximum respondents were single (69%), women (57.2%) and belonged to the age group of 22–26 years (77.9%), and were working in private hospitals (60.4%) with basic nursing qualification of BScN (50.9%).

Table 2 indicates the frequencies of the shift-related factors. Majority of the nurses had worked for eight or less night shifts per month (65.8%), had less sleep-related disorders (76.1%), and had not used hypnotics for inducing sleep (79.7%).

Table 3 shows the frequencies of PSQI factors. Seven factors that were identified include sleep duration, sleep

Table 1: Demographics

Variables	Categories	Percentage frequency
Gender	Male	42.8
	Female	57.2
Age (years)	22–26	77.9
	27–31	7.2
	32–36	13.1
	37–41	1.8
	Greater than 41	0
Marital status	Single	69
	Divorced	1.8
	Widowed	1.8
	Married	27.5
Education	RN	45.5
	BScN	50.9
	MScN	1.8
	Midwifery	1.8
Number of children	0–1	74.8
	2–3	22.1
	More than 3	3.2
Organization	Public	39.6
	Private	60.4

disturbance, sleep efficiency, sleep latency, needs of medicine, day dysfunction due to sleepiness, and overall sleep quality. It was calculated using scoring chart¹⁵. Score 0 showed better result whereas score 3 showed worst result. The total of these seven factors gave the value of total PSQI.

A greater number of women working in the shift duties might be the reason for the significant association between gender and number of working hours per day ($p < 0.001$). Maximum number of nurses worked more than 8 h, which is one of the reasons of distress and poor quality of sleep. The significant ($p = 0.006$) association between mental health status of nurses with the number of night shifts per week showed that maximum of the nurses who worked for more than two night duties per week have greater evidence of distress. Around 25 of the participants who worked for more than two night shifts had chances of severe psychological

Table 2: Frequencies of factors related to shift work

Variables frequency	Categories	Percentage
Number of working hours per day	Less than 8	43.2
	More than 8	56.8
Years of experience	Less than 5	65.8
	More than 5	34.2
Night shifts in a week Two	55.9	
	More than two	44.1
Average number of night shifts in a month	Eight or less	65.8
	More than eight	34.2
Working in night shift as part time	Yes	22.1
	No	77.9
Aware of any other factor affecting sleep	Yes	47.7
	No	52.3
Sleep-related disorder	Yes	23.9
	No	76.1
Use of medicines or hypnotics	Yes	20.3
	No	79.7
Do you smoke	Yes	20.
	No	79.7

distress and mental illness. A significant difference ($p = 0.026$) was observed between the sleep disturbance and average night shifts per month.(Table 4)

The relation of sleep latency and average number of night shifts per month was highly significant ($p = 0.000$). However, nurses performing eight night shifts per month had greater effect on sleep latency. (Table 4)

A significant association ($p = 0.004$) was found between the day dysfunction due to sleepiness and work schedules. Sleep efficiency was found to be better among majority (97) of the nurses, and thus nonsignificant difference was found between the average number of night shifts per month and sleep efficiency of the nurses, showing shift duties did not influence sleep efficiency much. (Table 4)

Overall sleep quality of the nurses showed a significant difference between overall sleep quality and average night shifts. Those who performed eight night shifts per month had better sleep quality as compared to those who performed more than eight night shifts per month ($p = 0.002$).

Table 3: Results of Pittsburgh sleep quality index

Variables	Categories	Percentage
Duration of sleep	0 (Better)	51.4
	1	32.4
	2	14.4
	3 (Worse)	1.8
Sleep disturbance	0 (Better)	9
	1	63.5
	2	23.9
	3 (Worse)	3.6
Sleep latency	0 (Better)	18
	1	45.9
	2	23.4
	3 (Worse)	12.6
Day dysfunction due to sleepiness	0 (Better)	30.6
	1	36.5
	2	25.7
	3 (Worse)	7.2
Sleep efficiency	0 (Better)	71.2
	1	14.4
	2	5.4
	3 (Worse)	9
Overall sleep quality	0 (Better)	18.5
	1	52.7
	2	18
	3 (Worse)	10.8
Needs medicine to sleep	0 (Better)	59.9
	1	27.5
	2	9
	3 (Worse)	3.6

The association between night shifts per month and intake of medicines and hypnotics for sleep was not significant. Around 97 respondents did not take medicines to sleep as their sleep efficiency is better because they worked for average eight night shifts per month. This effect could also be contributed to awareness that they have regarding the use of hypnotics as health-care professional.

The association between sleep quality index and average number of night shifts per month was found to be significant ($p = 0.005$), which indicated that those nurses who worked for more than eight night duties per month had poor quality of sleep. Sleep quality index was calculated by scoring chart provided by author, and overall results also showed that maximum of nurses had poor quality of sleep due to shift schedule.

A significant relation was observed in age group and sleep-related disorder showing that sleep-related disorders can increase in individuals as their age increases. Majority of nurses fall in the age group of 22–26 years. The relation between organization and sleep quality index showed that almost equal number of nurses both in public and in private sector had poor sleep quality index.

The scores of GHQ in the studied sample showed that almost 68% nurses had some form of distress (34.7%) or severe psychological problem. The results of PSQI showed that majority of the nurses had poor quality of sleep that can be related to shift work. The calculation of the index was done using the guidelines provided in literature¹⁵.

Table 4: Association between variables with p -value ($N = 222$)

Variable 1	Variable 2	p-Value*
Gender	Number of working hours per day	0.001*
Night shifts per week	Mental health status	0.006*
Average number of night shifts per month	Sleep disturbance	0.026*
Average number of night shifts per month	Sleep latency	0.000*
Average number of night shift per month	Day dysfunction due to sleepiness	0.004*
Average number of night shifts per month	Sleep efficiency	0.902
Average number of night shifts per month	Overall sleep quality	0.002*
Average number of night shifts per month	Needs medicine to sleep	0.015*
Average number of night shifts per month	PSQI	0.005*
PSQI	Sleep-related disorder	0.058
Number of working hours per day	PSQI	0.007*
Sleep-related disorder	Use of medicines	0.000*
Age	Sleep-related disorder	0.002*
Organization	PSQI	0.013*

* p -Values < 0.05 = significant.

Statistical test applied = χ^2 -test.

Discussion

Shift work is essential when it comes to health-care delivery. Nurses and paramedical staff work day and night in shifts to ensure the proper care and management of the patients. However, appropriate supervision and proper arrangements for shift workers can increase the effectiveness and efficiency while working for extended hours.

Sleep quality index of nurses was explored in this study showing a better sleep efficiency in 71% nurses working in shift duties, but poor sleep latency was observed (12.6%). These results may imply the choice of shift duties for certain individuals as some nurses prefer to work in night shifts, which can be explained by the difference in circadian rhythms¹⁶.

The survey examined that almost 68% nurses working in shift duties had reportedly some form of distress or psychological problem whereas only 32% claimed to be mentally healthy. Previous studies have shown that medical errors were significantly higher in group with poor mental health than the group in good mental health¹⁷. The results of this study showed that around 56% nurses had PSQI, which might be due to night duties¹⁸.

Studies have reported an insignificant association between the shift work and sleep-related disorders¹⁸. However, this study has found a significant difference ($p = 0.006$) between the mental health status of nurses and night shifts per week. The results are in accordance with another study that showed a significant relation between 12-item GHQ score and night shifts as compared to the group without any shift duties¹⁷.

The most prominent finding of this study was the significant difference between the sleep quality and average number of night shifts with the p -value of 0.005. The nurses working for more than eight shifts per month (65%) were found to have poor sleep quality as compared to those who worked for less than eight shifts per month. Studies have reported that the mean value of perceived sleep quality and the shift work showed significant effect on subjective significance questionnaire (SSQ) scores. Although the study observed the nonsignificance between the quality between various days within one phase of shift cycle, duration of three phases of shift cycle was significantly higher during day shifts and lower in night shifts. This could be also influenced by the ad hoc or permanent nature of individual's job as the permanent employees get lesser rotations as compared to temporary employees¹⁹.

Sleep-related disorders were also found in different age groups of this study. Largest group of participants was from 22 to 26 age group, and association between the age and sleep-related disorder showed a significant p -value of 0.002. SWD was also found in previous literature, and the association between the sleep disorder with age, sex, circadian type, and night work was also identified. The prevalence of symptoms related to sleep because of shift work was high²⁰.

Sometimes shift schedules may not be suitable for the female staff in the health-care system, particularly in Pakistani culture. Similarly, in this sociocultural scenario, it also becomes very difficult for the women to work in the rotating shifts as they have dual responsibility of families and children. Various problems such as traveling during night for women would also be very difficult and around 57.2% nurses were women in this study. Thus, the factors such as personal, social, cultural, and environmental perspective of nurses need to be addressed appropriately and need greater attention²¹.

Limitations

The main limitation of this study was that the study design does not comprise control group of nurses.

Conclusion

This study has shown that shift duty has some kind of psychological and physiological effect on all age groups, and one of the worst affected things is sleep. Maximum of responses from nurses have shown poor quality of sleep due to night shifts.

Recommendations

A healthy nurse can look after the patients more efficiently and effectively. Work schedules, especially shift duties, should be designed such that they do not compromise the health and, particularly, sleep habits of nurses. Shift work should be safe, secure, free of hazards, flexible, and facilitated with encouragement and motivation for those nurses who prefer the shift duties.

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