Sleep deprivation and patient care abilities among nurses in a selected hospital of Mangalore

Amrita Ghimire[1], Subrahmanya Nayak[2], Maya VK[3]

[1]Department of Nursing, School of Nursing, Chitwan Medical College, Bharatpur, Chitwan, Nepal
2Dept. of Psychiatric Nursing,College of Nursing, Dr M.V. Shetty college of Nursing, Mangalore,,Karnataka, India
[3]Shreedevi College of Nursing, Mangalore, Karnataka,,India
Corresponding Author: *Ms Amrita Ghimire, Lecturer, Dept. of Psychiatric Nursing, School of Nursing, Chitwan Medical College, Bharatpur, Nepal*

Abstract
Background: *Nurses work to promote health, prevent disease and help patients cope with illness. Nurses are the around the clock providers of patients care. Nurses are encountered with different work tasks, and different working hours because of the institution demand and nature of work. Nurses need to have good concentration, sound judgment and quick reaction times, particularly in emergency situations. Research into the signs, prevalence, and impact of sleep deprivation and the associated problem of sleepiness is important because medical errors have been linked to sleep deprivation. The aim of the study was to determine the level of sleep deprivation among nurses and its impact on patient care abilities of nurses in selected hospital of Mangalore.*
Material and Methods: *The research design for the study is descriptive cross-sectional design. In this study, the researcher has administered self-constructed check list to the nurses on patient care abilities and rating scale to assess sleep deprivation to find the co-relation between sleep deprivation and patient care abilities.*
Result: *Majority (53.3%) of nurses were suffering from moderate sleep deprivation. Nearly one fourth (23.3%) of nurses were having severe sleep deprivation. Majority of respondents (70%) were having good patient care ability skill whereas 18.3% and 11.7% of respondents were having average and poor level of patient care ability respectively. Among all baseline variables, sleep deprivation was only associated with nap during duty. Patient care ability was found negatively correlated with sleep deprivation. (r=-0.367; p<0.05))*
Conclusion: *There was negative correlation between sleep deprivation and patient care abilities among nurses. So, the research hypothesis is accepted. Which means nurses should not be deprived of sleep for effective delivery of patient care services or to have maximum patient care ability.*
Key words: *Nurses, Sleep deprivation, Patient care ability, Correlation*

I.   Introduction

Nursing is a profession within the health care sector focused on the care of individuals, families, and communities so they may attain, maintain, or recover optimal health and quality of life.[1]Many nurses provide care within the ordering scope of physicians, and this traditional role has shaped the public image of nurses as care providers. However, nurses are permitted by most jurisdictions to practice independently in a variety of settings depending on training level. In the post-war period, nurse education has undergone a process of diversification towards advanced and specialized credentials, and many of the traditional regulations and provider roles are changing.[2]

Nurses are the around the clock providers of patients care. Working in shift duties can disturbed their normal lives and they feel physical weakness and fatigue. Scientific evidence is growing that adequate sleep is a biological need for life similar to the need to eat and drink and is critical to maintain life and health and to work safely.[3]Studies have shown that sleep disturbances in nurses not only influences their own health, but also affects nursing quality and even the psychological health and treatment process of patients.[4] Evidence from healthcare settings also suggests that chronic partial sleep deprivation has a cumulative effect on alertness and performance, particularly under conditions of chronically long work hours without adequate off-duty time between shifts.[5]

In healthcare setting, a number of types of occupational injuries have been linked with long working hours. Sleep deprivation may also invite injuries like needle prick injury which may keep a nurse vulnerable to infectious diseases.[6]A study among hospital nurses found that adjusted risks of needle-stick injuries increased by

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16% for every additional 10 hours of work.[7]Several studies have shown that failure to obtain adequate sleep is an important contributor to medical error in the hospital setting.[8,9]

Despite focus of the need to regulate compulsory overtime for nurses, considerably fewer studies have been conducted to examine the association between the length of nurses' shifts or work weeks and adverse events in patients. So, the aim of this study was to assess the level of sleep deprivation and patient care abilities among the nurses.

II.   Material And Methods:

Study design: Descriptive cross-sectional design. In this study, the researcher have administered self-constructed check list to the nurses on patient care abilities and sleep deprivation to find the co-relation between sleep deprivation and patient care abilities.

Study location: The study was conducted in Intensive Care Unit (ICU), Post Op and emergency ward of Indiana hospital which is a tertiary hospital located Kankanady, Mangalore.

Study duration: 1st jan 2018 to 30th June 2018

Sampling procedure

The sampling technique of the study will be purposive sampling in order to fulfil inclusion criteria and objectives of the study.

Sample size

The sample of the study would compromise of 30 nurses working in ICU, Post Operative and emergency ward in night shifts in selected hospital at Mangalore, fulfilling inclusion criteria.

Inclusion criteria

Nurses who areworking in ICU, Post-operative or Emergency Unit in night shift in selected hospital Mangalore and who were present at the time of data collection

Exclusion criteria

Nurses who were working in OPD and who were not working in night shift.

Operational definitions

Sleep deprivation: Sleep deprivation is the condition of not having enough sleep or condition of suffering from lack of sleep.

In current study, the presence or absence of sleep deprivation has been identified through self-constructed check list. With 30 maximum and 0 minimum score from the checklist, level of sleep deprivation is classified into following 3 categories as shown in the table below:

Mild sleep deprivation: 0-10 Score

Moderate sleep deprivation: 11-30 Score

Severe sleep deprivation: 21-30 Score

Classifications of sleep deprivation

Patient care ability: In this study, it refers the capacity of nurses to provide appropriate care to the patient as per need of the patient. Self-constructed rating scale was used to classify the level of patient care ability among nurses. Patient care abilities were obtained from 3 domains i.e. Physical care abilities, psychological care abilities and socio-spiritual care abilities. With maximum 60 and minimum 0 score. The patient care ability of nurses were classified based on summation of their self-reported score into following 3 categories i.e. 0-20, 21-40 and 41-60 as poor, average and good respectively.

Ethical clearance

The research proposal was approved by Dr. M.V Shetty College of Nursing institutional ethical review board. Prior permission was obtained from the Block Education Officer and headmasters of respective schools keeping in mind the ethical aspect of the research. Data were collected after obtaining informed consent from the respondents and were assured of the anonymity and confidentiality of the information provided by them.

Data analysis

Descriptive statistics are useful for summarizing empirical information. Inferential statistics which are based on laws of probability provide a means of drawing conclusions about the population from which data was obtained. Data will be analyzed by following steps:

- Data was entered and analysed trough IBM SPSS V. 20
- Frequency and percentage,mean was calculated for describing the socio-demographic variable.
- Chi-square test was used to find the association between sleep deprivations with selected baseline variables.

III. Results

Table 1 shows that majority (46.7%) of respondents were of age group below twenty-five, followed by 26-30 age group i.e. 36.7%. Majority (75%) of respondents were female. Slightly more than half (53.7%) of respondents were married. Majority (43.7%) of respondents were having 2 dependents in their family followed by1 dependent (31.7%) at their family. More than two-third of respondents (68.3%) reported their family income in between 10001 to 15000.

Table 1 Distribution of respondents according to Socio-demographic variables

Socio-demographic variables	Frequency	Percent
Age		
≤25	28	46.7
26 - 30	22	36.7
≥ 31	10	16.7
Sex		
Female	45	75.0
Male	15	25.0
Marital Status		
Married	28	46.7
Single	32	53.3
Number of Dependents		
1	19	31.7
2	25	41.7
≥3	16	26.6
Family Income		
8000 - 10000	14	23.3
10001 - 15000	41	68.3
15001 - 20000	5	8.3

Table 2 describes that majority (36.7%) of respondents have working hours between 7 to 8 hours a day. Majority (38.3%) of nurses were working in Emergency department followed by ICU (35.0%). Majority of respondents reported that they usually sleep less than or equal to 3 hours per day whereas only 3.3% of nurses reported that they usually sleep more than 8 hours a day. Majority (50.0%) of nurses reported that they go for night duty 4 days and above per week followed by (33.3%) 3 days a week. Half of respondents reported that usually they have 4 or more patients per nurse whereas least percentage (23.3%) of nurses revealed as they are having 2 patients per nurse. Majority of nurses (80%) reported that they are having family support. Majority (65.0%) of respondents reported that they were not having health problems. Slightly more than half (53.0%) of respondents reported that they have experience of more than or equal to 4 years whereas 16.7% of respondents reported that they have job experience of less than 1 year.

Table 2 Description regarding some Occupational components

Occupational variables	Frequency	Percentage
Working hours per day		
Up to 6 hours	19	31.7
7 to 8 hours	22	36.7
9 to 10 hours	8	13.3
Above 10 hours	11	18.3
Job Posting		
Emergency	23	38.3
ICU	21	35.0
Post-operative	16	26.7

Sleep hours per day		
≤ 3 hours	21	35.0
4-5 hours	18	30.0
6-7 hours	19	31.7
≥8 hours	2	3.3
Night duty per week		
2 days	10	16.7
3 days	20	33.3
4 days and above	30	50.0
Patient per Nurse		
2	14	23.3
3	16	26.7
≥4	30	50.0
Family support		
Yes	48	80.0
No	12	20.0
Health Problem		
Absent	39	65.0
Present	21	35.0
Years of Experience		
<1 Year	10	16.7
1-3 Years	18	30.0
≥4 Years	32	53.0

Table 3 shows that majority (53.3%) of nurses were suffering from moderate sleep deprivation. Nearly one fourth (23.3%) of nurses were having severe sleep deprivation.

Table 3 Distribution of respondents according to sleep deprivation level

| Levels of sleep deprivation	Frequency	Percentage
Mild Sleep deprivation	14	23.3
Moderate Sleep deprivation	32	53.3
Sever Sleep deprivation	14	23.3
Total	60	100.0

Table 4 revealed that respondents had mean ±SD physical symptoms score of 9.58±2.46 and mean ±SD psychological symptoms score of 9.27±3.18.

Table 4 Descriptive statistics on physical and psychological score among respondents

Areas	Minimum score	Maximum score	Mean	Standard deviation
Physical Symptoms score	5	15	9.58	2.465
Psychological symptoms score	4	13	9.27	3.183

Fig. 1 shows that majority of respondents (70%) were having good patient care ability skill whereas 18.3% and 11.7% of respondents were having average and poor level of patient care ability respectively.

Fig. 1 Level of Patient Care Ability
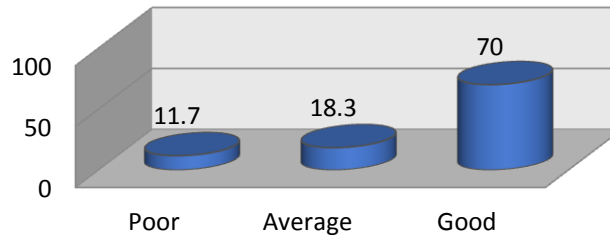
Data presented in table 5 reveals that the calculated chi-square value of nap during duty is greater than the table value at 0.05 level of significance. Hence null hypothesis was rejected. So, there is significant association between the nap during duty and sleep deprivation. Whereas, with age, Gender, marital status, Number of Dependent, job posting family income, working hour, sleeping time, night duty per week, nurse-patient ratio, health problem, family support, years of experience, there is no significant association with sleep deprivation.

Table 5: Association between level of sleep deprivation with the selected baseline variables

| S.N.	Baseline Variables	Chi-squire	P value	Inference
1	Age of Respondents	0.30	0.85	NS
2	Gender	0.35	0.83	NS
3	Marital Status	3.10	0.21	NS
4	Number of Dependent	6.22	0.39	NS
5	Job Posting Site	3.31	0.50	NS
6	Family Income	4.76	0.31	NS
7	Working Hour	5.22	0.51	NS
8	Sleeping Time	5.55	0.47	NS
	Nap During Duty	5.76	0.05	S
9	Night Duty Per Week	2.35	0.67	NS
10	Patient Per Nurse	1.97	0.74	NS
11	Presence of Health Problem	0.58	0.75	NS
12	Family Support	1.96	0.37	NS
13	Years of Experience	2.73	0.60	NS

Table 6: Association between level of Patient care ability with the selected baseline variables

Table 6 reflects that there is no association of patient care ability with age, Gender, marital status, Number of Dependent, job posting family income, working hour, sleeping time, night duty per week, nurse-patient ratio, health problem, family support, and years of experience.

S.N.	Baseline Variables	Chi-squire	Degree of freedom	P value	Inference
1	Age of Respondents	0.35	2	0.84	NS
2	Gender	4.50	2	0.10	NS
3	Marital Status	1.11	2	0.57	NS
4	Number of Dependent	9.46	6	0.14	NS
5	Job Posting Site	4.90	4	0.29	NS
6	Family Income	2.46	4	0.65	NS
7	Working Hour	8.54	6	0.20	NS
8	Sleeping Time	2.25	6	0.89	NS
	Nap During Duty	1.60	2	0.44	NS
9	Night Duty Per Week	5.98	4	0.20	NS
10	Patient Per Nurse	0.70	4	0.95	NS
11	Presence of Health Problem	1.02	2	0.60	NS
12	Family Support	0.21	2	0.89	NS
13	Years of Experience	0.38	4	0.98	NS

Fig 2 shows a negative correlation between sleep deprivation and patient care abilities among nurses. (r=-0.367) The downward slopping line reflects that as sleep deprivation increases the patient care ability decreased. So, the research hypothesis is accepted.

Figure 2: Scatter diagram showing correlation between sleep deprivation and patient care ability
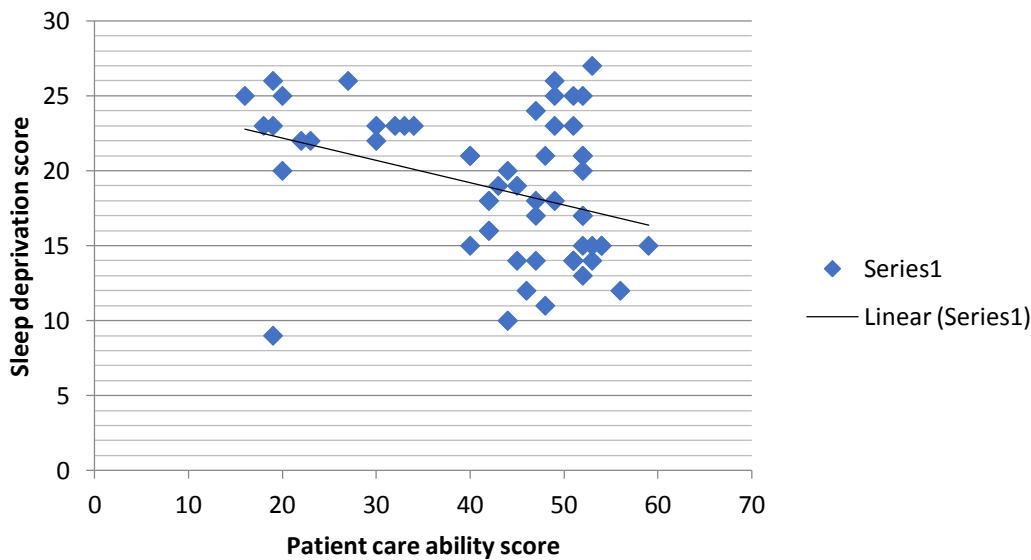
IV.   Discussion

In the present study, majority (53.3%) of nurses were suffering from moderate sleep deprivation. Nearly one fourth (23.3%) of nurses were having severe sleep deprivation.

A similar study by **Johnson A L et al.** conducted among hospital night shift nurses by using cross-sectional co-relational design revealed that more than half (56%) of the sample reported being sleep deprived.[10]Another similar study by **Ibrahim A et, al** reported that 61% of the nurses had a sleep deprivation.[11]These findings are quite similar to the finding reported from the present study in terms of sleep deprivation.

In the present study, there was significant association between the nap during duty and sleep deprivation. Whereas, with age, Gender, marital status, Number of Dependent, job posting family income, working hour, sleeping time, night duty per week, nurse-patient ratio, health problem, family support, years of experience, there is no significant association with sleep deprivation.A questionnaire based comparative study conducted by **Yazdi Z and et al.** to assess the prevalence of Sleep Disorders and Their Impacts on Occupational Performance revealed that Occupational impact of different sleep disorders was detected by Occupational Impact of Sleep Disorder questionnaire.[12] There was no significant difference in the age, BMI, marital status, and years of employment in the two groups. Shift workers scored significantly higher in the Occupation Induced Sleep Disorder (OISD). The prevalence of insomnia, poor sleep quality, and daytime sleepiness was significantly higher in shift workers. Correlations between OISD scores and insomnia, sleep quality, and daytime sleepiness were significant. The study concluded that sleep disorders should receive more attention as a robust indicator of work limitation.

Majority of respondents (70%) were having good patient care ability skill whereas 18.3% and 11.7% of respondents were having average and poor level of patient care ability respectively.There is no association of patient care ability with age, Gender, marital status, Number of Dependent, job posting family income, working hour, sleeping time, night duty per week, nurse-patient ratio, health problem, family support, and years of experience.A similar study conducted by **Fernando M G and et al.** among night shift nurses reported that a decrease in the number of hours of sleep was associated with increased difficulty staying awake on the job, irritability, tiredness and medical errors.[13]

There was a negative correlation between sleep deprivation and patient care abilities among nurses in the present study. (r=-0.367; p<0.05)A similar finding is found from the study conducted by **Abdelbaset M S et al.** reported significant relationships between sleep medication intake and medication errors,

depression, and fatigue. Linear regression analysis demonstrated that the independent predictors of medication errors were the number of patients under the nurses' direct care and the depression score of the nurses. Medication administration errors, fatigue and depression were all significantly affected by circadian sleep disorders. The study suggested that an administration's control of work flow to provide convenient sleep hours will help in improving sleep circadian rhythms and consequently minimize these problems.[14]

Johnson Aet. al (2007) study reported that there was there was a significant (p<0.0001) inverse relationship between psychomotor performance and hours of sleep. The total sample of night shift nurses revealed poor psychomotor performance scores. Sleep deprived nurses who worked the night shift had poorer sleep quality (p=0.0006) and lower mood states (p=0.0094). As the hours of sleep decreased the psychomotor performance declined.[15]

V. Conclusion

The assessment of sleep deprivation level in nurses revealed that the majority (53.3%) of the samples had moderate sleep deprivation. The area-wise analysis revealed that the samples scored highest in the area of physical symptoms mean ±SD physical symptoms score of 9.58±2.46 and mean ±SD psychological symptoms score of 9.27±3.18. The assessment of patient care ability level in nurses revealed that the majority (70 %) of the samples had good patient care ability. The area-wise analysis revealed that the samples scored highest in the area of physical care ability. The mean and standard deviation of Psychological, physical and social care ability score are 10.53(±3.01), 23.70(±7.42) and 8.15(±2.18) respectively.

There was a negative correlation between sleep deprivation and patient care abilities among nurses in the present study. (r=-0.367; p<0.05) The finding suggests that as sleep deprivation among the nurses increases the patient care ability decreases.

There was a negative correlation (r=-0.367; p<0.05) between sleep deprivation and patient care abilities. There was significant association between sleep deprivation and with selected baseline variable i.e. nap during duty hour. There was no significant association between patient care ability with selected baseline variables.

Nursing Implications

The present study was conducted to assess correlation of sleep deprivation and patient care abilities among nurses in selected hospital, Mangalore. The findings of the study have implications on nursing practice, nursing education, nursing administration and nursing research.

Implications for nursing practice

The present study will help nurse to emphasize more about the preventive and promotive aspects of health. The ICU nurses, Emergency nurses, psychiatric nurses and critical care unit nurses have the ultimate responsibility in providing the quality care and providing life saving measures. while lack of adequate sleep in nurses not only influences their own health but also affects nursing quality. i.e.cognition, performance, mood, improper care, lack of problem solving skill.

This study can help nurses to know the level of sleep deprivation and the ability to provide needed care.

Implications for nursing education

The present study would help the nurses to understand the correlation between Sleep deprivation and patient care abilities in nurses. The nursing curriculum should include more content on boosting the nurses abilities on different work settings. Nurses should taught to recognize their abilities and capacities instead of having more workload and develop ability to work and study. As there is enough scope for nurses to practice in variety of working areas such as ICU, POST Operative wards, oncology department, Critical care units, Emergency department ,curriculum should provide adequate facilities to prepare them as independent health care providers.

Implications for nursing administration

The nurse administrators should see that the aspect of health promotion while providing nursing care. Nursing administration should implement the programmes to make the nurses aware about the sleep deprivation and patient care abilities and its effect on the care they are providing to patients. It is important that the hospital authorities should manage the working environment, providing the facilities to the nurses adequately. Nursing administrator can also take initiatives in imparting health information and providing the opportunities for personal and professional development programmes.

Limitations
*   The time duration could have been more for better responses.
*   In this study, the research could have included other hospitals for more samples.

Recommendations

Based on the findings of the present study recommendations are:

1.   Sleep deprivation has been proved to hinder the work ability of the night shift nurse specially working in critical care unit, post operative and emergency ward. So, proper care should be taken to avoid their sleep deprivation.

2.   Hospital administration should consider avoiding continuous night shift to a nurse for whole week. There should be some arrangement to have short nap during duty hours alternatively to avoid sleep deprivation.

3.   Similar study can be conducted by involving large numbers of hospitals and nurses to have concrete finding.

4.   A strict policy can be developed and implemented by stat government to monitor sleep deprivation status of night shift nurses working in vulnerable wards of hospital to avoid poor performance and errors in nursing service delivery due to sleep deprivation.

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