

The effects of state anxiety and thermal comfort on sleep quality and eye fatigue in shift work nurses

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ABSTRACT

Psychological problems as state anxiety (SA) in the work environment has negative effect on the employees life especially shift work nurses, i.e. negative effect on mental and physical health (sleep quality, eye fatigue and comfort thermal).The purpose of this study was determination of effects of state anxiety and thermal comfort on sleep quality and eye fatigue in shift work nurses. **Methods:** This cross-sectional research conducted on 82 shift-work personnel of 18 nursing workstations of Isfahan hospitals in 2012. To measure the SA, sleep quality, visual fatigue and thermal comfort, Spielberger state-trait anxiety inventory, Pittsburg sleep quality index, eye fatigue questionnaire and thermal comfort questionnaire were used respectively. The data were analyzed with descriptive statistics, student test and correlation analysis. **Results:** Correlation between SA and sleep quality was $-0.664(P < 0001)$, Pearson correlation between SA and thermal comfort was $-0.276(P = 0.016)$ and between SA and eye fatigue was $0.57 (P < 0001)$. **Conclusion:** Based on these results, it can be concluded that improvement of thermal conditions and reduce state anxiety level can be reduce eye fatigue and increase the sleep quality in shift work nurses.

Key words: Eye fatigue, shift work nurses, sleep quality, state anxiety, thermal comfort

INTRODUCTION

Nursing is a professional, which because of its stressful nature, being faced with unforeseen situations, shifting, organizational and personal factors, effect on mental and physical health of these practitioners. Different studies has reported that in comparison with the mental and physical health of people of our country, the mental and physical health of this group of health care workers is a lower level.^[1]The current study sought to determine

the relationship between anxiety disorders and specific types of sleep quality complaints in a large epidemiological sample^[2] and among the various anxiety disorders assessed in the current study, most had a moderately strong relationship with sleep problems.^[3]Among the other variables of work environment, thermal comfort can be mentioned.

The thermal comfort feeling of an individual depends upon its thermal stability. Thermal stability also depends on different factors such as physical activity, garment and environmental factors (such as dry bulb temperature, radiant temperature, air movement speed and air moisture). Thermal comfort based on ANSI/ASHRAE -SS 1981 standard is described as a condition which in, a human being is mentally satisfied with thermal condition.^[4,5]Mental satisfaction of environmental conditions of the work place is one of the issues that should be considered, because care of patient needed to especial air condition so indoor air rarely circulate without door fresh air, this poor ventilation can be unpleasant for nurses and other health care workers. Hence, they should be noticed seriously. Among the problems of night shift nurses, sleep quality can be named. In past few years, nursing has been in

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the spot light, because of its work injuries. In research, which was done on 2372 nurse in Baltimore, USA, it was shown that more than one-fourth of nurses work about 12 hour that this more work hours continually lead to mental and physical fatigue and finally this factor is the negative effect on the sleep quality.^[6] Legar shows that people with sleeping problems receive 7 times more injuries related to people who have enough sleep.

The one important factor that can influence comfort level in buildings can be environmental factors.^[7] Environmental factors can be evaluated by thermal comfort questionnaires. Nurses in comparison with others, experience disorders such as disturbance in sleep quality, physical and mental tension, depression, job stress and other problem.^[11] In a study, effects of work-sleep cycle on physical health among shift nurses, the results determined that the night shift nurses contract physical illnesses more than nurses who work in day light.^[8] In another research, results showed that, there is a magnificent difference between the sleep quality of the night shift and fixed shift nurses. The fixed shift nurses enjoyed better sleep quality.^[9] Hence, this study was done with the purpose of determining the effects of state anxiety and thermal conditions on sleep quality and eye fatigue in shift work nurses.

Subjects

Subjects were chosen voluntarily and simple randomly, which their average (standard deviation) of age, weight, height, body mass index and work record were 30.75 (6.42) years, 74.04 (13.15) kg, 174.65 (8.38) cm, 24.17 (3.27) kg/m² and 9.7 (3.5) years respectively. The inclusion criteria were having at least 1 year work history, lacking of cardio vascular diseases, respiratory diseases and not receiving any sedatives drug. Exclusion criteria was not willing to cooperate or not filling out the questionnaires completely (two of the participants were removed).

Procedure

This cross-sectional research was done on the night shift nurses in Isfahan Al-Zahra Hospital in 18 nursing work stations in 2012. In the present study, state anxiety measured by state-trait anxiety inventory^[10] that has the Likert scale and its divisions include "almost never" with grade "1" to "almost always" with grade "4." This questionnaire had high intra-class correlation coefficients and the average reliability ration different groups.^[11]

Visual fatigue level measured by eye fatigue questionnaire comprising 15 questions that they has been designed in (0-10) Likert range. Alpha coefficient of this questionnaire was 0.755.^[12] Sleep quality measured by Pittsburg sleep quality index (PSQI) that sensitivity and reliability of PSQI were 89.6% and 86.5% respectively.^[13] This questionnaire yields 7 scores for the individual's over all description of sleep quality, the period of sleeping, the period of effective sleep, effective sleep, sleep disorders, dose of receiving opiate, daily performance disorders scales and one overall score.^[13] The score of each questionnaire has been considered from 0 to 3

in which, 0, 1, 2 and 3, imply normal condition, presence of a little mean and intense problem respectively. Data measured between 9 p.m. and 1 a.m. Data analyzing was performed by descriptive statistics, Pearson correlation analysis and regression analysis.

RESULTS

The mean score (standard deviation) of SA was 40.98 (18.56) with range 5.00-96.67. The mean score (standard deviation) of sleep quality was 63.64 (19.35) with range 2.38-95.24. The mean score (standard deviation) of thermal comfort was 53.47 (17.15) with range 16.67-83.3. The mean (standard deviation) of eye fatigue among these people was 29.06 (24.28) with range 3.65-78.00.

Pearson correlation between state anxiety and the other variables represent, areas follow: Pearson correlation between state anxiety and eye fatigue was 0.57 ($P < 0001$) [Figure 1]. Pearson correlation between state anxiety and sleep quality was -0.664 ($P < 0001$) [Figure 2] and correlation between state anxiety and thermal comfort was 0.276 ($P = 0.016$) [Figure 3]. Pearson correlation between thermal comfort and eye fatigue shows reverse relation -0.38 ($P = 0.002$) [Figure 4]. Pearson correlation between thermal comfort and sleep quality was 0.24 ($P = 0.033$) [Figure 5], Pearson correlation between eye fatigue and sleep quality, which indicates positive and moderate relation was -0.66 ($P < 0.001$) [Figure 6].

DISCUSSION

The relationship between psychological problems such as state anxiety and mental health workers is a very complex so that studies to examine these relationships are essential. However, the results of this study showed that between shift work nurses' sleep quality and state anxiety, as a psychological problem, was negatively correlated. This means that with an increase in anxiety levels, quality of sleep declines that these results are consistent with Ramsawh *et al.* 2009 findings.^[14] Thermal comfort is also negatively correlated with state anxiety.

Negative adverse effect of anxiety can be observed on the thermal comfort of shift work nurses. This relationship can be theoretically confirmed. Because anxiety as a state of fear, distress and confusion often associated with physiological reactions such as increased heart rate, increased respiration and evaporation, which ultimately causes the thermal discomfort in anxious individuals (Garfingel).^[15] And another results of the study can be noted that a direct connection between increased levels of eye fatigue and increase anxiety. This association may be due to a lack of good sleep in shift work nurses, which in turn has enhances eye fatigue. Sleep disorders is one of the most important issues among shift nurses, especially night shift nurses. High stress and disarranged shifts are important effective factors on sleep disorders and sleep quality.^[16] The results of the current research like the others (Escribà *et al.*), which have conducted

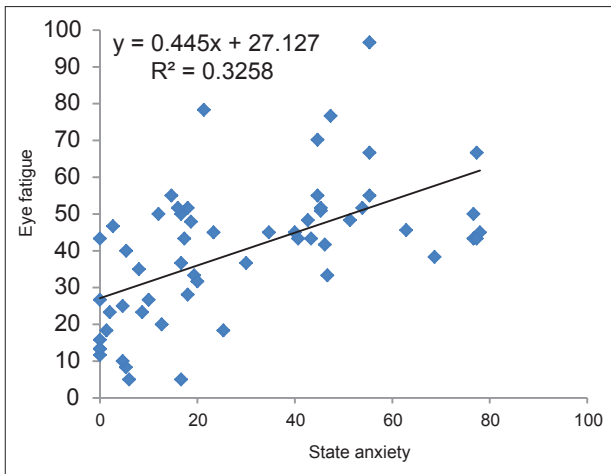


Figure 1: Scatter plot between state anxiety and eye fatigue in shift work nurses

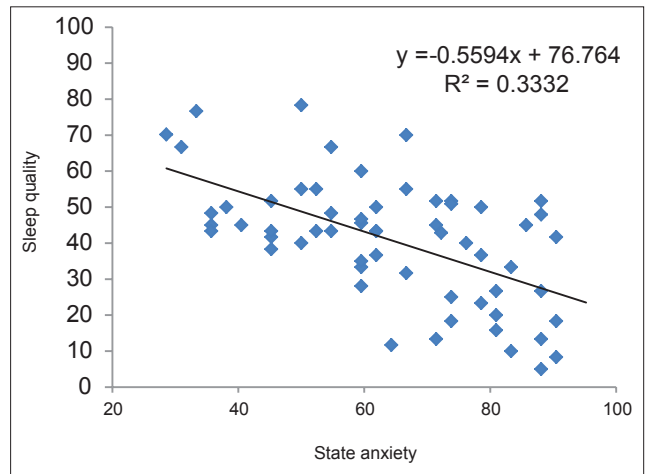


Figure 2: Scatter plot between state anxiety and eye fatigues in shift work nurses

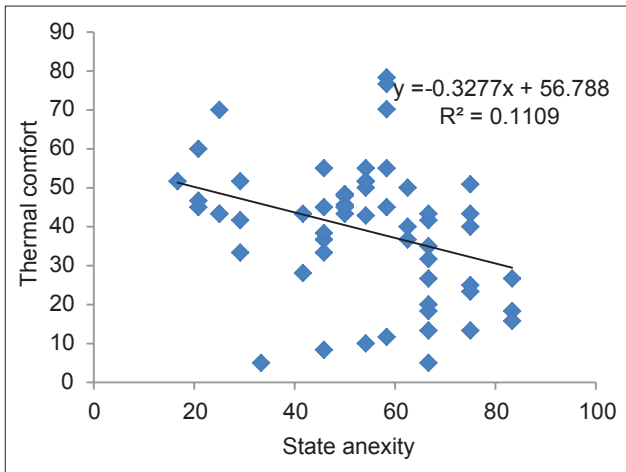


Figure 3: Scatter plot between state anxiety and thermal comfort in shift work nurses

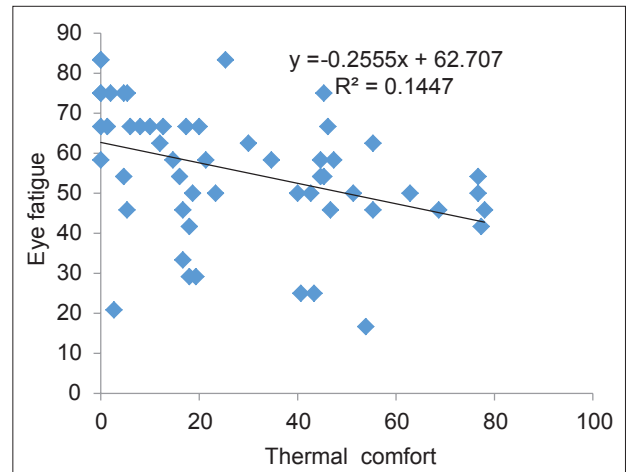


Figure 4: Scatter plot between thermal comfort and eye fatigues in shift work nurses

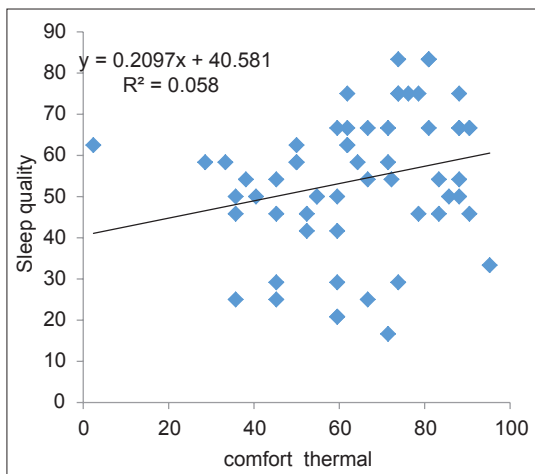


Figure 5: Scatter plot between thermal comfort and sleep quality in shift work nurses

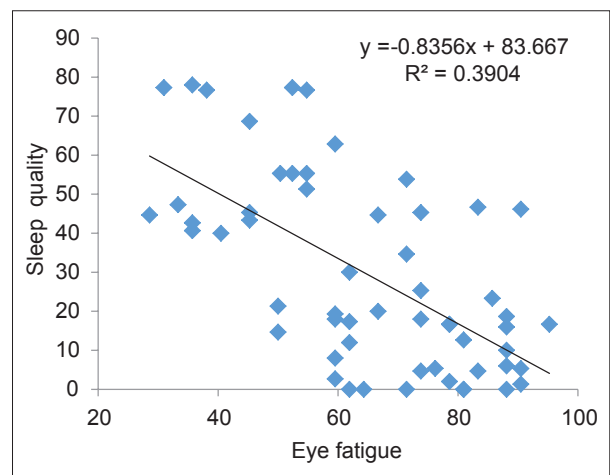


Figure 6: Scatter plot between eye fatigues and sleep quality in shift work nurses

before, indicate that night shift nurses (participant in this research) suffer from sleep disorders, is one of the researches

with the same results, which describes the poor sleep quality of shift nurses very clearly. One of its reasons could be

lacking an adequate sleep model and this in adequate and disordered sleep model may have originated in personal and environmental factors.^[17]

Among the important and interesting results of this study is the Pearson correlation relation between eye fatigue and sleep quality, which is a reverse and significant relation. This relation indicates that the less level of eye fatigue decreases, then or level of their sleep quality increases. Atmospheric condition is one of the other environmental factors, influencing physical and mental health conditions of people. Pearson correlation results between dependent variables of this study (including eye fatigue and sleep quality) and nurses' thermal comfort indicates that increase in thermal comfort contributes to decrease in eye fatigue of nurses and improvement in their sleep quality; therefore, it can be inferred that we can decrease eye fatigue of shift nurse and improve their sleep quality by improving thermal condition of the workplace. Finally, it is presumed that the relationship between eye tiredness and sleep quality can be a mutual relationship.

CONCLUSION

Based on these results, it can be concluded that improvement of thermal conditions and reduce state anxiety level can be reduce eye fatigue and increase the sleep quality of shift work nurses.

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REFERENCES

1. Khaghanizade M, Siratinir M, Abdi F, H Kaviani. Assessing of mental health level of employed nurses in educational hospitals affiliated to Tehran Medical Sciences University. *The Quarterly Journal of Fundamentals of Mental Health* 2006;31:141-8.
2. Ohayon MM, Roth T. Place of chronic insomnia in the course of depressive and anxiety disorders. *J Psychiatr Res* 2003;37:9-15.
3. Roth T, Jaeger S, Jin R, Kalsekar A, Stang PE, Kessler RC. Sleep problems, comorbid mental disorders, and role functioning in the national comorbidity survey replication. *Biol Psychiatry* 2006;60:1364-71.
4. Mayer E. Objective criteria for thermal comfort. *Building and environment*. 1993;28:399-403.
5. Azmoon H, Dehghan H, Akbari J, Souri S. The Relationship between Thermal Comfort and Light Intensity with Sleep Quality and Eye Tiredness in Shift Work Nurses. *Journal of environmental and public health*. 2013;1-5.
6. Trinkoff A, Geiger-Brown J, Brady B, Lipscomb J, Muntaner C. How long and how much are nurses now working? *Am J Nurs* 2006;106:60-71, 72.
7. Leger D. The cost of sleep-related accidents: A report for the National Commission on Sleep Disorders Research. *Sleep* 1994;17:84-93.
8. Ito H, Nozaki M, Maruyama T, Kaji Y, Tsuda Y. Shift work modifies the circadian patterns of heart rate variability in nurses. *Int J Cardiol* 2001;79:231-6.
9. Soleimany M, Ziba FN, Kermani A. Comparison of sleep quality in two groups of nurses with and without rotation work shift hours. *Iran J Nurs* 2007;20:29-38.
10. Spielberger CD, Gorsuch RL, Lushene RE. *Manual for the State-Trait Anxiety Inventory (Self-evaluation Questionnaire)*. Palo Alto, CA: Consulting Psychologists Press; 1970.
11. Shahri HP. Preliminary study of validity and reliability of trait-State anxiety Spillberger questionnaire. *Masters Theses in University of Tarbiat Modares*; 1993.
12. Habibi E, Pourabdian S, Dehghan H. Development and validation of a visual fatigue questionnaire for video display terminal users. *J Nezamesalamat* 2011;7:502-11.
13. Grandner MA, Kripke DF, Yoon IY, Youngstedt SD. Criterion validity of the Pittsburgh Sleep Quality Index: Investigation in a non-clinical sample. *Sleep and Biological Rhythms*. 2006;4:129-36.
14. Ramsawh HJ, Stein MB, Belik SL, Jacobi F, Sareen J. Relationship of anxiety disorders, sleep quality, and functional impairment in a community sample. *J Psychiatr Res* 2009;43:926-33.
15. Garfinkel BD, Carlson GA, Weller EB. *Psychiatric Disorders in Children and Adolescents*. Philadelphia: W.B. Saunders Company, 1990.
16. Kamalii NJ, Abbas MY. Healing environment: Enhancing nurses' performance through proper lighting design. *Procedia Soc Behav Sci* 2012;35:205-12.
17. Escribà V, Pérez-Hoyos S, Bolumar F. Shiftwork: Its impact on the length and quality of sleep among nurses of the Valencian region in Spain. *Int Arch Occup Environ Health* 1992;64:125-9.

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