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Original Research Article

Shiftwork related health problems among nurses: a cross sectional study in a tertiary care centre of central India

Shilpa Lanjewar[1], Bhagyashree Gawande[1]*, Uday Narlawar[1], Nikhil Likhitkar[1], Bhushan Gawande[2]

[1]Department of Community Medicine, Government Medical College, Nagpur, Maharashtra, India
[2]ESIC hospital, Nagpur, Maharashtra, India

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***Correspondence:**
Dr. Bhagyashree Gawande,
E-mail: bhagyashreegawande4@gmail.com

ABSTRACT

Background: The nurses have an essential role to play in the provision of hospital healthcare services round the clock, which means that shifts are compulsory for them. Such work schedules have been related to numerous health problems including cardiovascular and gastrointestinal problems. This study has therefore been performed to assess the health problems associated with shift work among nurses.
Methods: A cross-sectional study among 375 nurses conducted in a tertiary care centre of central India. Nurses working in a shift duties and had worked for more than a year were included. Data were collected with the help of a pre designed pre tested questionnaire. Health problems related to shift work were assessed by using standard shift work index questionnaire. Blood pressure and blood sugar levels were measured. Data analysis was done using IBM SPSS Statistics Version 23.
Results: Mean age of the study participants was 38.36±8.69 (23-57) years. Most frequently reported gastrointestinal symptom was disturbed appetite (33%) whereas most frequently reported cardiovascular symptom was headache (32.80 %). Common health problems reported by nurses after engaging in shift work were anaemia, chronic back pain, hypertension, varicose veins, diabetes, haemorrhoids, arthritis.
Conclusions: Due to high proportion of health problems among nurses as compared to general population institutions must pay attention on their health and take measures for their well being.

Keywords: Health problems, Nurses, Shiftwork, Standard shiftwork index

INTRODUCTION

The International Labor Organization has estimated that approximately 15-30% of the workforce in developing countries comprise shift workers.[1] Health institutions must provide 24-hour facilities to the population. Nurses have a crucial role in providing round the clock medical facilities in hospitals and thus shift duties are mandatory for them.[2] WHO estimates that the world will need an additional 9 million nurses and midwives by the year 2030.[3] In the scientific literature, the term "shiftwork" has been widely used and generally includes any arrangement of daily working hours other than the standard daylight hours (7/8 am-5/6 pm).[4] Such work schedules have been related to numerous health problems, which include cardiovascular disease, digestive troubles, varicose veins, menstrual problems, fatigue, cancer, depression, anxiety, and sleep problems.[5] Being involved in shift duties if nurses are troubled by their own ill health or other stressful circumstances, then they

will not be able to give their full attention to this demanding task. No hospital can function effectively if there is high incidence of ill health among nurses. However, there is widespread ignorance and negligence on the part of the health authorities and medical staff when it comes to addressing the health problems posed by shift work. In spite of numerous studies to evaluate the health status of nurses globally, there are only few publications that address this issue in our country and thus, we believe that this study will contribute to the available body of scientific evidence. Based on this assertion, this study aims to assess health problems related to shiftwork among nurses.

METHODS

This cross-sectional study was conducted in Government medical college and hospital Nagpur which is a tertiary care centre in central India during February 2020-January 2021. Female nurses doing shift duties from at least 1-year were included in the study. Those who were pregnant, on leave and not willing to participate were excluded. Approval from Institutional ethics committee was sought. Permission from Institutional Head, Medical and Nursing superintendents were taken. Informed consent was taken from study subjects after explaining them the purpose of the study and assuring full confidentiality.

Sample size and sampling procedure

The sample size was calculated using the formula

$n = Z^2_{1-\alpha}\, p*(1-p)/d^2$

Assuming the prevalence of common health problem "P" among nurses as 57.6% from a previous study with absolute precision (d) of 5% and 95% confidence level, a minimum sample size of 375 was calculated.[6] List of all the nurses was obtained from nursing superintendent office. Nurses were selected from that list by using simple random sampling method.

Data collection

Data were collected by using pre designed, pre tested questionnaire. Nurses were personally interviewed to know the basic socio-demographic characteristics such as age, marital status, education. It was followed by the questions regarding work-related characteristics such as years of work experience, current working department, number of night shifts/month. Health problems related to shift work were assessed by using standard shift work index questionnaire developed by shift work research team (2005) Medical Research Council/Economic and Social Research Council (MRC/ESRC) social and applied psychology unit.[7]

Blood pressure was recorded. Those with BP of >140/90 mmHg or having the history of hypertension considered as hypertensives. Random blood glucose (RBS) level was measured. If RBS value comes more than 200 mg/dl then method was repeated on next day with fasting and postprandial values. Those with fasting blood glucose value ≥120 mg/dl or 2-hour postprandial value ≥200 mg/dl or having the history of diabetes were labelled as diabetic. Height weight was measured, BMI was calculated and classified according to WHO South East Asia classification of BMI.[8] Hemoglobin was measured by digital hemoglobinometer and classified as per WHO criterion. Those with Hb level <12 g/dl labelled as anaemic.[9]

RESULTS

Out of the total 375 nurses, majority (30.39%) were belong to 31-35 years of age group. Mean age was 38.36±8.69 (23-57) years. 88% were married whereas 10.13% were unmarried and 1.87% were widowed. Most of the nurses (63.73%) were diploma holders. 32.53% of the nurses had work experience of 6-10 years whereas 25.87% had experience of 1-5 years. Mean years of work experience was 11.46±7.52. In this study 22.40% of the nurses were working in surgery department, 20.53% in medicine department, 18.40% in obstetrics and gynaecology department, 11.73% in emergency department, 8.8% in paediatrics department, 7.73% in ICU, 6.68% in operation theaters and 3.73% in other departments (radiotherapy, psychiatry, radiodiagnosis, skin). Majority (65.33%) of the nurses were working with 5-8 night shifts/month. Mean value was 5.6±1.7(3-12) night shifts/month.

Although the minority of participants answered almost always, more participants answered quite often for all the questions. When considering the responses for almost always and quite often collectively for all the questions, many nurses reported gastrointestinal and cardiovascular symptoms. Most frequently reported gastrointestinal symptoms were disturbed appetite (33%), heartburn (24%), digestion difficulties (22.93%). Participants however, do not tend to suffer from nausea, flatulence, and constipation, pain in the abdomen often (Figure 1).

Most frequently reported cardiovascular symptoms were headache (32.80 %), shortness of breath while climbing the stairs (26.13%), dizziness (17.87%) and swollen feet (25.6%). Participants were less likely to suffer from palpitations, pain in the chest, tightness in the chest (Figure 2). When pattern of menstrual cycle was studied considering the responses for "almost always" and "quite often" collectively, shows that 256 (78.9%) had regular menstrual cycle (extremely regular and fairly regular) and 66 (21.09)% had irregular menstrual cycle (Figure 3).

Distribution of study subjects according to shift work related health problems before and after the start of shift work shows that proportion of anaemia before the start of shiftwork was 2.6% and after the start of shiftwork was 14.1%. No one had chronic back pain, hypertension,

varicose veins, diabetes, haemorrhoids, arthritis before the start of shiftwork but these problems were increased to 32.5%, 19.73%, 14.1%, 10.67%, 8.53%, 8.0% respectively after the start of shiftwork. Proportion of gastritis before the start of shiftwork was 1.6% and after the start of shiftwork was 21.1%. Few had reported hypercholesterolemia (4.0%), kidney stone (3.5%), eczema (2.9%), gallstones (2.6%), cardiac arrhythmias (2.1%), depression (2.1%), cystitis (1.9%), cancer (1.06%), angina (0.5%), MI (1.06%), and colitis (1.06%), after the start of shift work (Table 2). Out of 74 hypertensives 62 were known cases and 12 were newly diagnosed. Out of 40 diabetic 31 were known cases and 9 were newly diagnosed.

Table 1: Distribution of study subjects according to socio-demographic and work related characteristics (n=375).

Characteristics	N (%)
Socio-demographic	
Age (years)	
≤30	69 (18.42)
31-35	116 (30.93)
36-40	53 (14.13)
41-45	53 (14.13)
46-50	28 (7.46)
>50	26 (14.93)
Marital status	
Married	330 (88.00)
Unmarried	38 (10.13)
Widowed	7 (1.87)
Qualification	
Diploma in nursing	239 (63.73)
Bachelor of nursing	99 (26.40)
Masters of nursing	37 (9.87)
Work-related	
Years of work experience	
1-5	97 (25.87)
6-10	122 (32.53)
11-15	57 (15.20)
16-20	38 (10.13)
>20	61 (16.27)
Current working department	
Surgery	84 (22.40)
Medicine	77 (20.53)
Obstetrics and gynaecology	69 (18.40)
Emergency	44 (11.73)
Paediatrics	33 (8.80)
Intensive care unit	29 (7.73)
Operation theaters	25 (6.68)
Others	14 (3.73)
Number of night shifts/month	
<5	113 (30.13)
5-8	245 (65.33)
>8	17 (4.54)

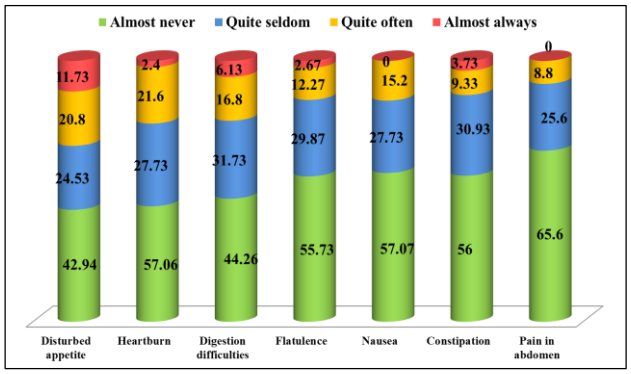

Figure 1: Percent distribution of nurses experiencing gastrointestinal symptoms (n=375).

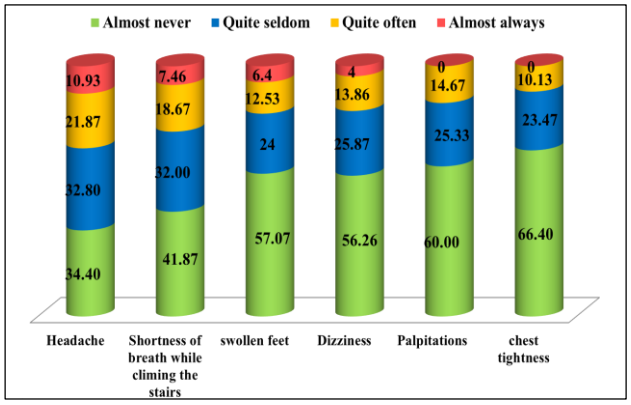

Figure 2: Percent distribution of nurses experiencing cardiovascular symptoms (n=375).

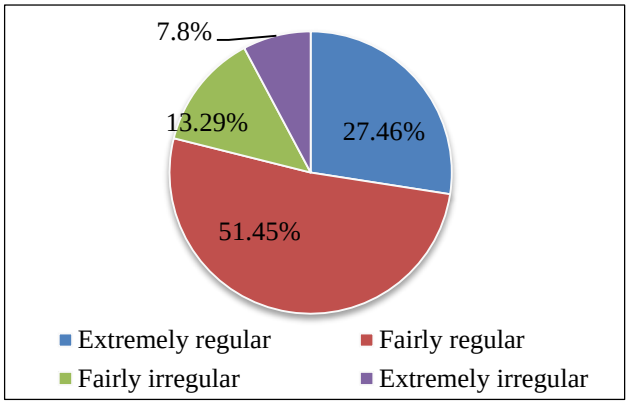

Figure 3: Distribution of nurses according to pattern of Menstrual cycle (n= 312)#. #63 study subjects had menopause

DISCUSSION

In the present study, most frequently reported gastrointestinal (GI) symptoms were disturbed appetite, heartburn, digestion difficulties whereas the most frequently reported cardiovascular symptoms were headache, shortness of breath, dizziness, and swollen feet. Somewhat similar to these findings, study done by Bruce et al reported that most frequently observed GI

symptoms were flatulence, disturbed appetite and stomach upsets and the most frequently reported cardiac symptoms were shortness of breath, swollen feet.[10] In a study done by Modawi et al most frequently reported GI symptoms were disturbed appetite, flatulence, heartburn and constipation/diarrhoea and the most frequently reported cardiac symptoms were shortness of breath, palpitations, swollen feet.[11]

Table 2: Shift work related health problems in nurses before and after start of shift work.

Shiftwork related illnesses	Before start of shift work	After start of shift work	Never
Chronic back pain	00 (00)	122 (32.5)	253 (67.5)
Gastritis	06 (1.6)	79 (21.1)	290 (77.3)
Gastric or duodenal ulcer	00 (00)	09 (2.4)	366 (97.6)
Gallstones	00 (00)	10 (2.6)	365 (97.4)
Colitis	00 (00)	04 (1.06)	371 (98.9)
Sinusitis/tonsillitis	06 (1.6)	43 (11.4)	326 (87.0)
Bronchial Asthma	08 (2.1)	24 (6.4)	343 (91.5)
Angina	00 (00)	02 (0.5)	373 (99.5)
MI	00 (00)	04 (1.06)	371 (98.9)
HTN	00 (00)	74 (19.73)	301(80.26)
Cardiac arrhythmias	00 (00)	08 (2.1)	367 (97.9)
Hypercholesterolemia	00 (00)	15 (4.0)	360 (96.0)
Diabetes	00 (00)	40 (10.67)	335(89.33)
Cystitis	00 (00)	7 (1.9)	368 (98.1)
Kidney stone	04 (1.1)	13 (3.5)	358 (95.5)
Eczema	00 (00)	11 (2.9)	364 (97.1)
Anxiety	02 (0.5)	34 (9.1)	339 (90.4)
Depression	02 (0.5)	08 (2.1)	365 (97.4)
Arthritis	00 (00)	30 (8.0)	345 (92.0)
Haemorrhoids	00 (00)	32 (8.53)	343 (91.5)
Varicose veins	00 (00)	53 (14.1)	322 (85.9)
Anaemia	10 (2.6)	247(65.86)	312 (83.3)
Cancer	00 (00)	04(1.06)	371 (98.94)

In the present study most commonly reported health problems after the start of shift work were anemia, chronic back pain, hypertension, varicose veins, and gastritis. Mean years of working in shift duties were 11.46 (7.52). This much time is sufficient to develop various health problems. Similar to this , in a study done by Bruce et al most commonly reported health problems were chronic back pain, hypertension, sinusitis/tonsillitis, and varicose veins after the start of shiftwork.[10] In a study done by Modawi et al reported that diseases that tend to develop after engaging in shiftwork are chronic back pain, gastritis, hypertension, diabetes, anxiety.[11] In a study done by Surekha et al most common complaints reported were headache, back pain, gastritis, and menstrual problems.[6]

This study reported that 21.09% of the participants had irregular menstrual cycle. Similar findings seen in Study done by Wang et al where irregular menstrual cycle observed in 16.6% of the nurses working in shifts.[12] In the present study the proportions of hypertension, diabetes and anaemia among nurses were found quite higher than general adult women population.[13] Rotational shift duties could be the reason behind this.

As this was a cross-sectional study there could be inaccurate recall of information by study participants. Since the study was limited to a tertiary care centre, the findings of the study cannot be generalized to nurses in other sectors.

CONCLUSION

Despite the fact that nurses cannot be excluded from shift duties, hospital should conduct periodic health evaluation at least twice a year for early detection and management of illness related to shift work in them. Health evaluations should be holistic and should focus on mental and psychological well-being as well; not just physical well-being. From an occupational health point of view, health talks and training programs of nurses should be organised to create self-health awareness among them. The study suggests for the future research using comparative design or longitudinal design to verify the health effects of night and shift work on the nurses.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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