International Journal of Tropical Medicine 11 (4): 98-101, 2016
ISSN: 1816-3319

Drowsiness and its Relation with Individual Characteristics among Night Workers in a Desert Hospital in Iran

[1]Mohsen Poursadeghiyan, [2]Leila Omidi, [3]Mahsa Hami, [4]Mehdi Raei and [5]Hamed Biglari
[1]Department of Ergonomics, School of Rehabilitation,
University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
[2]Department of Occupational Health,
School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
[3]Department of Economic Development and Planning,
Islamic Azad University, University of Firoozkooh Branch, Firoozkooh, Iran
[4]Department of Biostatistics, School of Medicine, Qom University of Medical Sciences, Qom, Iran
[5]Department of Environmental Health Engineering, Faculty of Public Health,
Social Development and Health Promotion Research Center,
Gonabad University of Medical Sciences, Gonabad, Iran

Abstract: Most hospitals perform 24 h daily. Night work is an important duty for staff of a major part of labor force. Shift work is regarded as working out of the normal working hours (about 7:00-18:00). In this cross-sectional study, the panel method was used. Emam Khomeini hospital, one of desert hospital of gonabad was our study site. Sample size was 90 people. Data were collected using Demographic information and questionnaire (Stanford sleepiness scale). Data were analyzed using SPSS software version 16. This study revealed a 95% positive correlation between degree of drowsiness and BMI ($p<0.05$, $r = 0/24$). Also, this study showed that there is a 95% positive correlation between the degree of drowsiness and age ($p<0.05$, $r = 0.589$). Also, the degree of drowsiness and number of years of employment had a 95% positive correlation ($p<0.05$, $r = 0.24$). Also, there was a 95% positive correlation between the degree of drowsiness and level of education in shift-works ($p<0.05$, $r = 0.378$). According to the results of our data, the degree of drowsiness has significant correlation with age variables, the number of years of employment in shift-works and educational level. Our results agree with other studies on the effect of age and experience on drowsiness and work-shifts conformation.

Key words: BMI, experience, hospital staff, shift work, sleepiness

INTRODUCTION

Working 24 hours daily in industries now a days is unavoidable. Night work is necessary for workers/employees of a labor force (Poorabdian *et al*., 2011). Working out of the usual working hours is described as shift working (about 7-18). Examples of organizations with shift works are the police forces, fire service men/women, healthcare workers and transport workers. It is estimated that 10-15% of workers in all jobs do shift works, more than half of which are at evening and night and 25% have circular shifts. Due to the necessity of 24-hour performance, shift workers often live with life patterns different from those of other people (in which the highest level of activity is in evening and night) (DeMoss *et al*., 2004; Farahnaki *et al*., 2014). Noting that physiological processes (such as level of metabolism) and psychological processes (such as short-term memory) and social processes (such as mutual familial behaviors) all show regular and rhythmic fluctuations in daily activities, these differences in daytime performances puts shift workers out of normal performance.

These rhythmic patterns are named circadian rhythms, because they are repeated once everyday and disorders and desynchronization in circadian rhythms is a key intermediate factor in causing health and immunity harmful consequences in shift workers. Only having the highest level of activity at night does not easily result in changes in circadian rhythms. This is due to relative stability of circadian rhythms (Foret *et al*., 1981). Some

Corresponding Author: Hamed Biglari, Department of Environmental Health Engineering, Faculty of Public Health, Social Development and Health Promotion Research Center, Gonabad University of Medical Sciences, Gonabad, Iran

immediate effects of shift works are sleeplessness and reduction in sleep hours in shift workers. In addition, sleep of shift workers at day is lighter and usually disturbed and uncomfortable and this gradually results in general drowsiness in shift workers.

Another negative effect of sleeplessness is drowsiness when one is awake during night working periods, coupled with the reduction in reduction in circadian processes can lead to the performance and consciousness in shift workers. As compared with day time workers, shift workers are more prone to accidents caused by functional impairments.

One of other immediate effects of shift works is impairment of familial and social life because these workers are sleeping or are at work at daytime or evenings which are times of highest levels of social and familial participation (Frank-Stromberg and Olsen, 2003). In addition, shift workers are at higher risks of recognition impairments and mental disorders such as depression and sensitivity. There have been reports on the relationship with some other diseases such as sweet diabetes, thyrotoxicosis, breast cancer, epilepsy and digestive and cardiovascular diseases (Karchani *et al*., 2011).

Impairment of day-time performance was caused by sleeplessness. These results can be dangerous for a worker who uses fine high-technology machines, transportation or critical decisions. Faults that develop during the performance and decision-making processes result in direct or indirect loss of billions of dollars annually (Khandan *et al*., 2013). There is an internal clock in suprachiasmatic nucleus of brain which adjusts a series of complex rhythms of body such as circadian rhythms. No compliance between circadian rhythm and sleep-awake pattern required by a job results in disorders/impairments during sleep. Due to this non-compliance, night-shift workers have to work even though their physiological conditions need sleep, at the expense of their wakeful body physiology (Khandan *et al*., 2012).

MATERIALS AND METHODS

This research is a cross-sectional and descriptive-analytical one. Night work staff members of Emam Khomeini Hospital and one of the desert hospital of gonabad city who have had shift working experience for at least 1 year were involved in this study. Sampling was the "simple" type.

Questionnaires, for data collection were of two parts: in this study, demographic information is asked and names and surnames were excluded in order to ensure that interviewees master courage, trust and confidence in answering the questions and to be aware of the confidentiality of their personal data. After collection, each questionnaire was given a code. Age, height, weight, gender, level of education, marital status, the duration of shift-work and smoking were captured in the demographic information.

The second section involved measurement of the degree of drowsiness/sleepiness using the Stanford sleepiness scale questionnaire which were filled and collected at the following times: 1, 3, 5 and 23 o'clock. Data was analyzed using SPSS software version 16. Analysis of Variance (ANOVA) test was used to examine the relationship between drowsiness, marital status and smoking.

The relation between drowsiness and age, BMI, the number of years of employment in shift works and smoking were examined using paired-t-test. Answers to the Stanford questionnaire were 7° answers and in order to investigate the difference in degrees of drowsiness, paired-t-test was used as well.

Stanford sleepiness scale: This accesses ones alertness. In the day, when running business errands, one would want to be rated with one. Considering the fact that most people have two peak times of alertness daily, at about 9 a.m. and 9 p.m. Alertness wanes to its lowest point at around 3 p.m; after that it begins to build again. It's important to rate ones' alertness at different times during the day. Values below 3 indicate the feeling of alertness, this is an indication that you have a serious sleep debt and you need more sleep.

An introspective measure of sleepiness/drowsiness: The degree of validity was computed with Wilkinson addition and vigilance tests using 0.68 as mean SSS value. Memory test gave a correlation degree of 0.47. Its reliability was 0. 88, using similar tests in Table 1 (Koller *et al*., 1978).

Table 1: The Stanford Sleepiness Scale (SSS)

Degree of sleepiness	Scale rating
Feeling active, vital, alert, or wide awake	1
Functioning at high levels, but not at peak; able to concentrate	2
Awake, but relaxed; responsive but not fully alert	3
Somewhat foggy, let down	4
Foggy; losing interest in keeping wake; slowed down	5
Sleepy, woozy, struggling to sleep; prefer to lie down	6
No longer struggling to sleep, sleep onset early; having dream-like thoughts	7
Asleep	X

RESULTS AND DISCUSSION

Demographic information of night workers staff was first investigated which showed the youngest and the oldest to be 23 and 56, respectively. In addition, most of the studied staffs were 24 years old and the age average in the studied population was 35±6.09 years. The lowest and highest Body Mass Index (BMI) among staffs was 17. 5 and 30 kg m^{-2}, respectively. The mean and standard deviations were 24.07 and 3, respectively. The same shift work involving 2 successive nights, 2 successive evenings, 2 successive nights and 2 off days were observed in all staffs in this study. Years of years employed in shift works showed an average of 5.5 years (ranging between 1-19 years) and a standard deviation of 3.6 (Fig. 1).

- The number of precipitants in this study was 90 men and no one quitted during the study
- Mean and standard deviation of ages of participants were 30.24 and 6.36, respectively
- Mean and standard deviation of BMI of participants were 23.83 and 2.81, respectivel.
- Mean and standard deviation of years of employment is shift works were 4.75 and 3.32, respectively

Relationship between drowsiness and BMI: Table 2 presents results about investigations conducted on the relationship between drowsiness and BMI using the analysis of variance test. The p-value of 0.05 in Table 2 shows a significant relationship between mean drowsiness and BMI in different age groups.

Relationship between drowsiness and age: The relation of drowsiness and age was investigated using the Analysis of Variance test and the results are available in Table 3. Table 3 shows that the p-value is <0.05. Therefore, there is a significant relationship between mean drowsiness and age in different age groups.

Relation of drowsiness and number of years of employment in shift works: Table 4 presents results of the relationship between drowsiness and number of years of employment in shift works using the t-test.

Relation of drowsiness and level of education: Table 5 presents results of investigations on the relationship between drowsiness and level of education using the analysis of variance test.

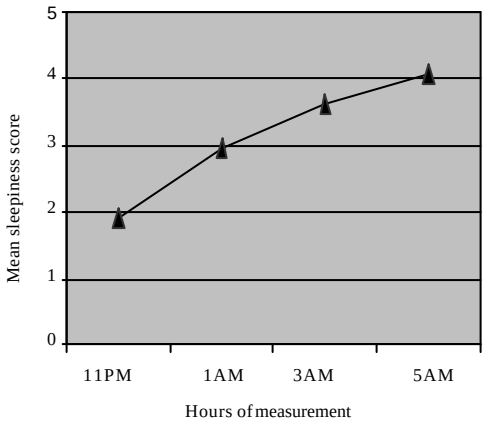

Fig. 1: The curve of average drowsiness in different hours of night is demonstrated

Table 2: The relation between drowsiness and BMI in participants

BMI groups	No.	Mean drowsiness	SD	p-value
<18.5	0	0.0	0.0	0.017
18.5-25	44	3.15	0.52	-
>25	35	3.43	0.56	-

There is a positive significant correlation with 95% certainty between mean drowsiness and BMI; R = 0.240; p-value<0.05

Table 3: The relation between drowsiness and age in participants

Age groups	No.	Mean drowsiness	SD	P-value
20-30	19	2.9412	0.50	0.000
30-40	43	3.6552	0.24	
40-50	17	3.7500	0.31	

There is a positive significant correlation with 95% certainty between mean drowsiness and age; R = 0.589; p-value<0.05

Table 4: Relationship between drowsiness and number of years of employment in shift works among participants

Parameters	t-values	df	p-value
No. of years of employment in shift works	6.11	79	0.000

There is a positive significant correlation with 95% certainty between mean drowsiness and number of years of employment in shift works; R = 0.240; p-value<0.05

Table 5: The relationship between drowsiness and level of education among participants

Level of education	No.	Mean drowsiness	SD	p-value
Illiterate	10	3.5	0.0	0.000
Guidance school	20	3.66	0.35	
Diploma	15	3.1	0.54	
2 years of college	29	3.14	0.57	

There is a positive significant correlation with 95% certainty between mean drowsiness and level of education; R = 0.378; p-value<0.05

As presented in the table, the p-value was below 0.05 and this shows a significant relationship between mean drowsiness and level of education in different age groups. Noting the results presented in Table 1-3, there has been a significant statistical correlation between drowsiness and age, BMI, number of years of employment in shift works and level of education. The current results, like others obtained by the following researchers, confirmed

the effect of age and experience on drowsiness and conformity with shift of work. Weitzman and colleagues found in a study in 1982 that young and aged individuals have some differences in parameters related to circadian system, in which the reduction in age is accompanied by reduction in range and sooner onset of periodical changes (Moline *et al*., 1992). According to the results of a study conducted by Monk and colleagues in 1991, perhaps, such changes resulted in early rising and diurnal. That is, time of individuals' sleep-awake is phase shifted (Monk *et al*., 1991). Although the obtained results are explicitly/absolutely experimental, according to the results obtained by Moline and colleagues in an indirect comparison and cross-sectional study in 1991, the procedure of conformity and consistency with periodical circadian changes caused by rapid changes in sleep-awake is slower in aged persons in comparison with younger ones (Rom, 1998).

A study performed by Foret and colleagues in 1981 revealed that age and experience were negative factors in conformity with work shift (Sharkey *et al*., 2001). A different study conducted by Koller and colleagues in Australia in 1978 revealed that 20% of the people retired as shift workers (Weitzman *et al*., 1983). Considering the currently increasing urge to exclude age discrimination, problems pertaining to loss of tolerance with shift-works caused by high ages seem to have become a serious concern. At the time the present generation reaches the age of 50, such tensions will aggravate and will result in shift workers laying down their tools.

CONCLUSION

According to our data, there is a significant correlation between the degree of drowsiness and age variables, the number of years of employment in shift works and educational level. Our results agree with previous ones in terms of the confirmation of age and experience on drowsiness and conformation to work-shifts and their effects. This study can be used to ensure climate safety in industries (Yarmohammadi *et al*., 2016; Zisapel and N., 2001).

REFERENCES

Poorabdian, J. Khoobi and M. Karchan, 2011. The study of changes in the serial peak flowmetery test in the workers of car painting workshops in Isfahan. Scient. J. Kurdistan Uni. Med. Sci., 15: Pe73-Pe80.

DeMoss, C., M. McGrail Jr., E. Haus, A.L. Crain and S.E. Asche, 2004. Health and performance factors in health care shift workers. J. Occup. Environ. Med., 46: 1278-1281.

Farahnaki, Z., A. Pournajaf, A. Karami, A. Abbasi and M. Karchani, 2014. Investigation of Shift Work Disorders in Nurses Working at Teaching Hospitals of Ilam. J. Hosp., 13: 35-42.

Foret, J., G. Bensimon, O. Benoit and N. Vieux, 1981. Quality of Sleep as a Function of Age and Shift Work. In: Night and Shift Work: Biological and Social Aspects, Berg, A.R., N. Vieux and P. Andlauer (Eds). Pergamon Press, Oxford, pp: 149-160.

Frank-Stromberg, M. and S.J. Olsen, 2003. Instruments For Clinical Health-Care Research. 3rh Edn., Jones and Bartlett Learning, USA., ISBN-13: 978-0763722524, Pages: 713.

Karchani, M., H. Kakooei, Z. Yazdi and M. Zare, 2011. Do bright light shock exposures during breaks reduce subjective sleepiness in night workers?. Sleep Biol. Rhythms, 9: 95-102.

Khandan, M., M. Maghsoudipour, S. Vosoughi and A. Kavousi, 2013. Safety climate and prediction of ergonomic behavior. Intl. J. Occup. Safety Ergon., 19: 523-530.

Khandan, M., S. Vosoughi and M. Maghsoudipour, 2012. Evaluation of safety climate factors-a macroergonomics approach: A case study in Iran. Iran. Rehabil. J., 10: 43-46.

Koller, M., M. Kundi and R. Cervinka, 1978. Field studies of shift work at an Austrian oil refinery I: Health and psychosocial wellbeing of workers who drop out of shiftwork. Ergonomics, 21: 835-847.

Moline, M., C.P. Pollak, T.H. Monk and L.S. Lester, 1992. Age-related differences in recovery from simulated jet lag. Sleep: J. Sleep Res. Sleep Med., 14: 42-48.

Monk, T.H., C.F. Reynolds, D.J. Buysse, C.C. Hoch, D.B. Jarrett, J.R. Jennings and D.J. Kupfer, 1991. Circadian characteristics of healthy 80-year-olds and their relationship to objectively recorded sleep. J. Gerontol., 46: M171-M175.

Rom, W.N., 1998. Environmental and Occupational Medicine. 3rd Edn., Lippincott-Raven Publishers, USA., ISBN: 9780316755788, Pages: 1880.

Sharkey, K.M., L.F. Fogg and C.I. Eastman, 2001. Effects of melatonin administration on daytime sleep after simulated night shift work. J. Sleep Res., 10: 181-192.

Weitzman, E.D., M.L. Moline, C.A. Czeisler and J.C. Zimmerman, 1983. Chronobiology of aging: Temperature, sleep-wake rhythms and entrainment. Neurobiol. Aging, 3: 299-309.

Yarmohammadi, H., A. Pourmohammadi, Y. Sohrabi, S. Eskandari, M. Poursadeghiyan, H. Biglari and M.H. Ebrahimi, 2016. Work shift and its effect on nurses' health and welfare. Social Sci., 11: 2337-2341.

Zisapel, N., 2001. Circadian rhythm sleep disorders: pathophysiology and potential approaches to management. CNS Drugs, 15: 311-328.