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Relationship Between Subjective Sleepiness and Demographic Characteristics in Night Work Drivers

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ABSTRACT

Nowadays, night work is a necessity for employees. So the aim of this study was to investigate the relationship between sleepiness and demographic characteristics among driver night workers.This study carried out in a simulated bus driver. 90 drivers were chosen as the study population. A two part questionnaire was used for data collection which included demographic information and Stanford sleepiness scale. Data were analyzed using SPSS software version 22.There was a significant correlation between sleepiness and BMI ($p < 0.05$, $r = 0.24$). Also, there was a significant difference in sleepiness by education level and job. Demographic variables should be considered in any attempt to management of sleepiness among night workers

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INTRODUCTION

Many important aspects of life, including medical care, power generation, the military, and law enforcement, depend on night or shift works. Also much important commercial part, such as manufacturing and public transportation is related to night work [1-4]. It is estimated that between 15-30% of the workers in developed countries are working outside of the standard work time hours [5,6]. Shift work has several negative effects, the most prevalent of which is disturbed sleepiness. Working at night typically led to sleepiness and performance reduction, so the number of accidents will be increased in the night [7-9]. The night work effects are due to the circadian interference with sleepiness during the daylight hours and circadian suppression of the metabolism at night [10]. Also there are some individual characteristics such as age which differ among people and can affect on workers sleepiness during night works.

Weitzman *et al* found that young and old men have some differences in parameters related to circadian system, in which the reduction in age is accompanied by reduction in circadian amplitude and faster beginning of periodical changes [11]. Monk *et al* also showed that these changes probably result in early rising, so time of individuals' sleeping and raising come along [12]. Moline *et al* in a cross-sectional study indicated that the conformity with temporary circadian changes which is caused by rapid alterations in sleeping and raising program is dilatory in aged persons versus younger persons [13]. A study performed by Foret *et al* also reveled that age and work experience are negative effectors in conformity with work shift [14].

Most of the obtained results are laboratory findings and it need to investigate sleepiness among shift work in an actual field. Therefore, this study has examined sleepiness among metallurgy workers to assess its relation with workers' demographic characteristic.

MATERIALS AND METHODS

This cross-sectional study carried out in the bus driver. The study populations were night workers in this job

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who have been for at least two year in night work. Sampling has been done among these workers randomly and 97 drivers were selected to participate in the investigation. Because of seven incomplete questionnaires, finally 90 workers had included in the ultimate analysis. Subjects were asked to sign the consent form, confirming that they understood the goals, risks, and potential benefits of the study and their right to withdraw from the study at any time. Tehran University of Medical Sciences Committee for Ethics approved the study.

The anonymous questionnaire, which were used for data collection, consisted of two parts: the first part was for demographic information consisted of age, height, weight, gender, level of education, marital status, the precedence of work in shift works and smoking.

The second part of questionnaire was Stanford sleepiness scale (SSS), which have measured the degree of drowsiness/sleepiness and were completed at 23, 1, 3 and 5 o'clock. SSS is a 7-point scale, beginning from 1, which indicates very awake to 7, which indicates very sleepy. In this test, a reduction of more than 3 scores is indicative of severe reduction in performance due to sleeplessness. Its degree of validity was calculated by Wilkinson addition test and Wilkinson vigilance test using mean SSS values to be 0.68. The word memory test gave a correlation degree of 0.47. Its reliability is reported to be 0.88, using similar tests [20].

SPSS software version 22 was used for data analysis. The relationship between drowsiness and demographic characteristics was examined using Kruskal wallis, Mann-Whitney, Friedman and Spearman correlation test.

Results:

The age range of participants was 21 to 45. Most of the subjects were 24 years old and the mean of age was 30±6.09 years. Table 1 indicated demographic characteristic of the subjects. All studied drivers had the same shift working program, from 10 pm to 6 am which was consisted. As showed in table 1, the mean of night working precedence was 5.5 ± 3.6 years. About 27% of participants were smoker, but the remaining 73%, which comprised the most of drivers, were smokers. The maximum cigarette consumption was about 20 numbers per day and the smoker population, consumed mean of 3±6 cigarettes daily.

Table 1: Demographics characteristics of the study populations (N= 90).

Age Mean (SD)		30.37 ± 6.06
BMI Mean (SD)		24.1±3.01
Duration Of driver in Shift Work		5.52±3.6
Smoking n (%)	Smokers	24 (26.7)
	Non Smokers	66 (73.3)
Duration of Smoking		2.28 ± 4.92
Number of cigarette per day		2.96±5.8
Marital Status n (%)	Single	19 (21.1)
	Married	71 (78.9)
Education Status n (%)	Lower than diploma	25(27.7)
	Higher than diploma	65 (72.3)

The mean score of drowsiness in different hours of night is demonstrated in figure 1. According to Friedman test, sleepiness was different in various times of the study night (P<0.001). Figure 1 shows that sleepiness had been increased during night work.

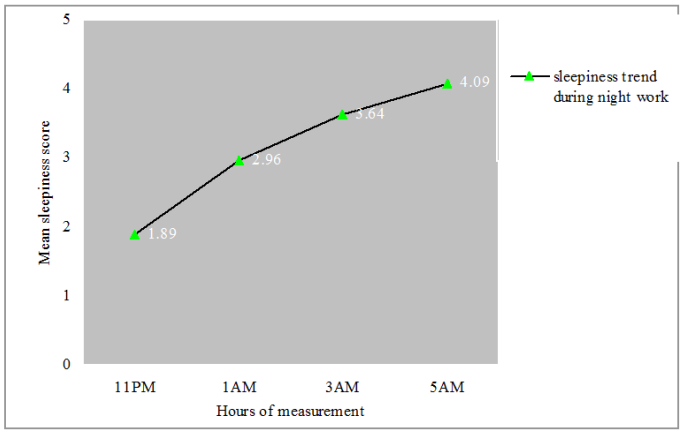

Fig. 1: Sleepiness trend during night work between study populations.

The relation between drowsiness and demographic characteristics was examined (Table 2). As shown in this table, no significant relation existed in the mean of total sleepiness score and smoking status (P= 0.999), also there was not a significant relationship between the mean score of total sleepiness and marital status

(P=0.122). But, the relationship of sleepiness and age was statistically significant (P< 0.001). Moreover, the relationship of sleepiness and BMI was significant (P= 0.013). Our result showed that there is a significant relationship between the mean score of drowsiness and level of education (P<0.001). The spearman correlation test showed that the relationship of drowsiness and the precedence of driver in shift works were also significant (r= 0.307; P = 0.003).

Results of this study also confirmed that there is a positive significant correlation between the mean score of drowsiness and age (r=0.613; P<0.001). Moreover, there was a positive significant correlation between the mean score of drowsiness and BMI (r= 0.275; P=0.009), but there was a negative significant correlation between the mean score of drowsiness and level of education (r= - 0.4; P<0.001).

Table 2: The relation between drowsiness and Demographic characteristics in the study populations.

		Mean (SD) 11PM	P	Mean (SD) 1AM	P	Mean (SD) 3AM	P	Mean (SD) 5AM	P	Mean (SD) Total	P
Smoking	Yes (n= 66)	1.79 (0.54)	0.214	3.12(0.94)	0.317	3.79 (0.72)	0.130	4.42 (0.93)	0.590	3.28 (0.57)	0.993
	No (n= 4)	1.64 (.54)		3.02(0.71)		4.06 (0.8)		4.3 (1)		3.25 (0.52)	
Marital status	Single (n= 19)	1.74 (0.65)	0.737	2.89 (0.74)	0.218	3.74 (0.56)	0.098	4 (1)	0.085	3.092 (0.53)	0.122
	Married (n= 71)	1.66 (0.51)		3.08 (0.79)		4.06 (0.83)		4.42 (0.97)		3.31 (0.56)	
Age groups	20-30 (n= 51)	1.56 (0.57)	0.018	2.78 (0.81)	<0.001	3.62 (0.62)	<0.001	3.98 (0.98)	<0.001	2.98 (0.50)	<0.001
	30-40 (n= 29)	1.9 (0.4)		3.48 (0.51)		4.55 (0.63)		4.86 (0.64)		3.69 (0.24)	
	40-50 (n= 10)	1.67 (0.52)		3.33 (0.52)		4.67 (0.81)		5.17 (0.75)		3.71 (0.31)	
BMI groups	<=25 (n=55)	1.65 (0.52)	0.575	2.94 (0.83)	0.153	3.81 (0.75)	0.01	4.20 (0.89)	0.021	3.15 (0.53)	0.013
	>25 (n= 35)	1.72 (0.57)		3.19 (0.67)		4.25 (0.77)		4.53 (1.08)		3.43 (0.56)	
Level of education	Lower than diploma(n=25)	1.8 (0.41)	0.126	3.48 (0.58)	0.001	4.48 (0.65)	<0.001	4.88 (0.72)	<0.001	3.66 (0.34)	<0.001
	Higher than diploma(n=65)	1.63 (.57)		2.88 (0.78)		3.8 (0.75)		4.12 (0.99)		3.11 (0.55)	

Discussion:

The effects of age and some other demographic factors on the prevalence of sleep and sleepiness complaints were studied. There was a significant statistical correlation between drowsiness and age, BMI, number of years of drivers in shift works, and level of education. Our results confirm the effect of age and experience on drowsiness and conformity with shift of work. Weitzman *et al* found that young and old peoples have some differences in parameters related to circadian system, in which the reduction in age is accompanied by reduction in the range and sooner onset of periodical changes [11]. These changes probably, according to the finding of a study performed by Monk and colleagues in 1991, result in early rising in the morning. That is, time of individuals' wake come along [12]. According to the results obtained by Moline *et al*, the procedure of consistency with temporary circadian changes caused by rapid changes in wake and sleeping program is slower in aged persons in comparison with younger persons [13]. A study performed by Foret *et al* in 1981 reveled that age and experience act as negative effectors in conformity with shift work [14]. However, aging have a detrimental effect on shift workers [15,16]. Compared with younger people, older subjects aren't probably sensitive to sleep debt [17]. With the currently increasing tendency to omit the age discrimination, the problems related to loss of tolerance with shift works caused by high ages seem to become a serious problem.

Our results revealed that drowsiness have had an increasing trend during the night of the study. Also the highest level of sleepiness has been showed in the last hour of night. Other studies also report that the highest degree of drowsiness is at 2, 4, and 6 AM [18].

There was not any relation between smoking and sleepiness. Similar studies also showed that smoking was related to daytime alertness, and the effect on sleepiness complaint is difficult to prove, moreover earlier results does not support this finding [19].

BMI had a positive effective on sleepiness. That is, subjects with a higher BMI index have more sleepiness complaint. These people probably didn't have an appropriate physical activity. Therefore, they were not in good shape and they have had a higher sleepiness score. In other studies, it is shown that a sedentary life-style was the most important factor that increased sleepiness. Also some results suggest that physical activity may decrease insomnia shift workers groups [20].

Conclusion:

In summary, this study suggests that sleep and sleepiness complaints are common among shift workers. And some factors like age, precedence of shift work, BMI have had a significant effect on sleepiness and should be considered in any attempt to management of the problem in workers.

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