



STRESS: A MAJOR PROBLEM IN SHIFT WORKERS

Physiology

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ABSTRACT

Shift work may cause considerable physiological and psychological changes in individuals who are susceptible to circadian rhythm misalignment and sleep wake cycle changes. The present study was conducted in the Department of Physiology, at National Institute of Medical Sciences and Research, Jaipur. 120 cases were included in which 60 healthy non shift workers and 60 healthy shift workers. Comparison between groups Male shift worker, Male non shift worker, Female shift worker, Female non shift worker (MSW, MNSW, FSW and FNSW) was performed using the student's t-test. Differences was considered significance at $p < 0.05$. Shift work can be stress factor with impact on workers health, workers with shift work schedule load need special attention and frequent health check-up due to higher risk.

KEYWORDS

Shift workers, sleep wake cycle, stress, working memory

INTRODUCTION

Stress is a complex condition with emotional, cognitive, and biological factors. Excessive stress causes long- and short-term disability in the various human systems. The stress responses differ depending on the type of stress and the individual's physiological responses. These responses consist of neuro-endocrine and behavioral responses and include the changes in the activity and immune function of the hypothalamo-pituitary-adrenal (HPA) axis [1-4].

"Shift workers are creators and victims at the same time" by Costa [5]. Particularly, night shift is one of the most frequent reasons for disruption of circadian rhythm, causing significant alterations of sleep and biological functions, which can affect the physical and psychological well-being and negatively condition work performance [4-6].

Shift work, particularly work including night shifts, is most widely studied condition, as it may interface at several levels with human homeostasis. At biological level, inversion of the sleep-wake cycle, is a significant stress for endogenous regulation of the circadian rhythms of biological functions which are driven by body clock [7-9].

Numerous physiological and behavioural processes demonstrate circadian rhythms, including body temperature, hormones such as cortisol and melatonin, as well as behavioural factors such as stress, cognition and mood [10].

The present study is an attempt, to found a correlation between stress and shift workers, for the betterment of population in future and to improve the quality of life.

MATERIAL AND METHOD

The present study was conducted in the department of Physiology, at National Institute of Medical Science & Research, Jaipur. The study was approved by the ethical committee of NIMS medical College, Jaipur. 120 subjects at age group between 20-32 years were included in the study, from the National Institute of Medical Sciences and Research Hospital, Jaipur. The present study included 60 healthy subjects (case) employed as technician in hospital with a weekly three-shift system (male=30; female=30), and 60 healthy subjects (control) employed as internship technician in hospital which worked non-shift (male=30; female=30).

In rotating shift 30 male shift workers and 30 female shift workers were included and considered as case group. In non rotating shift 30 male non shift workers and 30 female non shift workers were included and considered as control group. Both the case and control groups were healthy. For non-shift schedule, they work only at day time.

Information on the direction of shift rotation was gathered through the hospital records on work schedules.

The data related to demographic factors such as age, sex, marital status, position, personal history of illness, family history of illness, number of family member, addiction and occupational history were collected for each participant of the study.

Inclusion criteria-

Age: 20-32 years old. Subjects should be free from any sign of disease and no any history of smoking. No previous history of any one or more chronic disease.

Exclusion criteria-

Only night shift worker (without rotation or without working in day time) was excluded from this study.

In rotating shift -Day shift workers which were working less than a week in a month and night shift worker which was working less than a week in a month

Non-shift: Only night shift workers (without rotation or without working in day time)

Statistical analysis: All data are expressed as mean \pm standard deviation. Comparison between groups Male shift workers, Male non shift workers, Female shift workers, Female non shift workers (MSW, MNSW, FSW and FNSW) were performed using the student's t-test (t-test for two independent samples / Two-tailed test). Differences was considered significance at $p < 0.05$.

Assessment of stress

Perceived Stress Scale

Since the development of the Perceived Stress Scale, it has been widely used in various research such as the degree of global stress of a given situation, or effectiveness of an intervention on psychological stress [11].

Perceived Stress Scale Scoring

Each item is rated on a 5-point scale ranging from never (0) to almost always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress. PSS-10 scores are obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2, etc. and then summing across all 10 items. Items 4, 5, 7, and 8 are the positively stated items. Scores around 13 are considered average. Scores of 20 or higher are considered high stress.

OBSERVATION AND RESULTS

Table 1: Comparison of Mean ± SD and Unpaired t-test for two independent sample/Two tailed test (p value) for Stress Level in MSW, MNSW, FSW and FNSW

	MSW (n=30)	MNSW (n=30)	p value
Stress Level	14.07 ± 1.57	13.20 ± 1.32	p=0.025
	FSW (n=30)	FNSW (n=30)	
Stress Level	14.40 ± 1.57	13.57 ± 1.57	p=0.044
	MSW (n=30)	FSW (n=30)	
Stress Level	14.07 ± 1.57	14.40 ± 1.57	p=0.414 (non-significant)
	MNSW (n=30)	FNSW (n=30)	
Stress Level	13.20 ± 1.32	13.57 ± 1.57	p=0.332 (non-significant)

In male shift workers (14.07 ± 1.57) and male non-shift workers (13.20 ± 1.32) were found statistically significant (p=0.025). In addition, female shift workers (14.40 ± 1.57) and female non-shift workers (13.57 ± 1.57) were statistically significant (p=0.044). There were however, stress level in male shift workers and female shift workers was non-significant (p=0.414) and stress level in male non-shift workers and female non-shift workers was non-significant (p=0.332).

Stress level in shift workers in both male and female were found higher than that for non-shift workers (male and female).

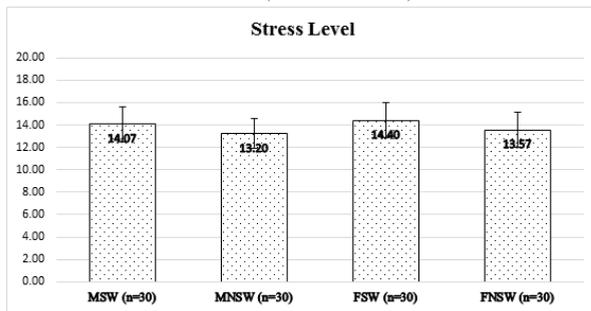


Figure 1: Comparison chart of Stress Level in Male shift workers (MSW), Male non-shift workers (MNSW), Female shift workers (FSW) and Female non-shift workers (FNSW).

DISCUSSION

In the present study, stress level was found higher in shift workers in both the males as well as females when compare with non-shift workers as control group. This result is consistent with other studies in which similar findings were found that shift workers were more stressed than non-shift workers [12-19].

Stress is one of the key elements in the relationship between shift work and disease [20]. Particularly, permanent shift workers have a highly significant health risk problems than in comparison with permanent non-shift workers. The rotating shift had the highest perception of stress. Shift work was also reported as major source of stress. Many occupational studies have suggested that shift may affect sleep patterns, eating habits, family life, and psychological well-being [17-19, 21, 22].

Some previous studies observed that alterations in circadian, homeostatic and psychosocial mechanisms lead to a stress response [21-22].

Stress accompanied by a higher-level role conflict at work was significantly associated with the negative mental health outcomes of shift workers. Studies have shown that both men and women were more likely to report a great deal of job stress, and severe emotional problems if they worked in variable shifts [23]. Rotating night shift work can be a stress factor with an impact on workers' health and well-being, in particular on job satisfaction, quality and quantity of sleep, and psychological and cardiovascular conditions frequently including chronic fatigue [24].

CONCLUSION

A high percentage of health professionals working in a shift working companies, or other organizations, suffer from stress (both mentally and physically), which creates negative impact on their social life style and daily life activities. Many health professionals are not aware of their bad sleep quality. Night workers have worse sleep quality than those working on morning or evenings. So there were many reasons to

develop cardiovascular problems, insomnia and mainly stress. In view of the above, it is necessary to develop awareness campaign for health workers in order to raise consciousness about the importance of good sleep quality and regular health check-up. In future studies this issue has needs further more studies to improve the quality of life.

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