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### Effect of night work related insomnia on cardiovascular responses among nurses working at hospital

Hossein Namdar<sup>1</sup>, Mohammadreza Taban Sadeghi<sup>1\*</sup>, Touraj Hashemi Nosrat Abad<sup>2</sup>, Razieh Parizad<sup>1</sup> and Davoud Ezzati<sup>2</sup>

<sup>1</sup>Cardiovascular Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

<sup>2</sup>Department of Psychology, Faculty of Educational Sciences and Psychology, University of Tabriz, Iran

\*Corresponding author

#### KEYWORDS

Blood Pressure,  
Heart Rate,  
Insomnia

#### A B S T R A C T

Effect of night work related insomnia on hemodynamic in nurses have not been studied broadly. The study aimed to investigate the effect of night work related Insomnia on cardiovascular responses of nurses in hospitals at Tabriz. Fifty night shift nurses of Alzahra Hospital and Madani Heart Hospital in Tabriz were selected using convenience sampling between the ages of 22 and 49 years. Their Blood pressure and heart rate were measured before and after the work shift and the data were analyzed using SPSS 18 software. There were significant differences between systolic pressure and heart rate of participants before and after night work and there were significant increasing in systolic pressure and heart rate after finishing night work. Based on obtained results, there is a relationship between insomnia induced stress and increasing blood pressure and heart rate of nurses working at night shift at hospitals, so it is recommended to undertake educational intervention to increase knowledge especially among nurses who are working at night shift.

### Introduction

Working at the hospital environment, nurses will have direct contacts with clients day and night, so they are influenced by patients and their families' pain and distress, and necessity to do tasks immediately and accurately causes to psychic pressure on employees as time passes. Reasons such as working for long hours, working at the weekends and night shift work causes

employees to leave the hospital environment (Pavesic and Brymer, 1990).

Sleep is a physiological and reversible phenomenon in which the response to a stimulus decreases (Stenberg, 2007). Sleep is needed to con to keep up energy, and enhances the physical appearance (Zakerimoghadam *et al.*, 2006). We spend

about one-third of our lives asleep and this should not be thought a waste of time it should not be thought of wasting time, because sleep reduces stress and anxiety and help individuals to recover their energy for better concentration, adaptability and enjoying daily activities (Zakerimoghdam *et al.*, 2006; Khealani, 2006).

Insomnia is one of the prevalent sleep disorders and extended problems which every individual may experiences it through life (Dastani *et al.*, 2011). Clinical importance of insomnia is specified by intensity, frequency, period and daily consequences. Insomnia is shown in individual with different forms and resources and reflects different kinds of complaints in the area of duration and quality of sleep. According to 1950 telephone interviews in Gallup institute 36 percent of Americans suffer from a sleep disorder (Dastani *et al.*, 2011). In other study, insomnia side effects are shown on general health, life satisfaction, behavior and quality of doing vocational duties (Brions *et al.*, 1996; Pilker *et al.*, 1997; Dinges *et al.*, 1997; Ulfberg *et al.*, 1996; Ramsawh *et al.*, 2009). Women are two times more likely than men to report their insomnia. The gender difference may reflect that women are more likely to accept and prepare for treatments and in other hand may reflect more accurate understanding of sleep disorder in the women. Complaints of insomnia in unemployed men and women, divorced and widowed people and even those who live alone are more common (Dastani *et al.*, 2011).

Anxiety and insomnia are important and complicated issues in psychiatric area which are correlated together. In a quarter of those who suffer from insomnia, there would develop anxiety disorder. Insomnia in long time can cause considerable stress and

disturb high quality of life as well as causing vocational, social and family problems (Carney *et al.*, 2005).

Stress is the most popular factor to accelerate insomnia (Dastani *et al.*, 2011), and is correlated to cardiovascular disease (Lynch *et al.*, 1997; Siegrist *et al.*, 1990; Bosma *et al.*, 1998). Some parts of this correlation are induced by stressor effects on automotive nervous system and blood pressure (Tanja *et al.*, 2000). Results of several studies on outpatients showed that blood pressure may increase in patients who had high vocational stress (Light *et al.*, 1992; Schnall *et al.*, 1992, 1998).

No studies shows effect of insomnia on cardiovascular disease in the country based on analyzing consistent information resources. For this reason, this study justifies its necessity and importance. Therefore, many studies could be conducted in this field.

## **Materials and Methods**

Statistical society of this study is women nurses of Alzahra Hospital and Madani Heart Hospital in Tabriz. Sample group included 50 nurses aged between 22 and 49 years who are working at night shift which were selected as convenience sampling.

First, samples were insured that they can leave the study whenever they want and then systolic and diastolic blood pressure and heart rate of samples were measured in three frequent times at the beginning and at the end of work shift. Then, obtained mean of results were used at statistical analysis.

Brachial mercury sphygmomanometer was used as tool. This is a medical tool to control and measure systolic and diastolic blood

pressure. In this study, heart rate was measured manually for 30 seconds.

The collected data were analyzed using SPSS 18 software. Central tendency indicators (frequency, mean, and standard deviation) were used in descriptive statistics. Repeated Measure ANOVA was used in inferential statistics for examining study questions.

## **Results and Discussion**

Mean and standard deviation of cardiovascular responses of samples is shown in table 1. As you see, samples obtained higher scores in cardiovascular responses at finishing work shift compared to beginning of the shift. Table 2 shows comparison of cardiovascular responses of samples. As shown in the table lists, there is significant difference in systolic blood pressure and heart rate between times before night work and after finishing it and there is significant increase in systolic pressure and heart rate after finishing night work.

This study aimed to investigate effect of insomnia induced by night work on cardiovascular responses in nurses who are employed in Madani and Alzahra Hospitals of Tabriz. findings of this study showed significant difference between systolic blood pressure and heart rate between two times, before beginning and finishing night shift and showed significant increase in systolic blood pressure and heart rate after finishing night shift.

Various studies showed rapid heart rate in individuals who suffered insomnia due to night work compared to normal individuals before sleep, during sleep and after waking up (Dastani *et al.*, 2011). Based on the study on cardiovascular responses on nurses who are working at night shift compared to day

shift, blood pressure and heart rate of both groups increased during work and decreased in at sleep time. This reduction was more in nurses who are working in at day shift and this difference is that nurses who are working at day shift can sleep during the nights and deep night sleep decreases blood pressure and heart rate (Goto *et al.*, 1994). According to a study on nurses who are working at alternating shift, systolic and diastolic blood pressure is increased during work and decreased at the sleep time. While, working at night shift, even at relaxing time after night shift showed increasing in blood pressure (Lo *et al.*, 2008).

Based on 24 hour test in the field of central temperature of body, arousal role of autonomic system is stated. When body temperature is low, individuals tend to sleep and maximum body temperature is shown in the diagram during caution. These findings shows arousal of autonomic system effect on onset and duration of sleep and individual who are suffering from insomnia are aroused not only at night, but also are aroused during day more (Borkovec, 1982).

An inconsistent study in the field of workers who are working at repair and maintenance departments of air lines showed, increasing flexibility and controlling work time cause to decrease systolic blood pressure and heart rate (Viitasalo *et al.*, 2008). Maybe, this inconsistency is due to some stress which is occurred for nurses who are in a direct contact with patients and their families, observing patients' pain and this issue cannot generalized to other vocations.

## **Study limitations**

This study has some limitations which affect on generalizability of the results. First, this study is conducted on patients between 22 to 49 years old and participants were women.

**Table.1** Mean and standard deviation of SBP, DBP and HR in nurses before and after night working

| Variables  | Mean ± SD         | Mean ± SD        |
|------------|-------------------|------------------|
|            | Before Work Shift | After Work Shift |
|            | n=50              | n=50             |
| <b>SBP</b> | 105.06 ± 11.07    | 108.08 ± 13.40   |
| <b>DBP</b> | 68.78 ± 9.07      | 70.72 ± 9.82     |
| <b>HR</b>  | 81.86 ± 6.99      | 84.10 ± 7.91     |

SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate

**Table.2** Results of repeated measure test

|            | Sum of Squares | Mean Squares | F     | Sig*  |
|------------|----------------|--------------|-------|-------|
| <b>SBP</b> | 228.010        | 228.010      | 0.582 | 0.013 |
| <b>DBP</b> | 94.090         | 94.090       | 0.399 | 0.071 |
| <b>HR</b>  | 125.440        | 125.440      | 5.621 | 0.022 |

SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; HR: Heart Rate

P< 0.05, DF= 1

Therefore, it is recommended in future study to consider people of other ages including two genders in the study.

### Conclusion

Based on findings of this study, insomnia induced stress increases blood pressure and heart rate, decreasing health. So, it is better to conduct extensive training intervention to increase knowledge of hospitals employees especially who are working at night shift.

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