



Association between Blood Pressure and Oral Temperature Rate with Sleepiness Changes among Clinical Night Workers

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(Received 09 Apr 2019; accepted 19 Apr 2019)

Dear Editor-in-Chief

Drowsiness at work and lack of proper sleep quality is a critical aspect of safety in night workers (1-3).

This cross-sectional descriptive-analytic research was carried out in order to investigate the sleepiness among clinical shift workers in a hospital in Iran and its relationship with some other important signs and features of them at different hours during the night working. This paper follows analyses of data from the second night in the previous study (4).

The conditions of this night (based on ethical consideration) are similar to first night; the difference is as follows: participants were studied in only one group, the intensity of sleepiness was measured by the valid, and reliable questionnaire of Karoniska Sleepiness Scale (KSS) was used (1). Regarding the considered schedule, questionnaires were completed by participants at 21:00, 22:30 and 24:00 PM, 1:30 and 3:00 AM. There were sporadic changes in the body temperature of shift workers because of sleepiness disorder mostly around 9:00 PM and slightly around 5:00 am (5). Sampling time was selected based on this

criterion and working duration (8:00PM to 3:00AM). Oral temperature and blood pressure were simultaneously measured using a thermometer and a mercury sphygmomanometer at the noted times (3).

After testing the normality of data with Kolmogorov-Smirnov, *t*-test, ANOVA and Pearson's correlation were used. Relationship between body temperature and blood pressure with sleepiness were found by Spearman's correlation through SPSS V.21(Chicago, IL, USA). To present the changes of sleepiness based on both body temperature, and blood pressure in (Fig. 1, Fig. 2), we calculated its values over mean of normal values for body temperature (37 °C) and blood pressure (100 mmHg). The highest levels of sleepiness were at 3:00 am then at 1:30 am, which is in line with other research findings that were indicative of appearance of the highest sleepiness at midnight (2:00, 4:00, and 6:00 am) (2,4,6). A research on the drivers was carried out involved in shift working and concluded that sleepiness would raise by an increase in work duration (7). Body temperature had a relationship with sleepiness

($r=-0.08$, $P=0.046$). Also, the correlation between blood pressure and sleepiness was significant ($r=-0.419$, $P< 0.001$). A study in the field of vital

changes among night workers depicted that increasing sleepiness is related to decreasing vital sign (8).

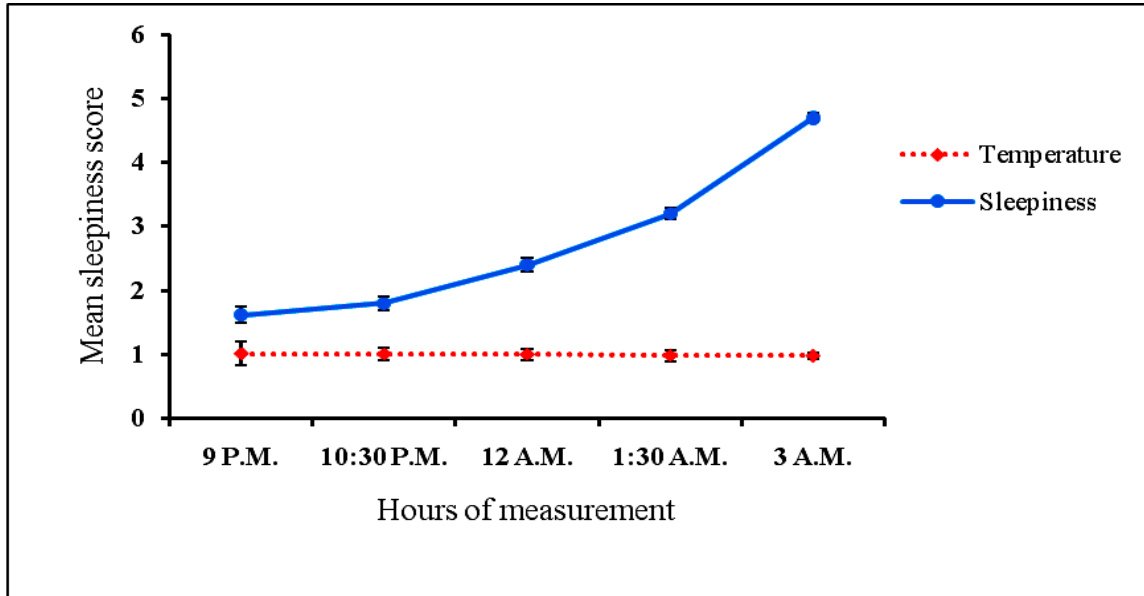


Fig. 1: Changes in the body temperature with sleepiness

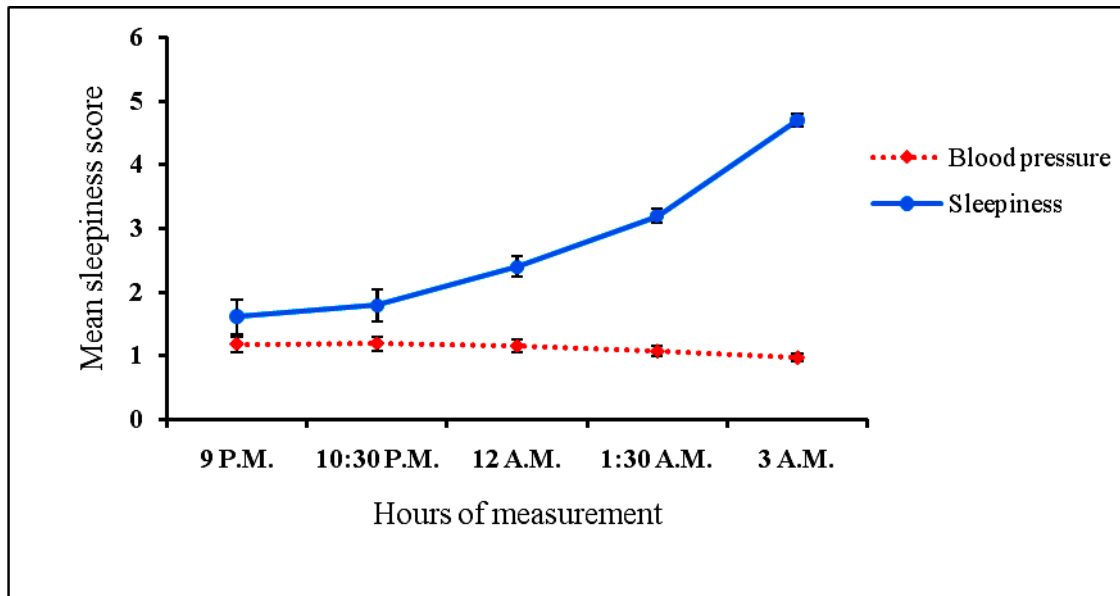


Fig. 2: The rate of changes in blood pressure with sleepiness

However, in another study sleepiness was related to fatigue positively, and fatigue would lead to an increase in heart rate and blood pressure (9). Furthermore, people with high sleepiness levels are

at risk of hypertension (10). The sleepiness level at 10:30 PM was lower than at 9 PM (3). This outcome may be because of subjective effects on the new situation.

Findings of Pearson's correlations (P -value) demonstrated that sleepiness was significantly correlated with age, work experience and BMI with coefficients of 0.589 ($P<0.001$), 0.27 ($P=0.01$) and 0.24 ($P=0.012$), respectively. Similar to our results, previous studies reported that two main factors of individual characteristics such as age and BMI are the main causes of increasing the sleepiness (6-8).

Fig. 1, 2 suggest that an increase in the rate of sleepiness leads to reducing the mean score of body temperature and blood pressure. Altogether, it is so critical to assign credit and value to the demographic and physiological characteristics of the workers when one intends to select eligible employees for different shift working times.

Conflict of interest

The authors declare that there is no conflict of interest.

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