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Original Article

SLEEP QUALITY AND SLEEP DISTURBING FACTORS AMONG NURSES IN A SELECTED HOSPITAL IN COLOMBO, SRI LANKA

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Abstract

Sleep is a naturally recurring state of mind and body which is a vital human physiological process. The sleep quality of nurses has become a prominent social focus since they are engaging in work based on a shift schedule. The paucity of data available on sleep quality and associated factors in Sri Lanka led this study to be conducted among nurses at Apeksha Hospital, Sri Lanka. A descriptive cross-sectional study was conducted among 215 nurses at Apeksha Hospital, using a simple random - sampling method. A self-administered structured questionnaire was used as the data collection instrument and Pittsburgh Sleep Quality Index (PSQI) was used to measure the sleep quality among nurses. The majority (86.5%) were females. Of the participants 65.58% had deficient sleep (PSQI≥5) and 34.42% had healthy sleep (PSQI<5). The mean score of the sleep quality was 7.16±3.30. Sleep quality was significantly ($p<0.05$) associated with chronic symptoms ($p=0.003$), children status ($p=0.007$), night shift frequency per month ($p=0.029$), number of patients per night shift ($p=0.048$), number of working hours per week ($p=0.001$), sleep duration ($p=0.032$), sleep disturbances at night ($p=0.001$), sleep medication use ($p=0.020$), and daytime dysfunction ($p=0.001$). In conclusion, sleep quality was poor among nurses working at Apeksha Hospital, Sri Lanka. The characteristics of night shifts, such as number of shift duties, number of hours, and number of patients in the night shift, were associated with the sleep quality of nurses. Therefore, scheduling working hours and night shifts according to the `national and international guidelines are vital.

Keywords: Sleep quality, Pittsburgh sleep quality index, Nurses

Introduction

Sleep is a state of reduced consciousness and responsiveness from which an individual can be aroused by external stimulus (Zielinski et al., 2016). It is a biological necessity essential for life and optimal health. Average sleep duration in an adult is 7 to 8 hours (Adams et al., 2006). The quality of sleep is significant due to its close relation to the psychological and physical well-being of an individual (Galante et al., 2011). Sleep deficiency in the long-term may increase the risk of chronic illnesses such as obesity, diabetes, gastrointestinal disorders, hypertension, cardiovascular disease, Alzheimer's disease, and cancer (Kolo et al., 2017; Chernyshev et al., 2018). Deficient sleep is also associated with significantly increased risk of mortality (Chien et al., 2013), increased risk of coronary heart diseases (Chernyshev et al., 2018), impaired social relationships, drowsy driving, occupational accidents, and heightened risk of cardiovascular events (Lemma et al., 2012). The long-term sleep disorder leads to thought retardation, memory loss, slow response, irritability and even the increase in the possibility of depression and suicidal tendency (Mieda & Sakurai, 2013). According to economic estimates, sleep disorders are associated with large financial and non-financial costs. The greatest financial costs appear to be non-medical costs related to loss of productivity and accident risk (Hillman & Lack, 2013). Sleep problems can negatively affect the immune system and metabolism and can cause various health issues such as depression, hypertension, and coronary heart diseases (Fernandez et al., 2015). Occupational related sleep problems influence their sleep quality in daily life such as job satisfaction, effort-reward-imbalance, job insecurity and organizational injustice (Kim et al., 2017). There are many standard measures that are available to assess the sleep quality. The Pittsburgh Sleep Quality Index (PSQI) is one of the most widely used standardized questionnaire used to assess sleep quality and the factors that influence quality (Zitser et al., 2022).

Nurses have a higher rate of exposure to occupation related sleep problems. Sleep quality is one of the influential factors in nurses' performance. Sleep disorders of nurses could lead to mistakes in the treatment process and patients' care which might cause irreparable damages (Dagget et al., 2016). Hospitals are known to be both rewarding and stressful places to work. Nurses are the main workforce at hospitals, and work at a highly stressful and responsible environment (Dagget et al., 2016). Further, nurses must remain awake throughout the night while working the night shift (Costa et al., 2003). This makes their sleep time irregular (Costa et al., 2003). Shift work among health care professionals is associated with poor sleep quality and have shown to have deficient sleep when compared to non-shift work health professionals (Alshahrani et al., 2017). Therefore, nurses have a high rate of exposure to sleep related problems.

Age, gender, educational level and marital status were among the most common socio-demographic factors that has a relationship with sleep quality (Alshahrani et al., 2017). Moreover, the work-related variables such as level of experience, and shift work also had relationship with sleep quality (Alshahrani et al., 2017). Thus it is important to assess the nurses' sleep quality and the factors contributing to their sleep quality because it directly affects accuracy of nursing care worldwide.

Sri Lanka is one of the most stressful and busiest working countries for nurses (Warnakulasuriya et al., 2021). Many nurses have reported different sleep problems as well as lack of sleep leading to the poor performances in patient care in many hospitals in Sri Lanka (Samarasinghe et al., 2021). As a health care person, the nurse is responsible for providing a safe and good health care through the application of medical science knowledge, skill and expertise in meeting all people's health needs. Therefore, it is necessary to assess the sleep quality among 'nurses and its associated factors in Sri Lanka. Thus, assessment of nurses' sleep quality and its association with socio-demographic and work-related factors

may encourage the researchers to implement interventional studies. Such research will helps to improve nurses' sleep quality which is crucial for better work performance and increase the productivity of the hospital. Therefore, this study was conducted to determine sleep quality and factors associated with sleep disturbances among nurses in a selected Hospital in Colombo district, Sri Lanka.

Methodology

A descriptive cross-sectional study was conducted to determine the sleep quality and factors associated with sleep disturbances among nurses in a selected hospital in Colombo district Sri Lanka. Ethical approval (KIU/ERC/20/063) was obtained from the Ethics Review Committee of KIU prior to the data collection. Nurses were recruited using simple random sampling method till the sample size was reached. The sample size was calculated using Yamane formula (Yamane, 1967). A sample of 215 nurses who were willing to participate and who gave written informed consent were included in the study. Nurses who were not doing night shifts and taking long term medications were excluded from the study. Baseline and work-related data were obtained by a self-administered questionnaire which consisted of gender, age, BMI, educational level, monthly income, marital status, number of children, work history, type of employment, department, and working shift. Sleep quality was assessed using a validated Pittsburgh Sleep Quality Index (PSQI). It was a standard questionnaire with 9 items categorized in 7 dimensions of subjective sleep quality, sleep latency, habitual sleep efficiency, sleep duration, use of sleeping medication, sleep disturbances, and daytime dysfunction. The PSQI is a self-rated scale assessing sleep quality and sleep disturbances over 1 month interval. The global score rate from 0–21 while the global sleep quality score >5 indicates deficient sleep and <5 indicates healthy sleep. Collected data were entered into a database created using Microsoft excel 2019. After data cleaning, the excel database was exported into the IBM SPSS version 25. Data were analyzed using descriptive statistics. Categorical variables are expressed as frequencies and percentages. The Chi-square test was performed to assess the factors associated with sleep quality.

Results

In this study, total of 215 nurses completed the questionnaire. Majority of nurses were females (86.5%, n=186), aged between 25-30 years 51.2% (n=110). Most (95.3% n=205) of nurses reported that they had not engaged in leisure time exercises. Only 30.2% (n=65) had chronic symptoms (Table 1).

Table 1 Baseline characteristics of the study population

Baseline Characteristics	Frequency (n=215)	Percentage (%)
Gender		
Female	186	86.5
Male	29	13.5
Age (years)		
25-30	110	51.2
31-35	55	25.6
36-40	31	14.4
41-45	17	7.9
46-50	2	0.9
Marital status		
Unmarried	140	65.1
Married	75	34.9
Children status		
No	13	17.3
Yes	62	82.7
Number of Children		
0	13	17.3
1	37	49.3
2	22	29.3
3	3	4.0
Level of professional qualification		
Graduate	40	18.6
Diploma	175	81.4
Personal income per month		
<50000	5	2.3
51000-70000	164	76.3
71000-90000	35	16.3
>91000	11	5.1
BMI		
Underweight	12	5.6
Normal	150	69.8
Overweight	53	24.7
Exercise in leisure time		
Never/almost never	205	95.3
Sometimes	9	4.2
Often	1	0.5
Chronic symptoms		
No	150	69.8
Yes	65	30.2

According to the work-related characteristics of the nurses 77.7% (n=167) had <10 years of

professional experience. 85.1% (n=183) had >5 night shifts per month and 93.5% (n=201) had >40 working hours per week (Table 2).

Table 2 Distribution of occupational characteristics of Nurses

Characteristics	Frequency (n=215)	Percentage (%)
Professional experience (years)		
1-10	167	77.7
11-20	39	18.1
21-30	8	3.7
31-40	1	0.5
Night shift frequency per month		
>5	32	14.9
6-10	122	56.7
11-15	37	17.2
<15	24	11.2
Number of patients / night shift		
>20patient	87	40.5
21-40patient	76	35.3
41-60	42	19.5
>61	10	4.7
Number of patients/ day time		
>20patient	71	33.0
21-40patient	81	37.7
41-60	27	12.6
>61	36	16.7
Number of hours/weeks		
30-40	14	6.5
41-50	15	7.0
51-60	14	6.5
61-70	18	8.4
71-80	97	45.1
>81	57	26.5

PSQI scores range from 0 to 21 and a value >5 indicates deficient sleep and <5 indicates healthy sleep. Only 34.4% (n=74) had healthy sleep (Figure 1). The sleep quality score ranged as 0-16 and the mean score was 7.16± 3.30 (Figure 2).

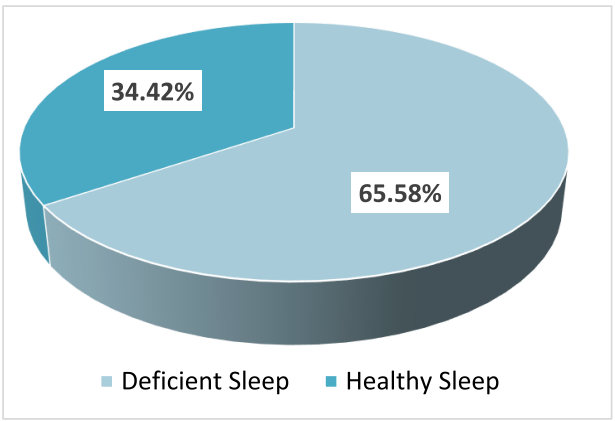

Figure 1: Sleep quality among nurses in Apeksha hospital in Colombo, Sri Lanka

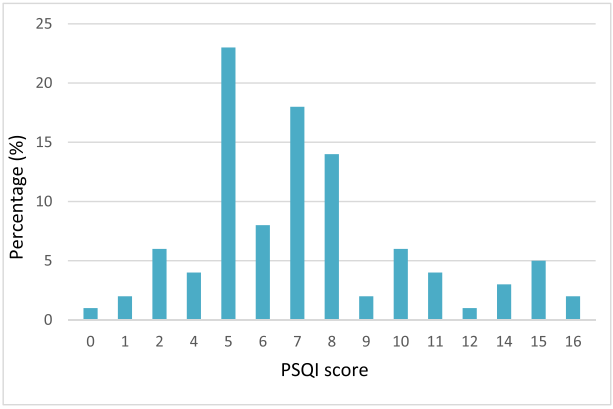

Figure 2: Sleep quality among nurses - Global Pittsburgh Sleep Quality Index Scores (0-16)

PSQI includes 7 dimensions of the sleep quality as subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, sleep medication use, daytime dysfunction. The severity level of each components showed that 82.3% (n=177) nurses had mild to severe dysfunction of their subjective sleep quality. While 76.7% (n=165) had >15 minutes sleep latency and only 23.7% (n=51) had >6 hours of sleep duration. Sleep efficiency participants was 62.3% (n=134). Majority (87.9%, n=189) of the participants had sleep disturbances during their sleep and 46.5% (n=100) had daytime dysfunction (Table 3).

Table 3: Severity of sleep quality components among Nurses

Factor	Normal Dysfunction	Mild Dysfunction	Moderate Dysfunction	Severe Dysfunction
Subjective Sleep	**Very Good**	**Fairly Good**	**Fairly Bad**	**Very Bad**
	38 (17.7 %)	139(64.7%)	31(14.4%)	7 (3.3%)
Sleep Latency	**≤15 minutes**	**16-30 minutes**	**31-60 minutes**	**>60 minutes**
	50(23.3 %)	65 (30.2%)	66(30.7%)	34(15.8%)
Sleep Duration	**>7 hours**	**6-7 hours**	**5-6 hours**	**<5 hours**
	38(17.7 %)	13(6%)	128(59.5%)	36(16.7%)
Sleep Efficiency*	**>85%**	**75-84%**	**65-74%**	**<65%**
	134(62. 3%)	35(16.3%)	36 (16.7%)	10(4.7%)
Sleep Disturbances	**Never**	**Once or twice a month**	**Once or twice a week**	**>times a week**
	26(12.1 %)	133(61.9%)	52 (24.9%)	4(1.9%)
Sleep Medication	**not during past month**	**less than once a week**	**once or twice a week**	**Three or more times a week**
	178(82. 8%)	4(1.9%)	27(12.6%)	6(2.8%)
Daytime Dysfunction	**0**	**1-2**	**3-4**	**5-6**
	115(53. 5%)	70(32.5%)	28 (13%)	2(0.9%°)

*Habitual sleep efficiency = (Number of hours slept/ Number of hours spent in bed) x 100

Sleep quality was significantly associated with chronic symptoms (p=0.003), children status (p=0.007), night shift frequency per month (p=0.029), number of patients per night shift (p=0.048), number of working hours per week (p=0.001), sleep duration (p=0.032), sleep disturbances at night (p=0.001), sleep medication use (p=0.020), daytime dysfunction (p=0.001). There was no statistically significant association between sleep quality and age, gender, body mass index (BMI), marital status, education level, exercise in leisure time, and the number of children in the house (p>0.05).

Table 4: Factors associated with sleep quality among Nurses

Characteristics	No. of good sleepers n(%)	No. of poor sleepers n(%)	p value
Gender			
Male	12(5%)	17(7.9%)	**0.396**
Female	62(28.8%)	124(57.7%)	
Age (years)			
25-30	39(18.1%)	71(33%)	
31 - 35	16(7.4%)	39(18.1%)	
36 - 40	11(51.1%)	20(9.3%)	**0.858**
41-45	7(3.3%)	10(4.7%)	
46-50	1(0.5%)	1(0.5%)	
Marital status			
Unmarried	53(24.7%)	87(40.5%)	**0.147**
Married	2(9.8%)	54(25.1%)	
Children status			
No	4(50.3%)	9 (12%)	**0.007***
Yes	17(22.7%)	45(60%)	
Level of professional qualification			
Graduate	11(5.1%)	29(13.5%)	**0.307**
Diploma	63(29.3%)	112(52.1%	
Personal income per month			
<50000	2(0.9%)	3(1.4%)	**0.690**
51000-70000	53(24.7%)	111(51.6%)	
71000-90000	14(6.5%)	21(9.8%)	
91000	5(2.3%)	6(2.8%)	
BMI			
Underweight	5(2.3%)	7(3.3%)	**0.816**
Normal	50(23.3%)	100(46.5%)	
Overweight	19(8.8%)	34(15.8%)	
Exercise in leisure time			
Never/almost never	70(32.6%)	135(62.8%)	**0.383**
Sometimes	3(1.7%)	6(2.8%0	
Often	1(0.5%)	0(0%)	
Chronic symptoms			
No	55(25.6%)	75(34.9%)	**0.003***
Yes	19(8.8%)	66(30.7)	
Professional experience (years)			
1-10	58(27%)	109(50.7%)	**0.537**
11-20	12(5.6%)	27(12.6%)	
21-30	3(1.4%)	5(2.3%)	
31-40	1(0.5%)	0(0%)	
Night shift frequency per month			
<5	7(3.3%)	25(11.6%)	**0.029***
6-10	37(17.2%)	85(39.5%)	
11-15	18(8.4%)	19(8.8%)	
>15	12(5.6%)	12(5.6%)	
Number of patients / night shift			
<20	36(16.7%)	51(23.7%)	**0.048***
21-40	127(12%)	49(22.8%)	
41-60	7(3.3%)	35(16.3%)	
>61	4(1.9%)	6(2.8%)	
Number of patients/day time			
<20	30(14%)	41(19.1%)	**0.225**
21-40	27(12.6%)	54(25.1%)	
41-60	9(4.2%)	18(8.4%)	
>61	8(3.7%)	28(13%)	
Number of hours/week			
30-40	2(0.9%)	12(5.6%)	**0.001***
41-50	7(3.3%)	8(3.7%)	
51-60	9(4.2%)	5(2.3%)	
61-70	4(1.9%)	14(6.5%)	
71-80	42(19.5%)	55(25.6%)	
>81	10(4.7%)	47(21.9%)	

**p < 0.05 indicates that the corresponding factor had significant influence on sleep quality.*

Table 5: Factors associated with Deficient sleep in PSQI

Components PSQI	Healthy %	Deficient %	p value
Subjective sleep quality	38(17.7%)	177(82.3%)	0.261
Sleep latency	50(23.3%)	165(76.7%)	0.320
Sleep duration	38(17.7%)	177(82.3%)	0.002*
Sleep efficiency	134(62.3%)	81(37.7%)	0.424
Sleep disturbance	26(12.1%)	189(87.9%)	0.001*
Use of sleep medications	178(82.8%)	37(17.2%)	0.032*
Daytime disfunction	115(53.5%)	100(46.5%)	0.021*

**p < 0.05 indicates that the corresponding factor had significant influence on sleep quality.*

Discussion

In this study, sleep quality was assessed among nurses working in a selected hospital in Colombo district, Sri Lanka. The data indicated that there was a high prevalence (65.58%) of deficient sleep quality among nurses in Apeksha hospital, Sri Lanka. Similarly, to this study some other studies globally reported a higher percentage of nurses with deficient sleep. Studies done in Nepal had 75% (Thapa et al., 2017) and 69% of deficient sleep among nurses respectively (Kaliyaperumal et al., 2017). The prevalence of nurses reported deficient sleep quality in a European study was 78% (McDowall et al., 2017). The sleep quality among nurses had nearly similar findings for most of the countries globally, despite its status as a developed or a developing country. In Sri Lanka nurses are the main workforce at hospitals and are working in a highly stressful and responsible environment (Warnakulasuriya et al., 2021). Further, there are limited number of staff working in most hospitals and thus leading to unpredictable workload (Warnakulasuriya et al., 2021). Therefore, the high number of deficient sleep quality reflected in the current study may be due to the limited staff, shift work patterns and unpredictable workload among nurses in Sri Lanka.

The result of the present study identified socio demographic factors such as age, gender, body mass index (BMI), marital status, education level and exercise in leisure time, were not significantly associated with deficient sleep

quality. These findings were similar with the study done by Akbari et al. (2016) which showed that gender and age were not associated with sleep quality among nurses. A study conducted by Salehi al el. (2010) also found that there was no association between marital status and sleep quality among nurses. A study done among Nurses in northeastern Ohio, USA found that there was no significant association between BMI and sleep quality among nurses (Huth et al., 2013). Interestingly in yet another study done by Mc Dowall among nurses reported that there was no statistically significant association found between poor sleep and exercise during leisure time (McDowall et al., 2017). Zhang et al. (2016) reported that there was no significant association found between personal income per month and education level with the sleep quality among nurses. These studies indicate that the findings are consistent with the present study. The findings of international studies and the Sri Lankan study highlights that sleep quality of nurses are not affected by the sociodemographic factors but rather it is work-related factors that can mostly affect the sleep quality of nurses.

The work-related factors such as number of night shifts, number of patients allocated in the night shift and long working hours in this population were significantly associated with deficient sleep quality. Sleep duration, sleep disturbances, daytime dysfunction and sleep medication also were associated with the sleep quality among nurses in this study. A study conducted in Turkey indicated that there was a relationship between sleep quality and work-related factors (Tarhan et al., 2017). In this study in Turkey, a high number of patients at night, night shift frequency per month and long work hours per week were associated with nurses' poor sleep. The number of patients in the charge at night and work hours per week could be taken as signs of workload, and further increased workload has been proved to be a hazard for fatigue or stress (Tarhan et al., 2017). Accordingly, those nurses with duty of several hours worked per week, nurses who worked >40 hours had lower sleep quality. In light of the current research findings, although few studies reported in literature the effect of hours worked per week on sleep quality, it can be said that nurses who work >40 hours a week are more fatigued physically and mentally and also the addition of the difficulties that come from working the night shift has a negative effect on their sleep quality. Further, as reported by Shao et al. nurses with increased night shift frequency had sleep problems more frequently (Shao et al., 2010). Moreover, the workload during a night shift is relatively heavy (Thapa et al., 2017). Night shift nurses often work independently with no group support. Therefore, nurses are likely to be more stressed during nightshifts than dayshifts resulting in altered biological rhythms, which directly cause poor sleep quality.

In the present study, association between health-related factors and sleep quality were discovered in addition to work-related factors. Chronic symptoms were significantly associated with poor sleep quality. These findings were consistent with the study by Chan et al., 2008 who showed that chronic symptoms such as gastrointestinal problems and joint, back or muscle pain were associated with insufficient sleep. Chien et al concluded that chronic symptoms have a large impact on peoples' life because it may result in pain and fatigue among them (Chien et al., 2013). Because of that those suffering from these symptoms often have sleep disturbances at night and end up with daytime sleep (Chien et al., 2013).

Conclusion and Recommendations

The present study concludes that the deficient sleep quality is a significant problem among nurses. Further that, this population night shift frequency per month, number of patients per night shift, number of working hours per week, sleep duration, sleep disturbances at night, sleep medication use, and daytime dysfunction paid a major role. These findings suggest that national guidelines should be developed to assess and enhance the sleep quality among nurses since it directly affects to quality of patient care. Furthermore, working hours of nursing staff

should be scheduled according to national and international guidelines. Health administrative and hospital authority should plan a periodic screening of sleep disorders among nurses to prevent complications of sleep problems. Policy makers should plan any alternative or adjustment method on current shift working practices. Allocating adequate staff members for the night shift, allowing the nurses to utilize the allotted rest hours properly, and allocating only the permitted number of night shifts for the nurses are crucial factors in maintaining adequate sleep quality.

Advice should be included in both undergraduate programmes and continuing education to help nurses to recognize and improve their own sleep quality and life quality managers should create a supportive environment to encourage shift-working nurses to engage in healthy behaviours.

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