

Research Article

A Cross Sectional Study on Relationship between Duration of Rotating Shift Work & Sleep Quality in Nurses

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Abstract

Nurses in tertiary care hospital has to work in rotating shift work to provide 24 service to patients. As duty time is constantly changing it affects their circadian rhythm. This can affect sleep duration & quality, cognition leads to fatigue, depression & work time errors. **Aim & objectives:** - This study was carried out to observe effect of rotating shift work (RSW) on quality & duration of their sleep. **Material & Method:-** Based on rotating shift experience female nurses were divided into three groups- group I (less than 1 year), group II (1 to 5 years) and group III (6 to 10 years). Each group consists of 130 nurses. Sleep quality was assessed by using Pittsburgh sleep quality index. Analysis of data was done by using ANOVA. **Results:** – PSQI all component score & PSQI Global score was increases as experience of RSW increases which was highly statistically significant. **Conclusion:** - Nurses working in rotating shifts for long duration were having less sleep duration & poor sleep quality.

Keywords – shift work, sleep quality, PSQI

Introduction

The term ‘shift work’ generally refers to a way of organizing daily working hours in which persons or teams work in succession for at least 8 hours per day, up to and including the whole 24 hour ¹. In tertiary care hospitals shift work is necessary to provide continuous service to patients especially to casualty, ICU & IPD patients. Nurses have to work in rotation shift work pattern in this sectors.

Nurses working in rotating shifts faces problems related with “Shift work disorder”. Shift- and night-work requires employees to work at times that disrupt their lives from the biological and social synchrony that is enjoyed by day workers.²

Many studies has been carried out on shift workers to access sleep quality, insomnia & fatigue in them. Shift workers or night workers with symptoms of insomnia & excessive sleepiness are categorized as having Shift work sleep disorder. Individuals having shift work sleep disorder are more likely to develop gastric ulcers, sleep related accidents, depression, missed family and social activities than shift worker who did not meet criteria. Shift workers are more prone to develop metabolic syndrome as compared to day workers and associated with poor sleep quality.^{3,4}

A study conducted on male security guards shown that working in rotating night shift for more than 1 year are associated with poor psychological health & reduced memory performance.⁵

Our study aimed to know the relationship between duration of rotating shift work and quality & duration of sleep in nurses.

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Material & Method

This study was carried out on female nurses working in Bharati Vidyapeeth Medical College and Hospital, Sangli. Prior to study ethical committee permission & permission of concerned authority was taken. Informed written consent of participant was taken at beginning. Nurses were ask to fill up proforma which included information about their family, economical background, medical history. General health checkup of nurses was carried out to rule out any major health problem.

Nurses between age ranges 25 – 45 years were included in study.⁶ Those having major systemic illness, endocrine disorder, any acute or chronic condition affecting sleep, current use of hypnotic drugs or drugs which may affect quality of sleep, psychiatric disorder or on its treatment, those having menopausal symptoms, any other sleep disorder were excluded from study.

Total 390 nurses participated in study. They were divided into 3 groups.

Group I (control, n = 130) – Nurses not worked in rotating shifts

Group II (cases, n = 130) – Nurses working in rotating shifts for 1 to 5 years

Group III (cases, n = 130) – Nurses working in

rotating shifts for 6 to 10 years

Sample size was calculated by taking level of significance 5%, power 80%.

Subjective Sleep Assessment: pattern & quality of sleep will be assessed by using PSQI. The PSQI allows assessment of sleep disturbances along seven dimensions: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication & day time dysfunction. Each dimension is rated on four point scales which are summed to yield global score. PSQI A total score of ‘5’ or greater indicates poor sleep quality. The PSQI has a high test-retest reliability and a good validity for patients with primary insomnia.^{7,8}

Nurses were asked to fill up questioners when they were not on duty, in quiet room away from their individual work place. Collection of data was done after making participant comfortable & relaxed.

Analysis was done by applying ANOVA test.

Observations –Table showing comparison between Pittsburgh sleep quality index (global & component scores) in rotating shift workers & controls.

Sr. No.	Variable	Group I n = 130	Group II n = 130	Group III n=130	F value	Significance
1	Component 1- Subjective quality of sleep	0.40 ± 0.67	0.80 ± 0.91	0.96 ± 0.83	16.330	0.000
2	Component 2 - Sleep quality	0.56 ± 0.80	0.89 ± 0.92	0.96 ± 1.01	6.947	0.001
3	Component 3 - Sleep duration	0.65 ± 0.80	0.70 ± 0.87	1.023 ± 0.83	7.325	0.001
4	Component 4 - Sleep efficacy	0.054 ± 0.22	0.21 ± 0.43	0.30 ± 0.59	10.888	0.000
5	Component 5 - Sleep disorder	0.49 ± 0.60	0.7 ± 0.68	0.88 ± 0.81	10.038	0.000

Table Cont...

6	Component 6 - Use of sleeping pills	0.054±0.22	0.092±0.29	0.346±0.723	14.942	0.000
7	Component 7 - Sleep related daily dysfunction	0.469±0.63	0.669±0.78	0.838±0.90	7.259	0.001
8	PSQI (Global score)	2.7±2.5598	4.085±2.94	5.33±3.50	24.737	0.000

Results

Table shows comparison of components of sleep quality & global score between three groups of nurses having different rotating shift work experience. Results in our study suggests that with increase in duration of rotating shift work there is rise in all component score of PSQI including global score which is highly statistically significant.

Global PSQI score mean + S.D. in group III nurses having experience of RSW 6 to 10 years was 5.33±3.50, in group II nurses having RSW experience 1 to 5 years was 4.085±2.94 & in group I having no or less than 1 year RSW experience it was 2.7±2.5598 which shows that increased duration of RSW in nurses leads to poor sleep quality.

Discussion

Human being spend one third of time of their life span in sleep. Sleep is not only absence of wakefulness but is very essential to maintain health and wellbeing. Circadian rhythm regulates sleep wake cycle and many other functions of body. It is 24 hours clock regulated by suprachiasmatic nucleus of hypothalamus. Rotating shift work especially night work causes disturbance in endogenous circadian rhythm and the environmental synchronizers (particularly the light/dark cycle) leading to disturbances in psycho-physiological functions.^{9,10,11}

Pittsburgh Sleep Quality Index (PSQI) is a self-reported questionnaire which measure the quality and patterns of sleep over one month time interval. It differentiates “poor” from “good” sleep quality by measuring seven components score.¹² The present study investigated the relationship between the rotating shift

work & sleep quality by using PSQI in female nurses. The results indicated that nurses working in rotating shift work for long time were having poor subjective sleep quality, higher sleep latency, less sleep duration, less habitual sleep efficiency and more sleep related daytime dysfunction. Also use of medication for sleep is more as nurses work in RSW for longer duration.

Nurses working in rotational shifts for 6 to 10 years was having mean global PSQI score 5.33 (> 5) suggesting poor sleep quality in them. Similar to our findings, a study in Taiwan on female nurses found that rotational shift work was associated with poor sleep quality & mental health. They also found that two days off after night shift improves sleep quality & mental health which is useful to maintain physical and psychological health in nurses.^{13,14}

Similar results were also obtained by P Lajoie et al in their study on female hospital employees observed that shift work (working for two 12 h days, two 12 h nights with 5 days off) is strongly associated with poor sleep latency (difficulty falling asleep), poor sleep efficiency with its components of prolonged sleep latency, waking during the night and early awakenings as compared to women working only during the day.⁴ Christopher L. Drake in study on participants selected randomly from general population found out that prevalence of insomnia or excessive sleepiness was 32% & 26% in night & rotating shift workers respectively and 18% in day workers. Percentage of insomnia & excessive sleepiness was higher in night and RSW as compared to day workers.³ In contrast K. McDowall et al in their study noted high prevalence of poor sleep quality in both Shift Worker & Non Shift Working Nurses (78 and 59%, respectively) with no association between poor sleep

and age, gender, body mass index (BMI), number of years worked and number of children in the house.¹⁵

Results of present study revealed longer the duration of rotating shift work for which female nurses working leads to with more daytime dysfunction leads to difficulty in performing daily routine activities. As Female workers have to manage their household chores, childcare, pregnancy in addition to their job they are more exposed to both physical & mental stress as compared to their male co-workers. Female nurses face problem of adjusting their household duties along with their irregular working schedules which can worsen sleep problems & can lead to chronic fatigue as compared to male co-workers.^{11, 16, 17}

Wan-Ju Cheng et al in their study observed strong associations between a fixed night shift and poor sleep and mental health outcomes in women than in men, suggesting that women might face greater difficulty to cope with fixed night work than men which might be due to greater family burden.¹⁸ Thus female nurses are more likely to suffer from insomnia, sleep related daytime dysfunction, sleep related disorders.

Our study was cross sectional study, perspective study should be carried out on shift workers along with other confounding factors like age, workload at working place & at home and other stressors.

Conclusion

From our study it can be concluded that as female nurses work in rotating shift pattern for long duration have poor sleep quality with less sleep duration & more daytime dysfunction leading to occupational accidents. Also RSW can be additional risk factor for cardiovascular disorders, metabolic syndrome, diabetes mellitus & gastric ulcers.

In order to avoid harmful effects of shift work on mental and physical health of nurses certain measures can be done. Shifts of nurses can be adjusted to give them more time for adaptation to changing work timings. Also two days off can be given after night shift to improve sleep quality. Working hours especially at night shift can be reduced to cope up with fatigue, daytime sleepiness.¹⁹ Good physical fitness can improve tolerance to shift work. Awareness about effects of RSW & supports from hospital should be increased. Support from family members & friends also can improve performance &

tolerance to RSW. Regular health check-up should be carried out to access both physical & mental health. Those nurses suffering from insomnia, physical & mental health problems can be separated and shifted to fixed duty pattern.

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Conflict of Interest - Nil

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