Original Article

The Predictive Power of Sleep Quality by Morning-Evening Chronotypes, Job Satisfaction, and Shift Schedule in Nurses: A Cross-Sectional Study

Abstract

Background: Among nurses, sleep quality is an important factor which can be associated with many other factors, including job satisfaction, Morning-Evening (ME) chronotypes, and shift schedule. Besides, poor sleep quality can cause some problems for nurses and negatively affect the quality of nursing care. Therefore, the present study aimed to determine the predictive power of sleep quality by ME chronotypes, job satisfaction, and shift schedule in nurses working in Urmia teaching hospitals in 2019. **Materials and Methods:** A total of 327 nurses working in teaching hospitals affiliated to Urmia University of Medical Sciences were recruited using stratified sampling. Data were collected using the demographic questionnaire, the Pittsburgh Sleep Quality Index (PSQI), the Minnesota Satisfaction Questionnaire (MSQ), and the Composite Scale of Morningness (CSM). Data were analyzed using linear regression analysis and Pearson correlation coefficient. **Results:** The results of the Pearson correlation coefficient and linear regression analysis showed that the ME chronotypes ($R^2 = 0.51$, $p = 0.006$), job satisfaction ($R^2 = 0.51$, $p = 0.001$), and shift schedule ($R^2 = 0.51$, $p = 0.005$) are significantly correlated with the sleep quality among nurses. **Conclusions:** We concluded that the sleep quality was correlated with ME chronotypes, job satisfaction, and shift schedule, so that increased job satisfaction was associated with improved sleep quality, and the shift to the morning chronotype was associated with decreased sleep quality. Rotating shifts were also associated with higher sleep quality.

Keywords: *Circadian rhythm, Iran, job satisfaction, nurses, sleep hygiene*

**Masumeh Hemmati-Maslakpak[1],
Farzin Mollazadeh[1],
Hossein Jamshidi[1]**

[1]*Department of Medical and Surgical Nursing, Urmia School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran*

Introduction

Poor sleep quality is a serious problem in nurses which affects the healthcare systems and can cause serious problems for nurses themselves.[1,2] Sleep quality refers to a deep sleep perception and includes dimensions of long-term sleep deprivation, its adequacy, its mental aspects, and sedation as well.[3] At least 75% of shift workers suffer from sleep disorders, so that 32% of night-shift workers and 26% of rotating shift workers suffer from insomnia and excessive sleepiness which can lead to circadian rhythm disorders, damaged interpersonal relationships, poor job performance, and low threshold for job stress tolerance, and low job satisfaction. Regarding what mentioned, low Job satisfaction can conversely affect the sleep quality.[2,4,5]

Nursing career satisfaction is a global challenge and has potential impacts on the quality of care and patient safety. Besides, it is one of the most important factors affecting turnover intention.[6] In Iran, about 22.2%, 61.1% and 16.7% of nurses have low, moderate and high levels of job satisfaction, respectively.[7] Chang Wen Pei (WP) and Chang Yu Pei (YP) (2019) showed that job satisfaction in nurses depends on the shift schedule and sleep quality, as the night shift nurses had a poor sleep quality and experienced a low level of job satisfaction.[5] Khajeh Hosseini *et al*. (2019) indicated that most nurses (90.68%) had poor sleep quality which can affect their job satisfaction.[8]

Another factor related to the sleep quality is Morning-Evening (ME) chronotypes.[9] Individuals differ in diurnal preferences, sleep-wake patterns, and alertness in the morning and evening. Morning-types get out of bed early and are usually more alert in the first half of the day and go to bed earlier. However, evening-types tend to wake up late in the morning and are more alert in the late

Address for correspondence:
Mr. Farzin Mollazadeh,
Urmia School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran.
E-mail: Farzin.nurse@gmail.com

afternoon, and it takes them a long time to fall asleep at midnight. The third group comprises the intermediate-type individuals who are in the middle.[10,11] While Lee *et al*. (2015) concluded that there was no correlation between the ME chronotypes and the sleep quality among nurses.[12]

Nursing as a job is of great sensitivity as the job satisfaction and chronotypes of nurses can affect their sleep quality. Determining the sleep quality status, level of job satisfaction, and morning-evening preferences in nurses as well as their relationships delineates the importance of the matter and shapes health policy to improve nurses' sleep quality. This, in turn, improves nurses' job satisfaction, quality of nursing care, patient satisfaction, and patient safety. Regarding the existence of contradictory studies on this area, and the lack of a particular study on the predictive power of sleep quality by the factors mentioned, the need for a comprehensive study in this field is becoming more evident. Therefore, the present study aimed to determine the predictive power of sleep quality by ME chronotypes, job satisfaction, and shift schedule among nurses working in Urmia teaching hospitals in 2019.

Materials and Methods

This is a cross-sectional descriptive correlational study conducted from March to August 2019 in Urmia, Iran. The study population consisted of nurses working in Intensive Care Unit (ICU), Neonatal Intensive Care Unit (NICU), and medical (internal, isolation, neurology, respiratory, gastroenterology, oncology, nephrology, endocrinology, cardiology and dermatology), surgical (general surgery, neurosurgery and orthopedics), pediatric, psychiatric and emergency wards of five teaching hospitals affiliated to Urmia University of Medical Sciences. In the present study, a total of 327 nurses were recruited using stratified sampling. Considering the confidence interval of 95% in the study by Mikaeli *et al*. (2017), the minimum sample size was calculated to be 323. Regarding sample attrition of 10%, the final sample size was considered to be 355. After filling in the questionnaires, 28 partially completed questionnaires were excluded and a total of 327 nurses were entered the study.[13]

The participants were enrolled using stratified sampling. To this end, the number of nurses working in teaching hospitals was obtained from the Vice-Chancellor for Treatment Affairs. Accordingly, the questionnaires were assigned to each hospital. Then the number of wards in each hospital (N) and the number of nurses in each ward (n) were identified. Based on the n/N ratio, a particular sample size was allocated to each ward. In each ward, sampling was conducted using the shift schedule and the table of random numbers. Inclusion criteria included (a) having at least 6 months of work experience in clinical departments, (b) willingness to participate in the study, and (c) having no mental health disorder requiring

sedative-hypnotic medications. Besides, exclusion criteria consisted of only incomplete questionnaires. Regarding easy access to the study population in all shifts, the researcher referred to the hospital in all three morning, evening, and night shifts to collect data. Considering the nurses' high workload and no intention of interfering in the patient care process, the questionnaires were given to the nurses at the beginning of the shifts and collected at the end, so that they completed the questionnaires whenever they were free during the shifts. In the present study, data were collected using the demographic questionnaire, the Pittsburgh Sleep Quality Index (PSQI), the Minnesota Satisfaction Questionnaire (MSQ), and the Composite Scale of Morningness (CSM). The demographic questionnaire included questions on gender, age, education, marital status, work experience, shift schedule, and workplace (ward).

The PSQI is a self-report questionnaire including 9 items. Item number 5 itself contains 10 sub-items, so that the questionnaire is composed of 19 items and is scored on a 4-point Likert scale. The higher overall score indicates poorer sleep quality. Buysse *et al*. (1989) who developed and introduced this questionnaire, measured the internal consistency of the questionnaire using Cronbach's alpha coefficient and alpha equaled to 0.83.[14] The validity and reliability of the Persian version of the questionnaire were obtained 0.73 and 0.74, respectively.[15]

The MSQ consists of 19 items for measuring job satisfaction. In this questionnaire, each item is scored on a 5-point Likert scale from "strongly disagree = 1" to "strongly agree = 5". A total scores of 19 to 38, 38 to 57, and above 57 indicate poor, moderate, and high job satisfaction, respectively.[16] The validity of the questionnaire was confirmed by experts and its reliability was confirmed with the Cronbach's alpha of 0.78.[17]

The CSM is a combined scale with 13 items to determine the ME Chronotypes of the individuals. Each item is scored on a scale ranging from 1 to 4 or 5, and the overall score ranges from 13 (severe eveningness) to 55 (severe morningness). In detail, scores of less than 23, 23 to 43, and 44 and above indicate the evening-, intermediate- and morning-type, respectively. The Cronbach's alpha of 0.80 confirms the internal consistency of the instrument, and its validity was also confirmed by the experts.[13]

After data collection, data were analyzed using the descriptive statistics, central tendency, the Pearson correlation coefficient, One-Way Analysis of Variance (ANOVA), and linear regression. All statistical analyses were conducted using SPSS software version 16.0 (SPSS Inc., Chicago, Ill., USA). A *P value* of less than 0.05 was considered statistically significant.

Ethical considerations

This study was approved by the Ethics Committee of Urmia University of Medical Sciences (with ethics number

of IR.UMSU.REC.1398.127). All participants were assured of the confidentiality of their personal information and the anonymity of the questionnaires. Written informed consent was obtained from all participants prior to the beginning of the study. Moreover, all participants were provided by explanation on the probability of withdrawal from the study, so that they were free to withdraw from the study at any phase. The researcher also explained the advantages of the study.

Results

The results of this study showed that the mean age of the participants was 33 years. The participants were constituted of morning (9.23%), evening (9.8%), night (8.16%), and rotating shift (5.50%) nurses. The results of the independent t-test showed a statistically significant difference in job satisfaction between the BSc (Bachelor of Science) and the MSc (Master of Science) nurses ($t_{325} = 2.20$, $p = 0.028$). The results of one-way ANOVA also showed a significant difference in sleep quality ($F_{326} = 3.96$, $p = 0.008$) and ME chronotypes ($F_{326} = 4.04$, $p = 0.008$) among rotating shift nurses. [Table 1]

Based on the results, there was a significant positive correlation between the sleep quality and the ME chronotypes ($R^2 = 0.51$, $p = 0.006$). Furthermore, there was a significant negative correlation between the sleep quality and the level of job satisfaction ($R^2 = 0.51$, $p = 0.001$), so that with an increase in preference for morningness, the mean score of sleep quality decreased (sleep quality would have weakened), and the mean score of sleep quality increased (sleep quality would have improved) with an increase in the level of job satisfaction [Tables 2 and 3].

In Table 3, the results of linear regression analysis for sleep quality are reported based on the variables examined. Based on the data in Table 3, ME chronotypes, job satisfaction, and shift schedule are the best predictors of sleep quality. Based on the findings, the correlation coefficient between the above variables and the sleep quality was 0.26 and the coefficient of determination was 0.51. The findings indicated that the sleep quality is predictable to 50.9% using the variables of ME chronotypes, job satisfaction, and shift schedule.

Discussion

The results of the present study showed that nurses' shift schedule is an effective factor in their sleep quality. In other words, the shift schedule is a predictor of sleep quality as the rotating shift nurses had a higher sleep quality than other nurses, and the night shift nurses had a higher sleep quality compared to those working on the morning shift, and the

Table 1: Demographic information and correlation between scores of sleep quality, ME chronotypes** and job satisfaction in nurses

Variable	n (%)	Sleep quality Mean (SD)	Results t	p	ME chronotypes** Mean (SD)	Results t	p	Job satisfaction Mean (SD)	Results t	p
Gender										
Male	20.80	7.41 (3.05)	-1.38	0.168	38.05 (6.50)	1.07	0.286	48.75 (12.37)	-0.19	0.845
Female	79.20	8.13 (4.02)			36.75 (9.47)			49.04 (10.58)		
Marital status										
Married	64.52	8.06 (3.18)	-0.49	0.627	36.91 (8.25)	0.32	0.749	49.80 (10.54)	-1.84	0.067
Single	35.48	7.84 (4.84)			37.24 (10.12)			47.48 (11.56)		
Education status										
BSN***	95.41	7.96 (3.88)	-0.36	0.720	37.00 (9.11)	-0.25	0.80	49.27 (11.01)	2.20	0.028*
MSN****	4.59	8.33 (3.03)			37.60 (4.06)			42.93 (7.67)		
	n (%)	Mean (SD)	F	p	Mean (SD)	F	p	Mean (SD)	F	p
Shift types										
Morning	23.85	8.44 (3.51)	3.96	0.008*	34.55 (4.85)	4.04	0.008*	49.29 (10.86)	0.41	0.745
Evening	8.86	9.96 (6.80)			35.31 (6.63)			46.82 (9.18)		
Night	16.81	7.69 (3.66)			39.36 (11.47)			49.16 (10.20)		
Rotating	50.48	7.51 (3.21)			37.72 (9.56)			49.15 (11.56)		
Workplace (Ward)										
Medical ward	39.75	7.69 (4.60)	1.04	0.397	38.66 (12.17)	1.55	0.160	49.13 (10.95)	0.71	0.712
Surgical ward	5.19	9.47 (2.57)			33.58 (4.50)			47.35 (15.33)		
ICU*****	26.29	8.46 (3.55)			36.47 (6.82)			49.45 (11.07)		
Psychiatric ward	9.18	8.10 (2.99)			36.00 (4.94)			46.10 (10.51)		
Pediatric ward	12.24	7.72 (2.87)			35.70 (3.85)			49.42 (8.91)		
Emergency	6.12	7.20 (2.76)			35.50 (3.36)			51.25 (10.92)		
NICU******	1.23	6.50 (5.80)			39.00 (12.32)			46.50 (12.23)		

*$p \leq 0.05$, **Morning-Evening Chronotypes, ***Bachelor of Science in Nursing, ****Master of Science in Nursing, *****Intensive Care Unit, ******Neonatal Intensive Care Unit

Table 2: Correlation coefficients between sleep quality, ME chronotypes** and job satisfaction in nurses

Variable	ME chronotypes**	Job satisfaction
Sleep quality	r=0.12, p=0.027*	r=-0.17, p=0.002*

*$p \leq 0.05$, **Morning-Evening Chronotypes

Table 3: Regression coefficient for the relationship between the sleep quality and the ME chronotypes**, job satisfaction, and shift types

Variable	r	R^2	Constant	β	p
ME chronotypes	0.26	0.51	65.79	0.15	0.006*
Job Satisfaction				-0.17	0.001*
Type of shift work				-0.15	0.005*

*$p \leq 0.05$, **Morning-Evening Chronotypes

evening shift nurses had the worst sleep quality. The results of the present study are not consistent with the results of the study by Karagozoglu and Bingol (2008). The results of their study demonstrated that nurses working on rotating shifts had a poor sleep quality which resulted in a negative impact on their daily activities and general health status, so that it eventually led to a decrease in job performance and satisfaction.[18] Chang WP and Chang YP (2019), in a study on the relationship between job satisfaction and sleep quality, revealed that job satisfaction among nurses depends on the shift schedule and sleep quality as the night shift nurses had a poor sleep quality and subsequently experienced a low level of job satisfaction.[5] One of the possible reasons for this inconsistency is the level of both nurses' job satisfaction and workload in different shifts and different countries. The results of the present study demonstrated that the job satisfaction and sleep quality in evening shift nurses are lower than in other nurses. The reason for this is the lower working hours and higher workload in the evening shifts compared to other shifts. Regarding the hospital policy, there is a heavy workload of medication administration and a high rate of elective patient admission during the evening shifts.

In a study by Li *et al.* (2019), shift schedule was also considered as a direct predictor of sleep quality.[2] However, the results of the study by Ferri *et al.* (2016) are not consistent with the results of present study since the quality of sleep and its related problems in night shift nurses were lower than those with rotating shifts.[19] The reason for this difference can be due to the shift categorization in their study. In their study, the shifts were categorized into two groups of night and rotating shifts, and the number of rotating shift nurses was significantly higher than the night shift nurses. However, there was an extensive and precise categorization in our study, so that the nurses were divided into four categories: morning, evening, night and rotating shift nurses. Moreover, the difference in the number of nurses between the categories was not statistically significant.

The results of the present study indicated that there was a significant correlation between sleep quality and job satisfaction, so that the high level of job satisfaction was directly correlated with high sleep quality. Furthermore, job satisfaction was a predictor of sleep quality. The results of the study by Luz *et al.* (2011) were also in line with the results of present study. Luz *et al.* found that there was a significant correlation between job satisfaction and sleep quality.[20] The results of the study by Khajeh Hosseini *et al.* (2019) are also consistent with the results of the present study. In their study, it was found that most nurses had poor sleep quality and one of the factors associated with poor sleep quality was low job satisfaction.[8] The results of a study by Li *et al.* (2019) also showed that job satisfaction affects nurses' sleep quality indirectly. They found that job satisfaction affects chronic fatigue which can produce negative effects on sleep quality.[2] Akerstedt *et al.* (2015) found that higher work demands predict disturbed sleep. This result is consistent with the results of present study.[21] Najafi *et al.* (2014) indicated that nurses' sleep quality decreases with an increase in the level of job stress.[22] Moreover, Karagozoglu and Bingol (2008) demonstrated that poor sleep quality is associated with low job satisfaction.[18] In a study by Kristiansen *et al.* (2011), it was found that sleep problems can cause problems in job performance.[23] All in all, the results of the present study were consistent with the above as the sleep quality and job satisfaction are correlated, and low job satisfaction decreases nurses' sleep quality.

The results of the present study showed that there is a significant relationship between the sleep quality and the ME chronotypes, so that the sleep quality significantly decreases in morning-type nurses. The ME chronotypes were also predictors of sleep quality. The results of the study by Mozafari *et al.* (2016) on the sleep quality among medical students showed that there is a significant relationship between ME chronotypes and sleep quality, so that the sleep quality of morning-type students is lower than other students.[24] The results of a study by Yazdi *et al.* (2014) indicated that there is a significant relationship between the sleep quality and the circadian chronotypes, so that the sleep quality of evening-type nurses was lower than other nurses.[25] Bavarsad *et al.* (2015) reported the quality of sleep among morning-types was worse than that of the morning-types.[26] The results of a study by Yoo *et al.* (2017) demonstrated that there is a significant relationship between the ME chronotypes and the sleep quality in shift nurses, although the results of their study differ from the results of our study. The reason for this difference is that the evening-type nurses experienced poor sleep quality and more severe daytime sleepiness.[27] On the contrary, Lee *et al.* (2015) showed that there is no relationship between the sleep quality of nurses and the ME chronotypes.[12] Furthermore, Zencirci *et al.* (2011) indicated that nurses working consistently on morning or

night shifts had better sleep quality than those working on rotating shifts.[28] The results of the study by Simor *et al*. (2018) were also in line with the results of present study. They found that eveningness can be a predictor of sleep quality.[9] The reason for this difference in the results could go back to the different tools used for examining the ME chronotypes. Therefore, further studies with different tools are needed to determine the wider dimensions of the effects of ME chronotypes on sleep quality. Based on the results of the present study, the nurses' sleep quality was associated with their job satisfaction, so that the high level of job satisfaction was directly associated with high sleep quality. Besides, as the ME progressed to the morningness, sleep quality significantly decreased. The results of some studies were consistent with the results of present study and the results of some studies were not. Therefore, to evaluate the differences between the studies, further researches are needed to be conducted on different cultural conditions and the hospitals with different management and nursing systems as well.

The limitations of the present study consisted of the followings: (a) the research setting was restricted to merely five teaching hospitals affiliated to Urmia University of Medical Sciences. Therefore, the results cannot be generalized to other health settings with relatively different nursing systems. Moreover, (b) response bias was possible due to the lack of full-time supervision of the researcher on the process of fulfilling in the questionnaires by the participants.

Conclusion

The results of present study showed that the nurses' sleep quality is affected by their job satisfaction and ME chronotypes. In other words, the level of job satisfaction increased with an improvement in sleep quality, and as the ME progressed to the morningness, sleep quality decreased significantly.

Acknowledgements

Financial support and sponsorship

Conflicts of interest

Nothing to declare.

References

1. Giorgi F, Mattei A, Notarnicola I, Petrucci C, Lancia L. Can sleep quality and burnout affect the job performance of shift-work nurses? A hospital cross-sectional study. J Adv Nurs 2018;74:698-708.

2. Li Y, Fang J, Zhou C. Work-related predictors of sleep quality in chinese nurses: Testing a path analysis model. J Nurs Res 2019;27:e44.

3. Seidi PAM, Mohammadi H, Khazaie H, Abas NQ, Jaff D. Psychometric properties of the Kurdish version of Pittsburgh Sleep Quality Index. Sleep Med 2019;63:75-81.

4. Lin PC, Chen CH, Pan SM, Pan CH, Chen CJ, Chen YM, *et al*. Atypical work schedules are associated with poor sleep quality and mental health in Taiwan female nurses. Int Arch Occup Environ Health 2012;85:877-84.

5. Chang WP, Chang YP. Relationship between job satisfaction and sleep quality of female shift-working nurses: Using shift type as moderator variable. Ind Health 2019;57:732-40.

6. Dall'Ora C, Griffiths P, Ball J, Simon M, Aiken L. Association of 12 h shifts and nurses' job satisfaction, burnout and intention to leave: Findings from a cross-sectional study of 12 European countries. BMJ Open 2015;5:e008331.

7. Tavakoli N, Shaker SH, Soltani S, Abbasi M, Amini M, Tahmasebi A, *et al*. Job burnout, stress, and satisfaction among emergency nursing staff after health system transformation plan in Iran. Emerg (Tehran) 2018;6:e41.

8. Khajeh Hosseini S, Sayadi A, Mobini Lotfabad M, Heidari S. Sleep quality among shift-working nurses in the hospitals of Rafsanjan City, Iran, in 2018. Health Develop J 2019;8:141-51. [persian].

9. Simor P, Harsanyi A, Csigo K, Miklos G, Lazar AS, Demeter G. Eveningness is associated with poor sleep quality and negative affect in obsessive-compulsive disorder. J Behav Addict 2018;7:10-20.

10. Markarian SA, Gildner DJ, Pickett SM, Warnke AS. Morningness-eveningness and social anxiety symptoms: The influence of depression symptoms on the indirect effect through punishment sensitivity and experiential avoidance. Chronobiol Int 2019;36:214-24.

11. Niu SF, Chung MH, Chu H, Tsai JC, Lin CC, Liao YM, *et al*. Differences in cortisol profiles and circadian adjustment time between nurses working night shifts and regular day shifts: A prospective longitudinal study. Int J Nurs Stud 2015;52:1193-201.

12. Lee CY, Chen HC, Meg Tseng MC, Lee HC, Huang LH. The relationships among sleep quality and chronotype, emotional disturbance, and insomnia vulnerability in shift nurses. J Nurs Res 2015;23:225-35.

13. Mikaeli N, Mehri S, Ghaseminejad M, Mollavi P. The relationship of morningness- eveningness with sleep quality and professional motivation in nurses. JHC 2017;18:316-25.

14. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.

15. Babamiri M, Moeini B, Tahmasian H, Barati M, Roshanai G. The study of sleep health education effect on sleep quality among Lorestan nursing personnel. Iran J Ergon 2017;4:8-13. [persian].

16. Martins H, Proença T. Minnesota Satisfaction Questionnaire– Psychometric properties and validation in a population of Portuguese hospital workers. FEP Journal–Economics & Management: Working Paper 2012;471:1-23.

17. Kakemam E, Irani A, Sokhanvar M, Akbari A, Dargahi H. The relationship between organizational learning capabilities and job satisfaction in Tehran hospitals. Payavard 2016;9:435-45. [persian].

18. Karagozoglu S, Bingol N. Sleep quality and job satisfaction of Turkish nurses. Nurs Outlook 2008;56:298-307.e3.

19. Ferri P, Guadi M, Marcheselli L, Balduzzi S, Magnani D, Di Lorenzo R. The impact of shift work on the psychological and physical health of nurses in a general hospital: A comparison

between rotating night shifts and day shifts. Risk Manag Healthc Policy 2016;9:203-11.

20. Luz E, Marqueze E, Moreno C. Job satisfaction and sleep quality in nursing professionals. Sleep Sci 2011;4:49-51.

21. Akerstedt T, Garefelt J, Richter A, Westerlund H, Magnusson Hanson LL, Sverke M, *et al.* Work and sleep-A prospective study of psychosocial work factors, physical work factors, and work scheduling. Sleep 2015;38:1129-36.

22. Najafi Ghezeljeh T, Moradi F, Rafii F, Haghani H. Relationship between job stress, sleep quality and fatigue in nurses. IJN 2014;27:40-9. [persian].

23. Kristiansen J, Persson R, Bjork J, Albin M, Jakobsson K, Ostergren PO, *et al.* Work stress, worries, and pain interact synergistically with modelled traffic noise on cross-sectional associations with self-reported sleep problems. Int Arch Occup Environ Health 2011;84:211-24.

24. Mozafari A, Mohamadi H, Tabaraie M, Arsang S. Morningness–eveningness chronotypes, sleep quality and insomnia among medical student of Qom. J Sleep Sci 2015;16:S186.

25. Yazdi Z, Sadeghniiat-Haghighi K, Javadi AR, Rikhtegar G. Sleep quality and insomnia in nurses with different circadian chronotypes: Morningness and eveningness orientation. Work 2014;47:561-7.

26. Bavarsad M, Azimi N, Moradbeygi K, Latifi M. Associations between morningness-eveningness and sleep quality among female dormitory residents. Thrita 2015;4:e59661.

27. Yoo GS, Kim TW. The effect of morningness-eveningness on shift work nurses: Sleep quality, depressive symptoms and occupational stress. Sleep Med Res 2017;8:39-43.

28. Zencirci AD, Arslan S. Morning-evening type and burnout level as factors influencing sleep quality of shift nurses: A questionnaire study. Croat Med J 2011;52:527-37.