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# Sleep Quality and Related Health Problems among Shift Working Nurses at a Tertiary Care Hospital in Eastern Nepal: A Cross Sectional Study

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## Abstract

**Background:** Nurses working in shift duties play a crucial role in providing 24/7 medical services in a hospital. Shift workers are known to be associated with various medical conditions and they have poor quality of sleep. Shift rotation duties also adversely affect their personal and social domain. There is paucity of literature from Nepal looking into impact of shift-work on general health and quality of sleep among the nurses.

**Material and methods:** A cross-sectional study was conducted among shift working nurses at Nobel Medical College Teaching Hospital between April-July 2017. 148 respondents were selected from different stations of the hospital. Structured pro-forma was designed which included demographic and job characteristics, satisfaction of respondents in their domestic and social domain, common symptoms of medical conditions as well as Pittsburgh Sleep Quality Index (PSQI) questionnaire.

**Results:** 111 (75%) of the 148 participant nurses in our study had Pittsburgh PSQI score of 5 or more indicating their poor sleep quality. The gastrointestinal symptoms of stomach upsets, nausea and stomach pain were more common symptoms followed by back pain and weight gain. There was significant correlation between GI disturbance and Back pain with PSQI scores ( $p < 0.01$ ). Shift work also affected the personal, family and social relations of the nurses.

**Conclusion:** Shift-rotation leads to poor sleep quality among the nurses. Not only general health condition is adversely affected but family and social relations are at risk for the nurses.

**Keywords:** Sleep quality; Health problems; Shift work; Nurses

## Introduction

Shift work is an employment practice where the 24 hours of in a day are divided into number of shifts to provide 24/7 services. Health institutions must provide 24-hour facilities to the population and thus shift-rotation duties are mandatory. Nurses working in shifts have a crucial role in providing round the clock medical facilities in hospitals.

Shift workers are shown to be associated with increased risk of myocardial infarction, coronary events and ischemic stroke [1]. The problem of overweight and obesity as well as varicose veins is known to occur more commonly in shift workers irrespective of their dietary habits and physical activity levels [2,3]. Shift work is also a known risk factor for development of medical comorbidities such as hypertension, diabetes and peptic ulcer [4,5]. There is also association between shift work and undesirable pregnancy outcomes as well as increased risk for breast cancer [5]. Family and marital responsibilities can be severely disrupted by shift work. Child care, house-work, shopping, and leaving a partner alone at night can all lead to marital strain and family dysfunction [6].

Sleep is an integrated part of human life and it is hard to imagine a human life without sleep. Sleep is crucial for almost every aspect of human well-being. Various studies have shown the poor quality of sleep among shift workers [3,5,7,8]. Poor sleep among shift working nurses is associated with a lower work performance and a higher risk of medical errors which may jeopardize patient's safety [9]. Anxiety and insomnia in shift working nurses adversely affects their physiological and mental well-being [10].

Nursing is a noble profession and shift working nurses put their own health at risk for service to the humanity. There is abundant literature published from across the globe to look into sleep quality and associated medical conditions among shift working nurses. Alas, there is no study published in this scenario from Nepal. By analyzing the sleep quality and associated medical conditions in shift working nurses, our present study aims to fulfill the same lacuna.

## Materials and Methods

A descriptive cross-sectional study was conducted among shift working nurses at Nobel Medical College Teaching Hospital, Biratnagar, Nepal between April-July 2017, after approval from the Institutional Ethics Committee. Sample size was calculated using the formula was  $n=1.962 \times p \times (1-p)/0.052$ , with reference to similar study among shift working nurses published from Iran [11], which came out to be 148. Random sampling method was used to ensure participation of nurses from different stations of the hospital. Shift working nurses with job experience of less than 6 months and those who refused to give consent for the study were excluded from the study.

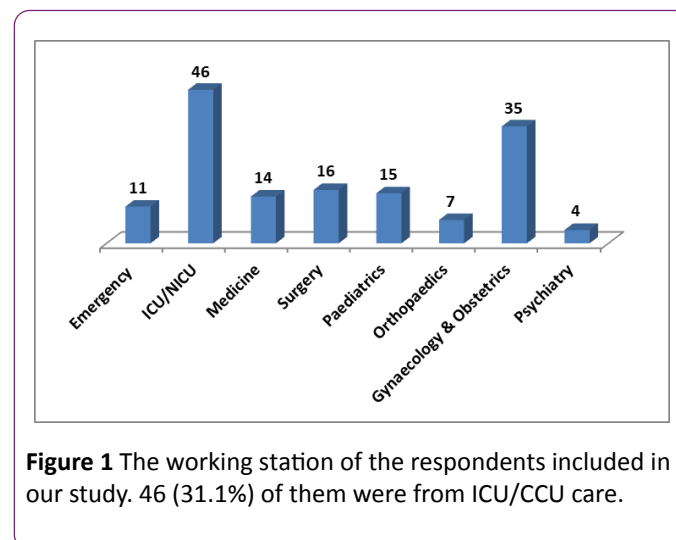
All the data were recorded using prefixed Pro-forma which included demographic characteristics such as age/gender, job characteristics such as working department, number of night shifts/months, satisfaction of respondents in their domestic and social domain, common symptoms of medical conditions as well as Pittsburgh Sleep Quality Index (PSQI). PSQI is an effective questionnaire with seven components to assess the quality of sleep [12]. Scoring of answers is based on a 0 to 3 scale, where by 3 reflects the negative extreme on the Likert scale (0=not at all, 3=extremely). Total score of less than 5 in PSQI questionnaire reflects poor quality sleep of the respondents. Data were entered in SPSS version 18. It was then analyzed by using descriptive statistics as well as Pearson Correlation Coefficient. P value of <0.05 was considered to be statistically significant.

## Results

All 148 shift working nurses included in our study were females. Majority 83 (56%) of them belonged to the age group 20-30 years, whereas 38 (25.7%) were below 20 years of age and 27(18.2%) of them were older than 30 years of age. 87 (58.8%) of them were married. Looking at their level of education we found that majority 113 (76.4%) were Proficiency Certificate Level (PCL) Nurses, whereas 15 (10.1%) were Auxiliary Nursing Midwives (ANM) and 20 (13.5%) have completed their bachelor level training (BN and Bsc Nursing). 55 (37.2%) of them had job experience working in shift

rotations of 1-2 years, 46 (31.1%) of them had job experience of more than 2 years and 47 (31.7%) had job experience of less than 1 year.

The bar diagram shown below summarizes the working station of the respondents included in our study. 46 (31.1%) of them were from ICU/CCU care (**Figure 1**).



**Figure 1** The working station of the respondents included in our study. 46 (31.1%) of them were from ICU/CCU care.

Majority 120 (81.8%) of them were doing night duties because of the obligatory shift rotation policy by the hospital whereas 28 (18.2%) of the nurses were doing night shift duties as per their personal preference. Majority 112 (75.5%) of them had to perform 9 or more-night duties in a month. 97 (65.5%) of them were not satisfied with their job of doing night shift duties.

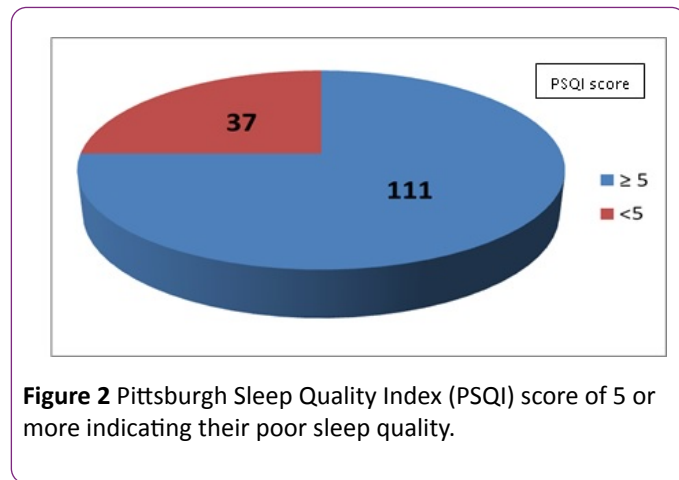
Furthermore, we tried to elaborate the satisfaction of the respondents in their personal and social domain. 72 (48.6%) of them were unable to pursue individual hobbies and sports activities whereas 75 (50.7%) were upset because they couldn't give enough time for social work through organizations. 82 (55.4%) of them were having troublesome relationship with their partners whereas 80 (54%) were unhappy as they couldn't give enough time looking after their children. 63 (42.6%) felt they were having problems maintaining healthy relationship with their family, friends and relatives because of the shift duties.

**Table 1** Summarizes the responses of the patients.

Disorders GI Disturbances	Frequency (%)	Disorders CVS Disturbances	Frequency (%)
Stomach upsets	75 (50.7%)	Heart palpitation	21 (14.2%)
Nausea	59 (39.9%)	Chest pain	21 (14.2%)
Stomach ache	56 (37.8%)	Shortness of breath	17 (11.5%)
Constipation	11 (7.4%)	Swollen feet	8 (5.4%)
Diarrhea	31 (20.9%)	Chest tightness	20 (13.5%)
Weight gain since beginning of shift work	56 (37.8%)	Back pain	60 (40.5%)

We asked the respondents if they have any medical symptoms which started after they join to perform rotating shift duties in hospital. The table below summarizes their responses (**Table 1**).

The gastrointestinal symptoms of stomach upsets, nausea and stomach pain were more common symptoms followed by back pain and weight gain. Though prevalence of symptoms related to CVS disturbances were less common, they cannot be neglected.



**Figure 2** Pittsburgh Sleep Quality Index (PSQI) score of 5 or more indicating their poor sleep quality.

111 (75%) of the 148 participant nurses in our study had Pittsburgh Sleep Quality Index (PSQI) score of 5 or more indicating their poor sleep quality which is shown in a pie-chart below (**Figure 2**).

Furthermore, we tried to find correlation between PSQI scores and health problems we mentioned earlier using Pearson Correlation Coefficient which is shown in the table below (**Table 2**).

There was significant correlation between GI disturbance and Back pain with PSQI. However, CVS disturbance and Weight gain did not significantly correlate to PSQI scores. CVS disturbance was however correlated to other medical conditions.

Our study shows the poor quality of sleep among the shift working nurses in tertiary care hospital in eastern Nepal. Shift rotation duties have adversely affected their personal and social domain. Also, some medical symptoms such as stomach pain, nausea, weight gain and back pain were more prevalent in them, which cannot be neglected.

**Table 2** Correlation between PSQI scores and health problems using Pearson correlation coefficient.

GI disturbance		CVS disturbance	Weight gain	Back pain	PSQI
GI disturbance	1	0.203*	-0.063	0.132	0.438**
		0.013	0.447	0.11	<0.00
CVS disturbance	0.203*	1	0.162*	0.227**	0.061
	0.013		0.049	0.006	0.462
Weight gain	-0.063	0.162*	1	105	-0.032
	0.447	0.049		0.205	0.698
Back pain	0.132	0.227**	0.105	1	236**
	0.11	0.006	0.205		0.004
PSQI	0.438**	0.061	-0.032	0.236**	1
	<0.001	0.462	0.698	0.004	

\*Correlation is significant at the 0.05 level (2-tailed)

\*\*Correlation is significant at the 0.01 level (2-tailed)

## Discussion

All shift working nurses who participated in our study were females. In other countries males are also involved in nursing profession. However, due to various social stigmas attached only females choose this profession in Nepal. In fact, we have not seen any male working as a nurse at various hospitals across the country. A study by Dong et al. [13] from China, female gender itself is a risk factor for poor quality of sleep among the clinical nurses.

Majority of participant nurses in our study belonged to age group 20-30 years of age. We believe the sleep and health problems will be more profound if the shift working nurses are of elderly population.

In our study maximum number of participants i.e. 46 belonged to ICU/CCU care. It is because ICU/CCU care has more number of staffs. Nurses working here usually get no opportunity to take a nap even for few minutes during their night duties as they have to take care of critically ill patients as compared to the other working stations.

Poor sleep quality and disruption of circadian rhythm may lead to fatigue, insomnia and daytime sleepiness which reduces the work performance and increases the risks of medical errors jeopardizing patient's safety. In the published study by Chien et al. [7] from Taiwan, 117 (75.8%) of 156 staff nurses had total PSQI score of  $\geq 5$  indicating subjective inadequate sleep. However, on doing objective sleep quality analysis using ECG based Cardiopulmonary Coupling Analysis (CPC), only 62 (39.7%) had inadequate stable sleep. The

prevalence of sleep disturbance among shift working nurses was 65% in yet another study from Egypt by Attia [8] and very high 86% in a study by Akbari et al. [11] from Iran. The prevalence of sleep disturbances and poor-quality sleep among shift working nurses in our study is 75% which is similar to previous studies. We could not perform objective sleep assessment as done by Chien et al. because of the resource challenged environment and financial constraints.

Night shift duties adversely affect the personal and social life of nurses disrupting the family and marital responsibilities [3,6]. Our study also shows that inability to pursue individual hobbies and sports activities, relationship problems with the partners and not having enough time for the care of children are the main reasons the nurses are not satisfied with shift rotation duties. We believe routine counseling of the nurses and their family members about their role in patient care and service to humanity can be beneficial to some extent.

Rotating shift duties can a reason for obesity and weight gain [2]. 56 (37.8%) of 148 nurses enrolled in our study also complained of weight gain. Shift work has shown to be risk factor for medical comorbidities such as Myocardial Infarction, stroke, diabetes, hypertension and peptic ulcer [1,4,5]. Our study also shows prevalence of GI disturbances and back pain more common than CVS disturbances in shift working nurses. We didn't have a normal control group for comparison and assessment was only done by history taking for the common symptoms which were the main limitations.

Health problems and total PSQI score were related in an earlier study by Attia [8]. In our study there seems to be correlation with GI disturbances and Back Pain with PSQI score. We don't know if poor sleep quality leads to these problems or these are independent complications of the shift work duties. Published literature however suggests sleep dysfunction may lead to gastrointestinal problems [14].

## Conclusion

Shift working nurses succumb to poor quality sleep. They are affected in every aspect of their health as well as their family, personal and social relations are at risk. Future research should be aimed at developing optimum shift working schedules in order to minimize these hazards.

## Limitations of the study

There was lack of a control group for comparison. We didn't compare our results with the nurses who work in normal work schedule whose working hours are fixed 9 am-5 pm. Our assessment of general health condition was based only on subjective symptoms of the respondents. There was correlation between GI symptoms and Back pain with poor quality of sleep. We couldn't establish the casual relationship as ours was a cross-sectional study.

## Recommendations

Shift duties should be based on voluntary preferences of the nurses rather than obligatory hospital policies wherever possible. If possible, on rotation basis nurses working especially at night should be given some time for rest or sleep during their duties.

The Nurses as well as their family members and relatives should be counseled regarding their role in patient care and service to humanity. Early detection of nurses who suffer from sleep impairment and related health problems is essential.

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