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Letter to the Editor

The Relationship between Subjective Sleepiness and Changes in Breath and Beat Rates among the Clinical Night Workers

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Dear Editor-in-Chief

Waking up and sleep quality is a critical aspect of safety in night workers (1-3). Shift work usually leads to many problems such as fatigue, high blood pressure, and heart rate and respiratory problems (4). In spite of this, few studies have investigated the Association of subjective sleepiness with changes in breath and beat rates among the night shift workers.

This paper was extracted from analyzing the second night data of our previous study based on Informed consent and ethical consideration in 2012 at Emam Khomeini hospital of Ilam (5). Differences between gathering in the first and second nights are as follows: 1. in second night, shift workers were only in one group, while the in first night, it was conducted in two groups (5); 2. Data gathering in second night was carried out using Karoniska Sleepiness Scale (KSS) while, in first night, it was done by Stanford Sleepiness Scale (SSS). Its validity and reliability have been proven previously (6). Participants had an experience of shift working at least one year. Furthermore, they had no history of long-term medicine consumption or working at night and work shift for two consecutive nights.

The questionnaires were completed by the participants at 9:00 P.M., 10:30 P.M., 12:00 P.M., 1:30 am, and 3:00 am. Breathing and beat rates were simultaneously monitored directly at the mentioned times. Fig. 1 shows the trend of sleepiness and scaling of changes in the beat rate and breathing rate during the night time.

Breathe rate and beat rate at the beginning of the study was 18.29±0.27 and 91.86±0.18 per minute, respectively. Finally, at the beginning of the work (9 P.M.), the mean of sleepiness rate was 1.62±0.27.

Based on Pearson`s correlation, beat rate had a negative relationship with sleepiness at the beginning of the shift (r=-0.24, *P*=0.033), 1:30 A.M. (r=-0.23, *P*=0.041) and 3:00 A.M. (r=-0.33, *P*=0.003).

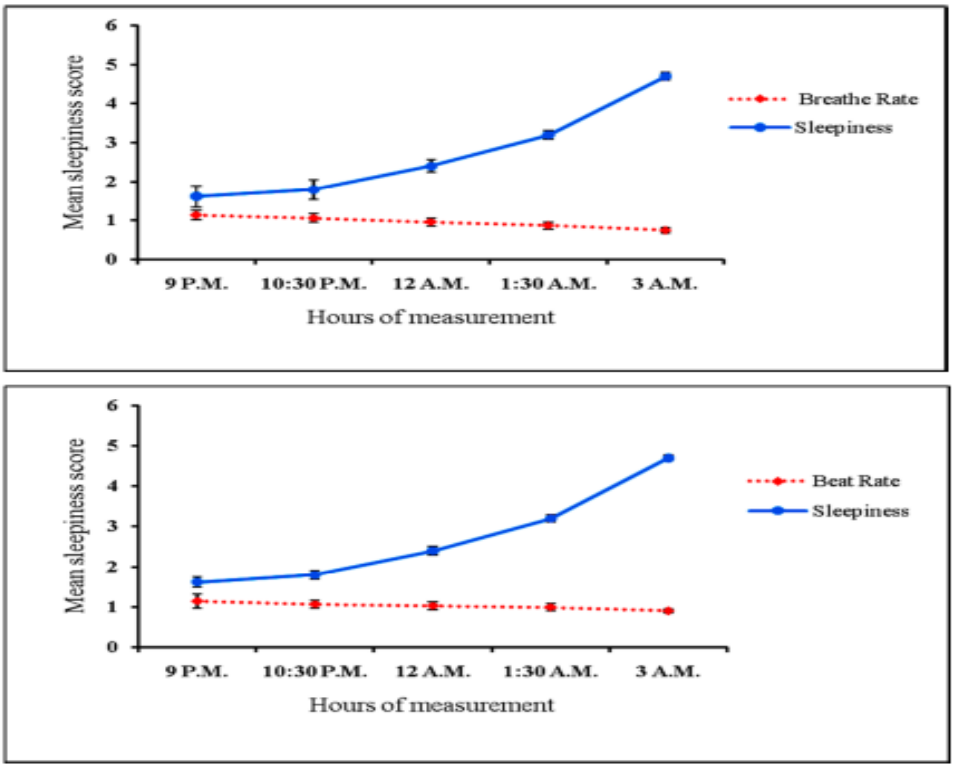

Fig. 1: Trends of Beat and Breath rate regards to sleepiness at different work hours

Moreover, Spearman`s correlation of breathing rate and sleepiness was negative and significant at the end of the shift (r=-0.28, *P*= 0.012).

The highest levels of sleepiness was observed at 3:00 am and then at 1:30 am. This result was similar to outcomes of other studies which reported that the maximum drowsiness occurs at 2:00, 4:00, and 6:00 am in night shift (1, 6, 7); hence, it could be concluded that work shift influences sleeping quality.

As mentioned above, Table 1 and Fig. 1 illustrate that increasing the sleepiness leads to a reduction in breath and beat rates as first night (5), this fact about the oral temperature in the first night was not approved by another study (8). Changes in heart rate could be used as an alarm to sleepiness (9).

Table 1: Relationship between sleepiness, beat rate and breathing rate during the time

Time of testing	*Sleepiness Mean±SD*	*Beat rate Mean±SD*	*Breathing rate Mean±SD*	*Correlation (P)†*	*Correlation (P)¥*
9:00 P.M.	1.62±0.27	91.86±0.18	18.29±0.27	-0.24* (0.033)	-0.22 (0.051)
10.30 P.M.	1.80±0.25	85.11±0.10	17.08±0.25	-0.19 (0.093)	-0.18 (0.112)
12:00 A.M.	2.40±0.16	82.11±0.09	15.40±0.16	-0.08 (0.483)	-0.11 (0.334)
1.30 A.M.	3.24±0.11	79.16±0.09	14.01±0.17	-0.23* (0.041)	-0.16 (0.159)
3:00 A.M.	4.7±0.09	72.07±0.05	12.06±0.10	-0.33** (0.003)	-0.28* (0.012)

†Between Sleepness and Beat rate. ¥Between Sleepness and Breathing rate
* Significant at the5% level. ** Significant at the1% level

Sleepiness can decrease beat and breathe rates, and shift workers especially nurses who are care the patients would be at risk. Shift working needs the special physical and emotional system; thus, the policymakers should pay attention to this and select better staffs for shift working.

Conflict of interest

The authors declare that there is no conflict of interest.

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