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HEALTH EFFECTS OF NIGHT SHIFT DUTY ON NURSES IN A UNIVERSITY TEACHING HOSPITAL IN BENIN CITY, NIGERIA.

E.C Isah, O.A Iyamu, G.O Imoudu.
Community Health Department, School of Medicine, College of Medical Sciences, University of Benin, Benin City, Nigeria.

ABSTRACT

Objective: This study is aimed at identifying the effects of night shift duty on the health and wellbeing of nurses in order to make recommendations on ways of ameliorating them.

Methods: The study was of a cross sectional descriptive type using a total sample of nurses in the hospital. Data collection was by means of a semi-structured self-administered questionnaire and the analysis by the computer Programme for Epidemiologists (PEPI).

Results: The response rate was 79.3% with a total of 211(68.1%) having one or more health complaints, which included muscle ache and pains (58.7%), frequent headaches (21.9%), lack of concentration (21.3%) and a negative effect on social life (66.1%). The younger nurses disliked night shift more than the older ones ($^2 = 57.5$, df = 6, p = 0.000) and 57.7% felt they were less productive during night shift. The shorter the period of sleep after the night shift, the lesser the level of productivity and the more the manifestation of health symptoms ($^2 = 45.5$, df = 4, p = 0.000 and $^2 = 29.0$, df = 2, p = 0.000 respectively).

Conclusion: Night shift duty caused both medical and psychological problems on the nurses. There is a need for medical surveillance, educational programme and the application of sleep hygiene techniques for shift working nurses.

Keywords: Night shift, Nurses, Health complaints. ((*Accepted 6 July 2007*)

INTRODUCTION

Health service personnel provide continuous care by applying medical science, knowledge, skill and expertise for the benefit of patients. Nurses play an important role in this continuous care and need to work both day and night for effective twenty four hour coverage of these services. In most countries of the world, the nurse-patient ratio is low, and so shift duty becomes imperative in order to cope with the health demands of the people[1].

Shift work arrangement is practiced globally and is not a modern phenomenon as Ramazzini (1633 - 1714) noted that bakers, innkeepers and soldiers worked such hours[2]. The most obvious deviations from normal life for night shift workers is staying awake during the night and having to sleep during daytime. These workers typically get less sleep, averaging 4 -6 hours compared to their day working counterparts who get an average of 7 -9 hours of sleep. In addition, day sleep is of a poor quality due to disruptions by frequent awakenings from the normal Rapid Eye Movement (REM)/ non-REM sleep stage pattern[3-5]. Sleep 'debt' often occurs and with time, accumulates, resulting in sleepiness during meetings, while doing monotonous work or scarier still while driving. The risks vary with the number of consecutive night shifts worked, the length and the amount of night work done[2]. These can undermine the health and safety of night shift workers as well as those of other employees and members of the public.

A healthy and psychologically balanced workforce is needed for the efficient provision of adequate health care services. It is therefore necessary to assess the effects of night shift duty on nurses who make up an important part of this workforce, in order to suggest appropriate applications of sleep hygiene parameters that may help in the reduction of this occupational hazard among nurses. There is also a paucity of local literature in this field; therefore this study will also help to generate this much needed data.

MATERIALS AND METHODS.

The study, which was of a cross sectional descriptive design, was carried out in a government-owned

Correspondence: Dr E.C Isah
E-mail: essyisah@yahoo.co.uk

tertiary University Teaching Hospital, with a bed capacity of 500. The hospital is located in the ancient cosmopolitan Benin City, the capital of Edo State, in the southern part of Nigeria with badly maintained network of roads and an urban- type of housing. Most of the nurses live within a radius of 1 10 kilometers and compute to work in private and commercial cars and buses as well as on motorcycles popularly called "Okada".

The method of sampling was exhaustive of all nurses employed at the time of the study.

Data was collected by means of a semistructured, self-administered questionnaire that contained socio-demographic data and questions relating to the perceived health complaints/symptoms experienced, duration of sleep after a night shift, methods of sleep induction after a night shift and their opinion about night shift duty. Nurses who were engaged in other jobs like working part time in private clinics and those who were attending part time programmes in the university were excluded from the study, as this will deprive them of adequate sleep after or in between a night shift.

The nurses worked a regular rotation of three shift cycles; the morning shift started at 8.00am and terminated at 16.00 pm, the afternoon shift between 13.00 pm and 21.00 pm, while the night shift was between 20.00 pm and 8.00 am. The overlap of the shift periods was to allow for proper and thorough hand over of duties to the next shift nurses. Each shift lasted for 3-5 days (depending on ward needs) and is followed by 3 days off duty and another 2 days off, preferably before the next night shift. The data collected was analysed by means of the computer Programme for Epidemiologists (PEPI)[6] and presented in form of tables and a graph, while the statistical significance level was set at p 0.05.

RESULTS.

A total of 310 out of the 391 nurses in employment at the time of the study participated in the study giving aresponse rate of 79.3%. Table 1 shows the perceived health complaints/symptoms among the respondents. A total of 211 (68.1%) had one or more health complaints, with generalized muscle aches, frequent headaches, lack of concentration having the highest frequencies of 58.7%, 21.9% and 21.3% respectively. Sleep deprivation was found among 8.7%, while night shift duty impacted negatively on the social lives of 66.1% of the nurses. Accident/injuries were in the form of needle stick injuries, with a frequency of 4.8%.

Table 1: **Health Complaint/Symptoms Among The Respondents**

Complaint/Symptom	* Frequency (%)
Negative impact on social/family life	205 (66.1)
Generalised muscle aches	128 (58.7)
Frequent headaches	68 (21.9)
Loss of concentration	66 (21.3)
Fatigue	47 (15.1)
Backache	42 (13.5)
Sleep deprivation	27 (8.7)
Aches in the feet	26 (8.4)
Increase in blood pressure	15 (4.8)
Needle stick injury	15 (4.8)
None	99 (31.9)

*** Multiple responses**

Tables 2 and 3 show significant differences in the association between duration of sleep after night shift and the manifestation of health complaints/symptoms ($^2 = 29.0$, df = 2, p = 0.000) as well as the self-reported or perceived level of productivity ($^2 = 45.5$, df = 4, p = 0.000), indicating that the shorter the duration of sleep, the more the manifestation of health complaints/symptoms and the lesser the level of productivity. A majority (55.5%) of the respondents had less than six hours sleep after a night shift.

Table 2: **Association Between Duration of Sleep After Night Shift Duty and the Manifestation of Health Complaints/Symptoms**

Duration of Sleep (Hours)	Health Complaints/Symptoms Present	Absent	Total
=5	137(79.7)	35(20.3)	172(55.5)
6 8	70(56.9)	53(43.1)	123(39.7)
>8	4(26.7)	11(73.3)	15(4.8)
Total	**211(68.1)**	**99(31.9)**	**310(100.0)**

$^2 = 29.0$, df = 2, p = 0.000

Table 3: **Association Between Duration of Sleep After Night Shift Duty and Perceived Level of Productivity Among the Respondents.**

	Perceived Level of Productivity			
Duration of Sleep (Hours	**More Productive**	**No Change**	**Less Productive**	**Total**
=5	26(15.1)	21(12.2)	125(72.7)	172(55.5)
6 8	34(27.6)	36(29.3)	53(43.1)	123(39.7)
> 8	7(46.7)	7(46.7)	1(0.7)	15(4.8)
Total	**67(21.6)**	**64(20.6)**	**179(57.7)**	**310(100.0)**

^{2} =45.5, df = 4, p = 0.000

The association between the cadre of nursing staff and the induction of sleep was not significant (^{2} = 1.26, df = 2, p = 0.53), as the proportions that induced sleep were almost equal among the various cadre of nurses (Table 4).

Table 4: **Association Between the Nursing Cadre and Induction of Sleep After Night Shift Duty.**

	Sleep Induction		
Nursing Cadre	**Present**	**Absent**	**Total**
Junior	65(52.4)	59(47.6)	124(40.0)
Middle	51(46.8)	58(53.2)	109(35.2)
Senior	42(54.5)	35(45.5)	77(24.8)
Total	**158(51.0)**	**152(49.0)**	**310(100.0)**

^{2} = 1.26, df = 2, p = 0.53

As shown in Table 5, the association between age and the opinion about night shift duty showed that the younger nurses disliked night shift duty more than the older nurses (^{2} = 57.5, df = 6, p = 0.000).

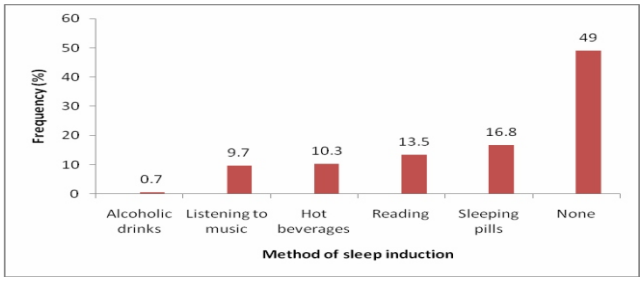
Table 5: **Association Between Age and Opinion About Night Shift Duty Among the Respondents**

	Opinion About Night Shift Duty			
Age Range (Years)	**Prefers It**	**Indifferent**	**Dislikes It**	**Total**
20 29	14(19.2)	11(15.0)	48(65.8)	73(23.5)
30 39	40(33.6)	44(37.0)	35(29.4)	119(38.4)
40 49	36(42.4)	37(43.5)	12(14.1)	85(27.4)
50 59	13(39.4)	16(48.5)	4(12.1)	33(10.6)
Total	**103(33.2)**	**108(34.8)**	**99(32.0)**	**310(100.0)**

^{2} =57.5, df = 6, p = 0.000

Figure 1 shows that about half 158(51.0%) of the study population used specified methods to induce sleep after night shift duty, while 152(49.0%) had no specific methods for sleep induction.

Fig 1: **Methods of Sleep Induction After Night Shift Duty Among the Respondents.**



DISCUSSION.

Circadian rhythm is the natural internal clock that controls the release of various hormones and enzymes that govern the body's daily physiological and psychological activities. Work is generally a daytime activity while sleep and rest, nighttime events. When there is a distortion of this natural rhythm as occurs in night shift workers, who have to stay awake in the night and sleep during the day, the resulting circadian dysrhythmias impact negatively on health and social well being[5,7].

A majority (68.1%) of respondents in this study experienced one or more health complaints/symptoms, including muscle aches, frequent headaches loss of concentration, fatigue, heartburn, raised blood pressure and accidents. Other studies have also reported similar health problems among night shift nurses. Night shift duty has been reported to be associated with various circadian dysrhythmias which include sleep deprivation, disturbances in the release of gastric and digestive enzymes leading to complaint of heart burn, indigestion, constipation, gastritis and peptic ulcer disease[5,8,9].

Of note is the high proportion (66.1%) of respondents who have negative effects on their family and social lives. Night shift duty often makes it difficult for such workers to adequately fulfill parenting and social responsibilities. Other studies have also found shift duty especially night shift to be associated with social marginalisation, marital strain and family dysfunction[10 -12]. Family support in understanding the physiological and emotional issues surrounding night shift duty is an important mechanism for managing and coping with this family dysfunction[13].

Sleep deprivation and fatigue are common complaints of night shift workers[7,14]. In this study sleep deprivation and fatigue occurred in 8.7% and 15.1% of the respondents respectively. Chang et al[14] reported a higher figure of 32.0% for fatigue, while another study, found sleep deprivation to be significantly related to night shift duty even after retirement[15]. It is thus not surprising that the shorter the duration of sleep after the night shift, the more the perceived manifestation of health complaints/symptoms and the lesser the perceived level of productivity.

The occurrence of needle stick injuries in the form of accidents in 4.8% of respondents is of significance especially as the human immunodeficiency virus, and other blood-borne infections may be transmitted through needle stick injuries. The 'shift lag' syndrome characterized by feeling of fatigue, sleepiness, insomnia, disorientation, digestive problems, irritability, poor mental agility and reduced performance efficiency, experienced by shift workers especially the night shift workers are contributory factors to human errors and accidents at work[2,16,17]. A number of incidents, such as those at Bhopal and the Chernobyl chemical spillages all occurred at night[17].

The association between age and the opinion about night shift duty was significant ($p = 0.000$). The fact that the younger nurses disliked night shift duty more than their older colleagues may probably be due to more years of coping experience and less of domestic problems from smaller children, among the older ones. In a related study the younger age group reported the highest fatigue and poorest recovery compared to the older group[18]. Other studies however, have found more adverse effect of night shift among the older age groups especially those above the age of 40 years as they find it more difficult to fall asleep and in adapting to night shift work.[19,20].

Undoubtedly, shift work including night shift duty is indispensable if health care is to be provided on a continuous basis by nurses who play an important role in the care of patients. In order to reduce the physiological and psychosocial health-related risks and problems among nurses and to increase their productivity, there is need for employers to undertake medical surveillance at regular intervals, to assess the work risks and monitor the health of shift workers especially night shift workers. Where they exhibit signs of ill health, stress and burnout, they should where possible, be re-located to suitable duties that do not involve night work. Employers should plan and work out shift schedules with the workers as their ability to choose the shift system has been found to maximize adaptation to shift work[20]. The number of night shifts should be minimized to not more than two in a row and the maximum length for night shift should not exceed 8 hours. Employers should avoid giving bonus or incentive for night shift so that workers do not opt for them. Rest breaks, tea or meal breaks and short nap breaks have all been found to be useful[2].

On the personal level, the application of sleep hygiene techniques is a fundamental coping strategy. These techniques would include among others, going to bed as soon as possible after a night shift in order to maximize sleep length, keeping to a regular sleeping pattern, modification of the bedroom to reduce noise, bright light and other forms of disturbances during sleep, aerobic and not strenuous exercises, good dietary habits and avoiding driving after working night shift. The use of alcohol and sleeping pills as seen in 16.5% of the respondents should be discouraged to avoid drug misuse and dependence.

Health education programmes for shift working

nurses and their families, on the health, safety and social effects of shift work, on the need for proper sleep and rest when necessary, and on family support for the night shift worker is of utmost importance.

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