Evidence Based Care Journal

Evaluation of Sleep Quality and Its Socio-demographic Predictors in Three Trimesters of Pregnancy among Women Referring to Health Centers in Tabriz, Iran: A Cross-sectional Study

Fatemeh Effati-Daryani, Sakineh Mohammad-Alizadeh-Charandabi, Azam Mohammadi, Somayeh Zarei, Mojgan Mirghafourvand

The online version of this article can be found at
http://ebcj.mums.ac.ir/article_12566.html

Evaluation of Sleep Quality and Its Socio-demographic Predictors in Three Trimesters of Pregnancy among Women Referring to Health Centers in Tabriz, Iran: A Cross-sectional Study

Fatemeh Effati-Daryani[1], Sakineh Mohammad-Alizadeh-Charandabi[2], Azam Mohammadi[3], Somayeh Zarei[4], Mojgan Mirghafourvand[5*]

Abstract

This study aimed to determine sleep quality and its socio-demographic predictors regarding three trimesters of pregnancy. This cross-sectional study was conducted on 605 pregnant women referred to health centers in Tabriz, Iran, using a two-stage cluster sampling method. Data were collected using socio-demographic characteristics questionnaire and the Pittsburgh Sleep Quality Index. The mean±SD of the total sleep quality scores were estimated at 5.22±2.52, 5.82±3.07, 8.60±3.03, and 6.56±3.24 in the first, second, and third trimester, and during the whole pregnancy, respectively. Moreover, the study results showed that 81 (40.1%), 105 (53.0%), 172 (83.9%), and 358 (59.2%) mothers experienced sleep disorder in the first, second, and third trimester, and during the whole pregnancy, respectively. According to the results of this study, sleep quality predictors may help health providers identify high-risk pregnant women in terms of sleep disorder to provide them with appropriate interventional programs.

Keywords: Iran, Pregnancy, Sleep

1. Instructor, Reproductive Health Research Center, Midwifery Department, Faculty of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran

2. Professor, Midwifery Department, Faculty of Nursing and Midwifery, Social Determinants of Health Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.

3. Instructor, Midwifery Department, Saveh Faculty of Medical Sciences, Saveh, Iran

4. MSc at Midwifery, Shohadaye Qom Hospital, Qom University of Medical Sciences, Qom, Iran

5. Associate Professor, Social Determinants of Health Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding author, Email: mirghafourvand@gmail.com

Introduction
Pregnancy is a joyful event generally. Nevertheless, remarkable physical and emotional changes occur during pregnancy (1). Even in uncomplicated pregnancies, physical and psychological changes associated with pregnancy can change women's ability and function in their various roles and ultimately affect their quality of life (2).

Sleep disorder is a common complaint during pregnancy that can affect physiological, hormonal, vascular, and metabolic changes, including endocrine changes, such as increased progesterone, prolactin levels, and fetal size and movements, bladder distension, aperture rise, stomach discomfort, nausea, and temperature fluctuations (3). In addition, pregnant women reported that sleep disorders, especially in the third trimester, was caused by nausea, back pain, frequent urination, heartburn, leg cramps, shortness of breath, too much thinking, sadness, anxiety, and fear (4).

Studies showed that 25% and 75% of women in the first and third trimester of pregnancy experience sleep disorder, respectively (5). Despite the presence of low-cost and safe treatments (6), the prevalence of sleep disorder is probably high. The reason is that it is often considered a natural change in pregnancy or it is believed that there is no treatment for it; therefore, its treatment is not considered to be important (7).

The effect of sleep deprivation on women's function during pregnancy is widely varied. Sleep disorders affect some women catastrophically, whereas it has no significant influences on others (8). Poor sleep quality during pregnancy may increase the symptoms of depression in the last weeks of pregnancy (9). There are also reports on poor sleep quality and its association with adverse pregnancy outcomes, including preterm labor, labor length, and birth weight (10).

In several studies, many factors are reported as predictors of sleep quality, including gestational age (11), education and economic level, number of pregnancies, number of children, different pregnancy trimesters, age of mother (12), occupational status of pregnant mothers (13), acceptance of fetal gender by the family (14), husband's job (9) and residency in a rental home (9). These studies have often been conducted in other countries; however, a review of the medical database shows that no study has been conducted on sleep quality and different trimesters of pregnancy in Iran. Moreover, there is no exact statistics on the prevalence of sleep disorders and the predictors of sleep quality during different trimesters of pregnancy in Iran. A meta-analysis suggests future research should examine various factors underlying poor sleep quality during this period (15).

In one study, it is concluded that a better understanding of the sleep quality predictors among pregnant women helps identify high-risk groups. In addition, it focused on interventional programs to be applied to these groups (16).

Given the high prevalence of sleep disorder and its adverse effects on pregnancy and childbirth process, this study aimed to determine sleep quality and its socio-demographic predictors regarding three trimesters of pregnancy among pregnant women referring to health centers in Tabriz, Iran. In this regard, healthcare professionals, such as midwives, should provide pregnant women with appropriate sleep counseling and incorporate a supportive model of sleep-related prenatal care during the whole pregnancy. In doing so, they prevent and treat sleep disorders regarding the date of pregnancy.

Methods
This cross-sectional study was conducted on 605 pregnant women referred to health centers and bases in Tabriz, Iran, between February 2015 and May 2016. The sample size was determined based on the following criteria: the confidence interval of 95%, prevalence rates of 25%, 50%, and 75% for sleep disorder in the first, second, and third trimester, respectively (5), error accepted around the ratio (d) of 0.1, and the design effect of 2. As a result, the estimated sample sizes for the first and third trimester were 145 and 193 for the second trimester.

The inclusion criteria in the study were: 1) residency in Tabriz, 2) low-risk singleton pregnancy, 3) living with husband at the time of the study, 4) access to phone calls, and 5) no night shift.

The data were collected using a socio-demographic characteristics questionnaire and the Pittsburgh Sleep Quality Index (PSQI). Socio-demographic characteristics questionnaire includes items on the mother's age (17), height, weight (18), education level (12), and occupational status (13). Moreover, it elicited information about husband's education level, job, income adequacy (12), along with

abortion history, fetal gender based on ultrasound, and the parent's interest in the fetal gender (14). The validity of this questionnaire was confirmed through the face and content validity.

The PSQI is a self-report questionnaire that assesses sleep quality during the last 4 weeks. This questionnaire investigates seven components, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. The scores for each scale in this questionnaire range from 0 to 3. The sum of the mean scores for these seven components makes the total score of the questionnaire ranging from 0 to 21. The higher the score is, the lower the sleep quality will be. A total score above 5 indicates poor sleep quality.

The reliability of this questionnaire was estimated at 0.83 and the questionnaire developers confirmed the appropriate level of this instrument with a sensitivity and specificity of 89.6% and 86.5%, respectively, in the experimental group, compared to the control one (19). In addition, this questionnaire was employed in a study conducted on pregnant women in Tabriz, Iran (9, 20).

In this study, the reliability was confirmed through the internal consistency, and Cronbach's alpha was estimated at 0.84. The sampling was performed through a two-stage cluster sampling method. At first, one-third of all 60 health centers and 25 health bases were randomly selected using the website www.random.org. Then, the list of eligible pregnant women was prepared for each selected center or bases.

Subsequently, a relative number of samples for each center and bases was calculated and randomly determined. The selected pregnant women were contacted by phone and invited to participate in the study. After the visit, the participants were first evaluated in terms of demographic information and inclusion and exclusion criteria. If the participants met the inclusion criteria, they would be provided with comprehensive information about the reasons to conduct the research, the research benefits and results, the confidentiality of the information, and the research process.

Finally, 202, 198, and 205 pregnant women completed the questionnaire during the first, second, and third trimester of pregnancy, respectively. The study protocol was approved by the Ethics Committee of Tabriz University of Medical Sciences, Tabriz, Iran (Code: Tbzmed.Rec.1392.244). Informed written consent was obtained from all participants. Moreover, the confidentiality of the data and their anonymity, along with the objectives of the study and the way to access the results were emphasized within this

Data were analyzed in SPSS software (Version 21) through descriptive statistics including frequency, percentage, mean, and standard deviation, to describe the participants' socio-demographic characteristics and sleep quality. Normality of quantitative data was measured using Skewness and Kurtosis. Furthermore, one-way ANOVA was utilized to compare the total sleep quality score regarding three trimesters of pregnancy. Furthermore, bivariate tests, including independent t-test, and one-way ANOVA were used to determine the relationship between sleep quality and socio-demographic characteristics. Finally, the independent variables with a p-value of less than 0.05 in bivariate tests were entered into the multiple linear regression model.

Results

In total, 605 pregnant women were studied from February 2015 to May 2016. The mean±SD age and BMI of the participants were 27.08±5.18 years and 23.89±4.04 kg/m^2, respectively. With regard to the education level, about half of the participants (47.4%, n=287) were under diploma and the other half (52.6%, n=318) had a diploma and academic degree. In terms of the occupational status, about 90% of the respondents were housewives (n=547). About half of the participants' spouses (47.3%, n=286) were under diploma and the rest (52.7%, n=319) had a diploma and academic degree.

In terms of the residency status, about one-third of the participants (30.4%, n=184) lived in their personal home and 39 % of them (n=236) lived in a rental home. About two thirds (60.3%, n=125) reported earning relatively adequate family income. According to ultrasound scans, 45% (n=272) of the fetuses were male and 90.6% of the mothers (n=548) and 88.9% of the fathers (n=538) were satisfied with the fetal gender (Table 1).

Table 1. Socio-demographic characteristics of the participants (n= 605)

Characteristic	First trimester Number (%)[*]	Second trimester Number (%)[*]	Third trimester Number (%)[*]	Characteristic	First trimester Number (%)[*]	Second trimester Number (%)[*]	Third trimester Number (%)[*]
	n= 202	n=198	n=205		n= 202	n=198	n=205
Age (years)				Body mass index (kg/m^2)			
Mean±SD[**]	27.86±(5.15)	27.20±(5.68)	26.18±(4.54)	Mean±SD[**]	24.87±4.33	23.89±4.01	22.91±3.51
Gravid				Pregnancy status			
1	87 (43.1)	94 (47.5)	123 (60.0)	Wanted pregnancy	173 (85.6)	179 (90.4)	186 (90.7)
2	43 (21.3)	60 (30.3)	62 (30.2)	Unwanted pregnancy	29 (14.4)	19 (9.6)	19 (9.3)
≥3	72 (35.6)	44 (22.2)	20 (9.8)	Husband's Education level			
Education level				Illiterate	---	---	---
Illiterate	---	4 (2.00)	---	Elementary school	33 (16.3)	24 (12.1)	29 (14.1)
Elementary school	32 (15.8)	28 (14.1)	32 (15.6)	Secondary school	49 (24.3)	47 (23.7)	48 (23.4)
Secondary school	28 (13.9)	39 (19.7)	37 (18.0)	High school	12 (5.9)	25 (12.6)	19 (9.3)
High school	31 (15.3)	21 (10.6)	35 (17.1)	Diploma	45 (22.3)	50 (25.3)	68 (33.2)
Diploma	61 (30.2)	54 (27.3)	42 (20.5)	University	63 (31.2)	52 (26.3)	41 (20.0)
University	50 (24.8)	52 (26.3)	59 (28.8)	Husband's Job			
Job				Clerk	51 (25.2)	49 (24.7)	25 (12.2)
Housewife	183 (90.6)	169 (85.4)	195 (95.1)	Worker	40 (19.8)	63 (31.8)	67 (32.7)
Employed	11 (5.4)	23 (11.6)	---	Shopkeeper	18 (8.9)	20 (10.1)	34 (16.6)
Work at ome	8 (4.0)	6 (3.0)	10 (4.9)	Others[****]	91 (45.0)	63 (31.8)	79 (38.5)
Residence				Abortion history	47 (23.3)	41 (20.7)	24 (11.7)
Personal	63 (31.2)	62 (31.3)	59 (28.8)	Sufficiency of income for expenses			
Rental	74 (36.6)	71 (35.9)	91 (44.4)	Completely Sufficient	44 (21.8)	49 (24.7)	32 (15.6)
Father's parent's home	63 (31.2)	55 (27.8)	53 (25.9)	Fairy sufficient	119 (58.9)	112 (56.6)	134 (65.4)
Mother's parent's home	---	5 (2.5)	1 (0.5)	Insufficient	39 (19.3)	37 (18.7)	39 (19.0)
Others[***]	2 (1.0)	5 (2.5)	1 (0.5)	Fetal gender			
Woman's interest in fetal gender				Female	43 (21.3)	71 (35.9)	105 (51.2)
Yes	178 (88.1)	185 (93.4)	185 (90.2)	Male	61 (30.2)	111 (56.1)	100 (48.8)
No	24 (11.9)	13 (6.6)	20 (9.8)	Unknown	98 (48.5)	16 (8.1)	---
Spouse's interest in fetal gender				---	---	---	---
Yes	171 (84.8)	181 (91.4)	186 (90.7)	---	---	---	---
No	31(15.3)	17 (8.6)	19 (9.3)	---	---	---	---

[*]Valid percent has been reported in all the variables because of missed data.
[**]All data indicate the number (percent) unless they have been specified.
[***] Others indicate residence in the relative house and corporate house.
[****] Other includes occupations, such as building painter and farmer.

The mean±standard deviation of the total sleep quality scores were 5.22±2.52, 5.82±3.07, 8.60±3.03, and 6.56±3.24 in the first, second, and third trimester, and during the whole pregnancy ranged from 0 to 21, respectively. According to the results obtained from one-way ANOVA, there was also a significant difference between the different trimesters and total sleep quality scores (P<0.001). Moreover, in the first, second, and third trimester, and during the whole pregnancy, the mean±SD

scores of the component of subjective sleep quality were 0.84±0.69, 0.94±0.79, 1.88±0.79, and 1.23±0.89, respectively.

In addition, with regard to the same period, the mean±SD scores of the component of sleep latency were 1.22±0.94, 1.32±0.96, 1.93±0.96, and 1.50±0.96. In addition, the mean±SD scores of the component of sleep duration were 0.33±0.72, 0.36±0.75, 0.34±0.74, and 0.35±0.74. The mean±SD scores of the component of sleep disturbances were estimated at 1.21±0.56, 1.33±0.56, 1.91±0.5,1 and 1.49±0.62. The mean±SD scores of the component of the use of sleeping medications were obtained at 0.02±0.14, 0.04±0.18, 0.00±0.00, and 0.02±0.13. The mean±SD scores of the component of daytime dysfunction were 1.10±0.74, 1.27±0.73, 1.98±0.78, and 1.46±0.84.

The study results also showed that 81 (40.1%), 105 (53.0%), and 358 (59.2%), 172 (83.9%) of mothers had sleep disorders in the first, second, and third trimester, and during the whole pregnancy, respectively.

According to the bivariate test results, there was a significant correlation between the total sleep quality scores in the first trimester and the mother's age (P=0.007), education level (P=0.008), occupational status and interest in current pregnancy (P=0.001), and fetal gender on the basis of ultrasound scans (P=0.04).

With respect to the multiple linear regression model by adjusting the other variables, a significant association was observed between total sleep quality scores and variables, such as mother's age, education level, job and interest in the current pregnancy, and fetal gender in the first trimester. This association was able to predict 19.5% of sleep quality variance among pregnant women in the first trimester.

Meanwhile, based on the bivariate test results, there was no significant difference between the total sleep quality scores and socio-demographic characteristics in the second trimester (P<0.05). Furthermore, a significant correlation was observed between the total sleep quality scores and body mass index (P<0.001), education (P=0.004), husband's occupation (P=0.01), and the number of pregnancy (P=0.007) in the third trimester.

With regard to the multiple linear regression model by adjusting the other variables, there was a significant relationship between the total sleep quality scores and the variables, such as BMI, and husband's education level and occupation. This relationship was able to predict 19.1% of sleep quality variance among pregnant women in the third trimester.

According to the bivariate test results, the total sleep quality scores were significantly correlated with gestational age (P<0.001), place of residence (P=0.01), and fetal gender based on ultrasound scans (P<0.001) during the whole pregnancy, regardless of the pregnancy trimesters. With regard to the

Table 2. Relationship of socio-demographic characteristics with sleep quality in pregnant women based on the bivariate test and multiple linear regression model

Variables	Bivariate test results				Multivariate linear regression results		
	Mean ±SD	P			β (95% CI)	P	
First trimester (n= 202)							
Age		0.007†		Age			
<18	3.0±0.6			<18	0.3 (-2.6 to 3.1)	0.80	
18-25	4.8±2.5			18-25	0.9 (-0.4 to 2.3)	0.18	
25-30	5.7±2.5			25-30	1.9 (0.6 to 3.2)	0.005	
>30	4.2±2.3			>30	Reference		
Education level		0.008†		Education level			
Elementary school	5.8±2.8			Elementary school	-0.2 (-1.4 to 0.9)	0.66	
Secondary school	5.7±2.3			Secondary school	-1.7 (-2.9 to -0.6)	0.002	
High school	3.9±2.8			High school	-0.6 (-1.5 to 0.3)	0.19	
Diploma	5.0±2.1			Diploma	0.3 (-1.6 to 1.2)	0.89	
University	5.7±2.4			University	Reference		
Job		0.005†		Job			
Housewife	5.2±2.5			Housewife	1.8 (0.3 to 3.3)	0.01	

Employed	7.0±3.2			Employed	3.3 (1.1 to 5.5)	0.004
Work at home	11.0±4.2			Work at home	Reference	
Pregnancy status		0.001‡		Pregnancy status		
Wanted pregnancy	5.4±2.6			Wanted pregnancy	1.8 (0.9 to 2.8)	<0.001
Unwanted pregnancy	4.0±1.8			Unwanted pregnancy	Reference	
Fetal gender		0.04†		Fetal gender		
Male	5.6±2.5			Male	0.7 (-0.2 to 1.5)	0.11
Female	5.7±3.0			Female	1.6 (0.7 to 2.4)	<0.001
Unknown	4.8±2.2			Unknown	Reference	
Third trimester (n=205)						
Body Mass Index (kg/m^2)		<0.001†		Body Mass Index (kg/m^2)		
<19.8	7.1±1.7			<19.8	-3.0 (-4.8 to -1.1)	0.001
19.8-26	8.4±3.1			19.8-26	-1.5 (-3.2 to 0.1)	0.06
26-29	11.0±3.1			26-29	0.8 (-1.2 to 2.8)	0.41
>30	10.6±1.7			>30	Reference	
Education level		0.004†		Education level		
Elementary school	9.5±3.0			Elementary school	1.0 (-0.4 to 2.4)	0.16
Secondary school	7.7±3.1			Secondary school	-0.5 (-1.8 to 0.7)	0.39
High school	9.2±2.4			High school	0.7 (-0.5 to 2.0)	0.26
Diploma	9.4±3.8			Diploma	1.3 (0.1 to 2.4)	0.03
University	7.8±2.4			University	Reference	
Husband's Job		0.01†		Husband's Job		
Clerk	8.8±3.1			Clerk	0.5 (-0.7 to 1.8)	0.41
Worker	9.5±2.9			Worker	1.5 (0.5 to 2.4)	0.003
Shopkeeper	7.8±2.7			Shopkeeper	0.1 (-1.1 to 1.2)	0.92
Others*	8.1±3.1			Others*	Reference	
Parity		0.007†		Parity		
1	8.2±2.9			1	-1.0 (-2.4 to 0.5)	0.19
2	9.0±3.2			2	-1.2 (-2.7 to 0.3)	0.12
≥3	11.2±2.0			≥3	Reference	
Whole pregnancy (n= 605)						
Gestational age		<0.001†		Gestational age		
First trimester	5.2±2.5			First trimester	-3.0 (-3.6 to -2.3)	<0.001
Second trimester	5.8±3.1			Second trimester	-2.8 (-3.3 to -2.2)	<0.001
Third trimester	8.6±3.0			Third trimester	Reference	
Residence		0.01†		Residence		
Personal	6.5±3.5			Personal	-3.6 (-5.6 to -1.5)	0.001
Rental	6.8±3.2			Rental	-3.5 (-5.5 to -1.4)	0.001
Mother's parent's home	8.2±3.0			Mother's parent's home	-1.6 (-4.7 to 1.4)	0.28
Father's parent's home	6.1±3.0			Father's parent's home	-3.9 (-6.0 to -1.9)	<0.001
Others**	9.4±2.3			Others**	Reference	
Fetal gender		<0.001†		Fetal gender		
Male	6.6±3.3			Male	0.451 (-0.3 to 1.2)	0.22
Female	7.3±3.2			Female	0.9 (0.2 to 1.7)	0.01
Unknown	5.0±3.2			Unknown	Reference	

*Others include residence in relative's home and corporate houses.

** Others include jobs, such as building painter and farmer.

First trimester: Adjusted R^2= 0.195; Third trimester: Adjusted R^2= 0.191; Whole of pregnancy: Adjusted R^2= 0.228

† One-way ANOVA   ‡T-test

multiple linear regression model by adjusting the other variables, a significant relationship was observed between the total sleep quality scores and all three variables. This association was able to predict 22.8% of sleep quality variance among pregnant women during the pregnancy (Table 2).

Implications for practice
According to the results of this study, it is concluded that women suffer from high rates of sleep disorder during pregnancy. Moreover, the factors predicting the quality of sleep in pregnant women include some variables, such as age, education level, women's and husband's job, pregnancy status, fetal gender, BMI, gestational age, and place of residence. These results may help health providers identify high-risk pregnancy for a sleep disorder and provide appropriate interventional programs for them. It seems that paying more attention to these factors and not ensuring the routine care running in health centers can improve the quality of sleep as an important factor in predicting pregnancy outcomes. Early diagnosis and treatment of sleep disorders can help reduce complications during pregnancy, increase postpartum maternal health, and improve the short-term and long-term outcomes for infants and children.

Acknowledgment

Conflict of Interest
The authors declare that there is no conflict of interest.

References
1.Sieber S, Germann N, Barbir A, Ehlert U. Emotional well-being and predictors of birth-anxiety, self-efficacy, and psychosocial adaptation in healthy pregnant women. Acta Obstet Gynecol Scand. 2006;85(10):1200-7.
2.Mckee MD, Cunningham M, Jankowski KR ,Zayas L. Health-related functional status in pregnancy: relationship to depression and social support in a multi-ethnic population. Obstet Gynecol. 2001;97(6):988-93.
3.Lee KA. Sleep and pregnancy/postpartum. J Perinat Neonatal Nurs. J Perinat Neonatal Nurs. 2007 Apr-Jun;21(2):91.
4.Bondad R, Abedian Z. Factors affecting sleep pattern of pregnant women in 3rd trimester. IJN. 2004;16(36):22-6.
5.Lee KA, Zaffke ME, McEnany G. Parity and sleep patterns during and after pregnancy. Obstet Gynecol. 2000;95(1):14-8.
6.Effati-Daryani F, Mohammad-Alizadeh-Charandabi S, Mirghafourvand M, Taghizadeh M, Bekhradi R, Zarei S. Effect of Lavender cream with or without footbath on sleep quality and fatigue in pregnancy and postpartum: a randomized controlled trial. Women health. 2018 May 22:1-13.
7.Pregnancy and sleep: National sleep foundation. Available at: https://www.sleepfoundation.org/articles/pregnancy-and-sleep: Accessed July 23, 2017
8.Li D, Liu L, Odouli R. Presence of depressive symptoms during early pregnancy and the risk of preterm delivery: a prospective cohort study. Hum Reprod. 2009 Jan;24(1):146-53. doi: 10.1093/humrep/den342.
9.Mirghaforvand M, Mohammad-Alizadeh-Charandabi S, Zarei S, Effati-Daryani F, Sarand FS. The relationship between depression and sleep quality in Iranian pregnant women. International journal of women's health and reproduction sciences. 2017 Apr;5(2):147-52.
10.Sharma S, Nehra A, Sinha S, Soneja M, Sunesh K, Sreenivas V, et al. Sleep disorders in pregnancy and their association with pregnancy outcomes: a prospective observational study .Sleep Breath. 2016 Mar;20(1):87-93.
11.Kızılırmak A, Timur S, Kartal B. Insomnia in pregnancy and factors related to insomnia. ScientificWorldJournal. 2012;2012:197093.

12. Taskiran N. Pregnancy and sleep quality. Journal of Turkish Society of Obstetrics and Gynecology, (J Turk Soc Obstet Gynecol). 2011; 8(3): 181- 7.

13. Karagozoglu S, Bingöl N. Sleep quality and job satisfaction of Turkish nurses. Nursing Outlook. 2008 Nov;56(6):298-307.

14. Najafi Ghezeljeh T, Moradi F, Rafii F, Haghani H. Relationship between job stress, sleep quality and fatigue in nurses. Iran Journal Of Nursing (IJN). 2014 Aug; 27(89): 40-9.

15. Sedov ID, Cameron EE, Madigan S, Tomfohr-Madsen LM. Sleep quality during pregnancy: A meta-analysis. Sleep Med Rev. 2018 Apr; 38:168-76.

16. Xu X, Liu D, Zhang Z, Sharma M, Zhao Y. Sleep duration and quality in pregnant women: A cross-sectional survey in China. Int J Environ Res Public Health. 2017 Jul 20;14(7). pii: E817.

17. Tsai SY, Lee CN, Wu WW, Landis CA. Sleep hygiene and sleep quality of third-trimester pregnant women. Res Nurs Health. 2016 Feb;39(1):57-65.

18. Seyedahmadinejad FS, Golmakani N, Asgharipour N, Shakeri MT. Investigation of sleep quality during the third trimester of pregnancy and some related factors in primigravida women referred to health care centers in Mashhad-2014. Scientific Journal Of Hamadan Nursing & Midwifery Faculty (Nasim-Danesh). 2015;22(4):53-60.

19 Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213.

20. Effati-Daryani F, Mirghafourvand M, Mohammad-Alizadeh-Charandabi S, Shiri-Sarand F, Zarei S. Sleep quality and its relationship with quality of life in Iranian pregnant women. Int J Nurs Pract. 2017 Apr;23(2) :e12518..