Original Article

Effect of shift work on dietary habits and occupational stress among nurses in a tertiary care centre: An observational study

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Abstract

Introduction: Shift work comprises work hours other than 9 am to 5 pm. Healthcare jobs such as nursing have been associated with shift work, which can affect their overall health status. Due to excessive workload and instability in working hours, nurses are also prone to higher occupational stress. **Materials and Methods:** A descriptive study, Cornell Medical Index (CMI) questionnaire, 24-h recall method, and occupational stress score (OSS) were used to assess overall health, calorie intake, and occupational stress among nurses working in a tertiary care centre in Central India. **Results:** The mean age of participants in the control and study groups was 43.2 ± 6.059 years and 43.93 ± 5.20 years, respectively. Neither of the group's participants had poor nutritional status. CMI health scores revealed poor mental health among the study group. Severe occupational stress was observed in 57% of participants, and 33% had moderate occupational stress. Among the causes of occupational stress, 92% cited unfavourable work conditions, and 88% pointed out the workload. Poor peer relations and low status were cited by 77% and 57% of participants. **Conclusion:** This study highlights the harmful effects of shift work on health of nurses. These negative effects are usually linked to poor diet and stress, which can be induced by overwork, poor sleep, or both. This study found that high workload is the main cause of occupational stress. Sleep disruption, lack of exercise and excess work load are major contributors for occupational stress and unhealthy eating habits. More awareness regarding importance of good diet and stress management may aid in improving health of nurses working in shifts.

Keywords: Dietary habits, nursing, occupational stress, shift work

Introduction

To meet the increased demand for 24-h services, shift work jobs have become more prevalent. Shift work can be defined as work hours that fall outside the traditional 9 am–5 pm schedule.[1] Nurses, doctors, and other healthcare staff work frequently in shift work to provide round-the-clock services. Several epidemiological studies revealed that people working beyond traditional working hours (9 to 5) are more prone to developing chronic diseases like cardiovascular disease, diabetes, metabolic syndrome, or even cancer. Shift work is also associated with sleep disorders, and obesity.[2]

Nurses often work in shifts to provide round the clock care to patients. It is the largest component of the Indian healthcare system; nurses not only play a role in providing quality care but also in maintaining a good quality of life. India has an average

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of 1 nurse for every 2500 residents, compared with 1 for every 150–200 in developed countries.[3] It is a stressful profession with a lot of workload, which may have ill effects on the physical and psychological well-being of an individual's health.[4] The job of nurses requires working in irregular shifts along with bearing heavy physical and psychological demands, which, in turn, risk their overall health status.[5] A recent survey of Korean nurses reported that about 10% of shift work nurses cited health problems as their main reason for resigning.[6]

Nursing is also associated with high levels of occupational stress. High stress not only affects in terms of health, well-being, and job satisfaction but also can reduces the quality of services provided and may decrease effects efficiency of nurses.[7] Menzies (1960) was the first to identify work stress among nurses. Patient care, decision-making, taking responsibility, and instability were the main stressors reported in his study.[8] Increasing use of technology, continuing rises in healthcare demands, and instability within the work environment have contributed more to this stress.[9]

Among the issues closely related to irregular working hours is the irregularity of food consumption. This abnormal circadian timing of meals may have adverse effects on the processes of digestion, nutrient absorption, enzyme activity, and metabolism, as well as the sensations of hunger, appetite, and satiety.[2] In a study by Han *et al.*[9] (2016), it was revealed that meal irregularity, skipping breakfast, and eating snacks at night, while less frequently eating three main meals per day and more fruit servings per day, was frequent among night shift workers. However, another study on a similar group of professional nurses by Beebe *et al.*[10] (2017) reported no differences between the dietary habits of day and night shift nurses and day shift nurses.

This study aimed at analysing the effect of shift work on occupational stress, nutritional habits, and the overall health of nurses in a tertiary care centre in Central India.

We used the 24-hour dietary recall method to calculate nutritional habits among nurses, and the Cornell Medical Index (CMI) health questionnaire was used to calculate overall health scores. The CMI health questionnaire was devised to meet the need for an instrument suitable for collecting a large body of pertinent medical and psychiatric data. The complete CMI contains 195 questions in informal language, including Hindi, made by Narendra Nath Vig, Dwarka Prasad, and Santosh Kumar Verma (Appendix 1). The questionnaires were administered to the patients by the investigators.

A modified occupational stress scale (OSS) was used to assess occupational stress among participants. It was developed by A.K. Srivastava and AP Singh. It measures the frequency with which stressful occurrences impact the workers. The measure contains five subscales that assess the extent of occupational stress due to job responsibilities, quality concerns, role conflict, job vs. non-job conflict, and workload (Appendix 2).

Materials and Methods

This is a descriptive study conducted in the Department of Physiology at a teaching institution in Central India after obtaining all necessary permissions from the institute (letter no: 239/MC/PHY/09). The study enrolled 90 nurses within the age range of 30 to 50 years with a minimum of 5 years of work experience in healthcare-related shift work, and 30 age and sex-matched nonworking females were taken as the control group. All participants were explained the purpose of the study, and informed consent was obtained.

The height of the participants was measured to the nearest millimetre by a wall-mounted stadiometer, and weight was measured with a spring balance to the nearest 0.5 kg, avoiding zero and parallax errors. Body mass index (BMI) was calculated. The Asian criterion for BMI was followed for grouping the subjects based on the level of BMI.

The 24-h recall method was used to calculate calorie intake, and participants were classified as per the ICMR (1988) criteria. The CMI health questionnaire was used to assess the overall health status of the participants. OSS was used to assess the occupational stress. Both questionnaires were administered by the investigators, and data was entered in Excel, followed by data analysis.

Results

The study included 90 female nurses and 30 nonworking age-matched females. The mean age of participants in the control group was 43.2 ± 6.059 years, and in the study group was 43.93 ± 5.20 years.

The BMI distribution of participants was based on the Asian Criterion. As illustrated in Table 1, the study group had a greater number of overweight participants. There was a significant ($P < 0.05$) difference between the BMIs of both cases and the control group ($P = 0.039$).

Table 2 classifies the participants based on their nutritional status and calorie intake. Most participants in both groups had good nutritional status, and neither of them belonged to the poor nutritional status category. We also reported significant differences ($P < 0.05$) between the calorie intake of both groups ($P = 0.000257$).

Table 1: Classification based on BMI

Group Based on BMI	Control (*n*=30)	BMI (Mean±SD)	Study group (*n*=90)	BMI (Mean±SD)
Underweight (<18)	0	0	0	0
Normal weight (18–25)	24 (80%)	22.6±1.54	54	22.58±1.67
Overweight (>25)	06 (20%)	26.30±0.93	46	26.63±1.42
Obese (>30)	0	0	0	0
Total	30	Mean±SD	90	

BMI=Body mass index, SD=Standard deviation

Table 2: Calorie intake of participants

Group based on Percentage of Recommended 24 hours calorie intake (24 hr. calory intake in Kcal)	Control *N*=30	24 h calorie intake Kcal (Mean±SD)	Study group *N*=90	24 h calorie intake Kcal (Mean±SD)
Poor nutritional status (Percentage of Recommended 24 h calorie intake <64; 24 h calorie intake <1424)	-	-	-	-
Fair nutritional status (Percentage of Recommended 24-h calorie intake 65–74; 24 h calorie intake 1425–1645)	09 (30%)	1555.22±52.66	56 (62%)	1521±54.29
Good nutritional status (Percentage of Recommended 24-h calorie intake 75–84; 24 h calorie intake 1646–1869)	13 (43%)	1742.5±68.94	25 (28%)	1758±65.83
Excellent nutritional status (Percentage of Recommended 24-hour calorie intake >85; 24 h calorie intake >1869)	08 (27%)	1983.33±77.62	9 (10%)	1933±85.

SD=Standard deviation

Scores of the CMI health questionnaire are depicted in Table 3. Participants in the study group had more participants in poor physical and mental health scores. However, no significant difference was observed between the CMI health scores of both groups.

Based upon the occupational stress, the study group participants were divided into two groups, namely, moderate stress and high stress [Table 4].

We also aimed to assess, the various causes of occupational stress among participants of the study group. Various causes are illustrated in Table 5.

Table 3: CMI health score among the study and control groups

Health status	Control	Mean score (Control)	Study group	Mean score (study group)
Physical health				
Very good (<15)	0	0	06 (6.67%)	12.67±1.17
Good (15–20)	18 (60%)	9.78±3.09	16 (17.16%)	18.19±1.79
Fair (20–25)	06 (20%)	16.8±1.28	15 (16.67%)	22.93±1.53
Poor (>25)	06 (20%)	22.6±137	53 (58.8%)	36.94±6.57
Mental health				
Good (≤3)	30 (100%)	2.1±0.71	14 (15.56%)	2.29±0.73
Poor (>3)	0	0	76 (84.44%)	5.84±1.53

CMI=Cornell Medical Index

Table 4: Occupational stress among the study group

Group	No. of subject (%)	Mean OSS±SD	*t*	*P*
I – Moderate stress (*n*=33)	33 (36.67)	160.96±19.11	I v/s II 3.99	<0.001
II – High stress (*n*=57)	57 (63.33)	198.57±9.99		
Entire series	90	184.79±22.95		

OSS=Occupational stress score, SD=Standard deviation

Table 5: Causes of occupational stress among participants of the study group

Subscale	Entire	
	n=90	%
Work overload	79	88
Ambiguity	13	14
Role conflict	12	13
Political/Group pressure	24	27
Responsibility	41	46
Under participation	50	56
Powerlessness	32	35
Poor pear relation	69	77
Intrinsic impoverishment	53	59
Low status	33	57
Unfavourable working condition	83	92
Unprofitability	62	69

Discussion

This study aimed to analyse the effects of shift work on occupational stress, health status and nutritional habits of nurses in a tertiary care centre. We found an increased occupational stress in nurses working in night shifts, which is in accordance with the findings of Sharma *et al.*[7] (2014), who also reported elevated professional stress among nursing professionals. We also reported poor mental health status among nurses when compared to the control group as per the CMI health score. Study by A Lowden *et al.* (2010) reported that Shift workers are more likely to develop metabolic disorders and diseases include obesity, cardiovascular disease, peptic ulcers, gastrointestinal issues, blood sugar control issues, and metabolic syndrome. Some of these complaints may be linked to diet quality and timing, but other factors affecting metabolism, such as stress, circadian rhythm disruption, sleep debt, physical inactivity, and lack of rest, may also contribute.[11]

In another study by PC Lin *et al.*[12] (2015), it was reported that nurses working in shift hours experienced higher stress. They also pointed out that nurses' stress levels improved if they got at least 2 days off after their most recent night shift and if they were not scheduled to work 7 consecutive days.

Studies by Paola Ferrie *et al.*[13] (2016) and DL Brown *et al.*[14] (2009) reported that nurses working in a rotating night schedule are more susceptible to experiencing job disenchantment and adverse physiological and psychological health effects such as stress and anxiety, in comparison to nurses working regular shifts.

Most nurses in our study reported work overload as a major contributor to occupational stress, which is consistent with the findings of Lin *et al.* (2015), AE Rogers *et al.* (2004)[15] and K Umehara *et al.*[16] (2006). Due to excessive workload, most

nurses are forced to work more than their scheduled work hours, which results in fatigue, stress, and other complications.[12]

Most people have a circadian rhythm, which synchronises activity and relaxation throughout 24 h. Shift work can disrupt circadian rhythms, causing stress, lack of appetite, poor food habits, and increased risk of depression, anxiety, obesity, diabetes, and other diseases. Shift workers might face desynchronisation between their circadian rhythm and the external environment over the long term, which leads to stress due to an incomplete adjustment process in the body, which may contribute to increased stress among night shift working nurses.[12]

Calorie Intake was mostly fair or good in both the control and study groups. However, higher BMI reported in the study group can indicate poor food quality despite normal calorie intake. In a study on nurses in India, the night shift workers reported to consume fewer main meals but were more likely to consume snacks during the night duty. However, Zhao et al (2011)., in their study also reported that more overweight and obese participants in their study in the shift work group.[17] In a study by Sahu et al (2011) it was observed that nurses working in shifts had lower appetite and eating satisfaction. It was also reported that nurses working in shift had lower intake as per ICMR recommended value, which is inconsistent with the findings of our study.[18]

The type of work and eating habits are closely related. In a study by Persson *et al.*[19] (2006), fatigue and lack of time had a negative effect on the diet and exercise habits of nurses working at night, leading to poor nutritional habits and increased risk of obesity and other metabolic issues. The increased intake of sugar and high carbohydrate food during night shifts, along with increased intake of caffeinated beverages, indicate poor dietary choices. They also cited fatigue as the reason for not exercising. Nocturnal feeding disrupts intestinal motility, influencing the digestion, absorption, and usage of pharmacological medicines and nutrients, which explains the increased prevalence of obesity and other metabolic issues.

Limitations

Our study possess certain limitations in terms of small size and difference in number of participants in both study groups. Additionally, the 24-hour dietary recall method, takes into account the quantify the dietary intake but does not give information about the quality of it.

Future Scope of the Study

The prospective areas for further investigation in this study may include the quality of food. We may also include factors that contribute to poor diet and increased stress, and such studies can be done in future to devise methods that can help shift workers recover from issues faced by their work timings. More such comparative studies can be done comparing various types of healthcare settings in different regions with different work conditions.

Conclusion

According to this study, shift work has several negative effects on the health and well-being of nurses. These negative effects are generally related to inadequate and bad food intake as well as increased stress, which can be caused by either an excessive amount of work or poor sleep, or both. According to the findings of this study, organisational factors such as high workload is the major contributing factor to occupational stress. Disrupted sleep-wake cycle and lack of time for physical activity influenced the eating habits of all nurses. Awareness regarding stress management and importance of good diet should be given to improve the health status of nurses.

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Conflicts of interest

There are no conflicts of interest.

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Appendix 1

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Appendix 2

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