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Original article

Late-pregnancy sleep quality and psychological distress in Iranian primiparous women

Koochaksaraei FY [1], Nasiri-Amiri F[2*], Faramarzi M[3], Khafri K[4], Kheirkhah K[5]

[1]Student Research Committee, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[2]Department of Midwifery, School of Nursing and Midwifery, Babol University of Medical Sciences, Babol, Iran
[3] Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran
[4]Department of Biostatistics and Epidemiology, Babol University of Medical Sciences Babol, Iran
[5]Department of Psychiatry, School of Medicine, Babol University of Medical Sciences, Babol, Iran

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Abstract

Background: Even though pregnant women commonly experience poor sleep quality during pregnancy, the role of sleep quality in psychological problems is still unclear. This study was carried out to determine the associations between poor sleep quality in the third trimester of pregnancy and the psychological distress among Iranian primiparous women.

Methods: This cross-sectional study was carried out on 300 primiparous women who attended prenatal care centers in Babol, Iran, in 2019. The sleep quality and the psychological status of the pregnant women were measured with Pittsburg sleep quality index (PSQI) and Symptom CheckList-90 (SCL-90), respectively. Bivariate and multivariable logistic regression analyses were used to examine the association(s) between independent, dependent, and control confounding variables.

Results: Poor sleep quality was found in 74% of the participants. Poor sleep quality was not associated with psychological distress (the total score of SCL-90-R). Compared with women with good sleep quality, women with poor sleep quality were more likely to have hostility (adjusted OR = 2.51; CI = 1.13, 5.55), somatization (adjusted OR = 4.31; CI = 1.96, 9.47), and less paranoid (OR = 0.22; CI = 0.11, 0.44) during the third trimester of pregnancy.

Conclusion: It is suggested that poor sleep quality was significantly associated with subscales of SCL-90 (hostility and somatization, paranoid) during the third trimester. Thus, further research on the topic is needed.

Keywords: Sleep quality, Pregnancy, psychological distres

Introduction

For most women, pregnancy can be a joyful and exciting time. But unfortunately, in many of them, it can lead to a serious sleep disorder, even in women who never had trouble sleeping. Overall, 76% of the women were found to be poor sleepers, as assessed by the Pittsburgh Sleep Quality Index (PSQI) (1). Pregnancy is a vulnerable time during a woman's life, which is associated with sleep disturbances resulted from general discomfort and pain, urinary frequency, nausea and vomiting, fetal movements and shortness of breath (2). Pregnancy affects women's sleep patterns due to systemic changes caused by hormonal, psychological, emotional and physical changes (3). The quality and amount of sleep vary in different periods of pregnancy. At the onset of pregnancy, the pattern of sleep changes, and the most common disorder could occur in the third trimester of pregnancy (4).

In some studies, the prevalence of poor sleep quality in pregnancy was reported to be 74.2% (5). The sleep disorder in primiparous women in Iran have been reported to be 84.8% (6). Factors such as parity and gestational length may also impact sleep quality (7). For example, Signal et al. indicated that nulliparous women generally had less efficient sleep (8), and Wilson and colleagues reported that women in the third trimester of pregnancy had poorer sleep efficiency, more awakenings and less deep sleep (9).

The existing literature emphasizes the potential harmful effects of sleep disorders on feto-infant and maternal health outcomes (10). Few studies have demonstrated the association between poor sleep

***Correspondence author:** Dr. Fatemeh Nasiri-Amiri, Faculty of Babol University of Medical sciences, Gang Afroz Street, Babol, Iran
Tel: +98-11-32190181 Email: nasiri_fa@yahoo.com

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quality and maternal complications including preeclampsia and pregnancy induced hypertension (11), gestational diabetes and glucose intolerance (12, 13), complications associated with labor and delivery (14) as well as depression (15). Several studies examined feto-infant health outcomes, preterm labor (16) low birth weight and small for gestational age infants (17) in women with poor sleep quality. As all of these factors can negatively affect the pregnancy outcomes (10). They can also have some potential impacts on fetal outcomes (7). There is some evidence that indicate poor sleep quality may increase mental health disorder. Sleep problems occur before a mood disorder or develop as a result of one (18, 19). Oken et al. found that poor sleep quality in pregnancy were significantly related to the recurrence of postpartum depression (20). There is limited empirical data on the association between poor sleep quality and anxiety, particularly in the postpartum period (21). Systematic review studies recommended further studies on sleep disorders and postpartum mental disorders, especially in different age groups and with more diverse samples (22). Poor sleep quality in pregnancy is probably associated with an increase in the psychological distress, which eventually leads to poor maternal and fetal outcomes and mood changes. Therefore, the aim of this study was to demonstrate the association between poor sleep quality in the third trimester of pregnancy and the psychological distress among Iranian primiparous women.

Materials & Methods

This cross-sectional study was carried out on 350 eligible healthy nulliparous women with the gestational age of 28-42, who attended prenatal care centers in Babol, Iran. Written informed consent was obtained from all participants who expressed interest. The inclusion criteria for the study were: Primiparous women who were 18 years of age or older, with singleton pregnancies and third trimester gestational age (28-42 weeks). Pregnant women who needed medications for diabetes, antidepressants, antipsychotics, opiate drugs, or corticosteroids before and during pregnancy, those with the history of chronic diseases such as diabetes, hypertension and cardiac disease, a current substance abuse diagnosis, drinking alcohol or smoking habits, those with the history of abortion or infertility, preterm delivery, and those who failed to complete the questionnaires, migrated to another city or experienced death of a first-degree relative during the pregnancy were all excluded from the study.

The socio-demographic questionnaire was a semi structured questionnaire used to assess the informational data including age, gestational age, marriage age, marriage duration, educational level, occupation, income satisfaction and fetal gender of the participants. The Pittsburgh Sleep Quality Index (PSQI) (23) was used to measure the sleep quality over the prior month. It is consisted of an 18-item questionnaire with seven components including: subjective sleep quality, sleep duration, sleep latency, sleep disturbances, the use of sleeping medication, daytime dysfunction habitual, and sleep efficiency. Each item is rated on a 0–3 scale and the score range of global PSQI is between 0 and 21. The sum of the seven component scores makes the global PSQI score. A higher score reflects a poorer sleep quality. Various studies, which were not focused on pregnancy reported a sensitivity of 89.6% and specificity of 86.5% and a good internal consistency (Cronbach $\alpha = 0.80$) when using a < 5 cutoff (24, 25). PSQI scores ≥ 5, indicating poor sleep quality (26, 27).The PSQI has been translated into 48 languages and has been used in a wide range of population-based and clinical studies.The PSQI and its psychometric properties have been validated in pregnant women. The reliability coefficient, Cronbach's alpha for the PSQI items, was 0.74. The participants were divided into two groups for analyses: good sleep quality (score < 5) and poor sleep quality (score≥5) (28).

The symptom checklist-90 revised (SCL-90-R) is the most common questionnaire used for the assessment of psychological distress, especially in clinical practice (29). The evaluation of psychiatric distress was performed using the Iranian version of the checklist (30). The SCL-90-R is a 90-item, self-report measure of clinical functioning tapping nine domains of distress and symptoms (i.e., Somatization, obsessive compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobia, paranoid ideation and psychoticism) within the previous 7 days. Each item has the following five response categories: 0 = not at all, 1= little, 2 = some, 3 = very, 4 = severe. Raw

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scores were computed by summing each item on a factor and dividing by the number of items making up the factor. Thus, each factor score could range from 0 to 4. The Persian version of this measure is also widely used in Iran and the consistency of its subscales ranged from 0.955 to 0.904. The highest consistency belonged to the Anxiety items (0.955), and the lowest consistency was related to aggression items (0.904). Therefore, the reliability of the questionnaire was established as well (31).

Of the 350 pregnant women who agreed to participate and were eligible for inclusion, a total of 300 (85.7%) individuals enrolled in the study. 50 women did not complete the questionnaires or voluntarily withdrew from the study, migrated to another city or changed their physician from a university affiliated centers to a private office, or experienced the death of a first-degree relative during the pregnancy. 300 nulliparous pregnant women who completed the PSQI and the SCL-90-R were statistically analyzed.

Table1. The Characteristics of pregnant women with poor and good sleep (n =300)

Characteristic	Total F (%)	Good sleep scores ≤ 5 F (%)	Poor sleep >5 F (%)	P Value
Age (years)				
<25	136 (45.3)	39 (50.0)	97 (43.7)	0.336
≥25	164 (54.7)	39 (50.0)	125 (56.3)	
Education level (years)				
< 12	204 (68.0)	57 (73.1)	147 (66.2)	0.264
≥12	96 (32.0)	21 (26.9)	75 (33.79)	
Occupation				
Housewife	251(83.7)	67 (85.9)	184 (82.9)	0.536
Employed	49 (16.3)	11 (14.1)	38 (17.1)	
Income				
Sufficient	223 (74.3)	56 (71.8)	167 (75.2)	0.413
Not sufficient	77 (25.7)	22 (28.2)	55 (24.8)	
Unwanted pregnancy				
Yes	111 (37.0)	28 (35.9)	83 (37.4)	
No	189 (63.0)	50 (64.1)	139 (62.6)	
Marriage age (years)				
<25	228 (76.0)	56 (71.8)	172 (77.5)	0.312
≥25	72 (24.0)	22 (28.2)	50 (22.5)	
Marriage duration (years)				
<5	221 (73.7)	59 (75.6)	162 (73.0)	0.645
≥5	79 (26.3)	19 (24.4)	60 (27.0)	
Husband education				
< 12	225 (75.0)	57 (73.1)	168 (75.7)	0.129
≥12	75 (25.0)	21 (26.9)	54 (24.3)	
Husband occupation				
Unemployed	12 (4.0)	1 (1.3)	11 (4.9)	0.129
Worker/ Employee	162 (54.0)	38 (48.7)	124 (55.9)	
self-employment	126 (42.0)	39 (50.0)	87 (39.2)	
Fetal gender				
Boy	252 (84.0)	64 (82.1)	188 (84.7)	0.585
Girl	48 (16.0)	14 (17.9)	34 (15.3)	

The data were analyzed by SPSS-21 software. Both descriptive and Chi-square analyses were applied. Bivariate and multivariable logistic regression analyses were used to examine the association(s) between independent, dependent , and control confounding

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variables. Before the multivariate analysis, regression assumptions including residuals normality, homogeneity of variance of residuals, linear outliers, and dependence of residuals were studied. This article is based on the Strobe guideline.

Results

The mean age of primiparous women was 25.6±5.13 years. 54.7% of the women were 25 years and older. The mean age of marriage was 21.6±4.98. Around three-fourth of the participants (76%) were under 25 years and the mean length of marriage was 3.7±2.80. Approximately half of the participants had a high school graduation degree and most of them (80%) were housewives. Additionally, more than 70% 0f the women reported that their monthly income was adequate. About 63% of the mothers were excited about their pregnancy, and 84% of the neonates were male. The Chi-square analysis revealed no statically significant difference in age, education level, occupation, income, unwanted pregnancy, marriage age, marriage duration, husband's education, husband's occupation, and fetal gender between women with poor sleep quality and good sleep quality; as a result, multivariable analysis was not necessary anymore (Table 1).

The mean score of PSQI was 6.01 ± 2.51. The overall sleep quality score of most pregnant women was ≥5, with 74% suffering from poor sleep quality during the third trimester of pregnancy (table 2). Almost one-fifth (19%) of the women had more than seven hours of sleep at night. More than 90% of the women had sleep latency problem. Around 20% of participants had bad/very bad subjective sleep quality. 40.3% of the participants had severe/ high sever sleep disturbance, and 94.3% of the total participants reported no use of sleep medication. Also, 59.7% of the women reported that their sleep quality affected their day-to-day function (Table 2).

Table 3 shows that poor sleep quality was not associated with psychological distress (the total score of SCL-90-R), while some subscales of SCL-90 and somatization, paranoid) was associated with poor sleep quality in pregnant women. Compared with women having good sleep quality, women with poor sleep quality were more likely to have hostility (adjusted OR = 2.51; CI = 1.13, 5.55), somatization (adjusted OR = 4.31; CI = 1.96, 9.47), and less paranoid (OR = 0.22; CI = 0.11, 0.44) during the third trimester of pregnancy. No significant associations were found between poor sleep quality and other subscales of SCL-90 including obsessive-compulsive, interpersonal sensitivity, depression, anxiety, phobic anxiety, and psychoticism .

Variable	f	%
Total score of sleep quality		
≤5	78	26.0
>5	222	74.0
Sleep duration (hour)		
>7	57	19.0
6-7	33	11.0
5-6	171	57.0
<5	39	13.0
Sleep latency		
No problem	29	9.7
Moderate problem	136	45.3
Sever problem	90	30.0
High sever problem	45	15.0
Subjective sleep quality		
Very good	25	8.3
Relatively good	215	71.7
Relatively bad	45	15.0
Very bad	15	5.0
Sleep disturbances		
No problem	13	4.3
Moderate problem	174	58.0
Sever problem	112	37.3
High sever problem	1	13.0
Day time dysfunction		
No problem	121	40.3
Moderate problem	139	46.3
Sever problem	34	11.3
High sever problem	6	2.0
Habitual sleep efficiency		
No problem	296	98.7
Moderate problem	2	0.7
Sever problem	2	0.7
High sever problem	0	0
Use of sleeping medication		
Not at all	283	94.3
>1	11	3.7
1-2	4	1.3

Table 2. The Pittsburgh Sleep Quality Index and its domains in pregnant women (n =300)

Table3. Multi-variable logistic regression: The association between psychological distress and poor sleep quality

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Psychological distress (SCL-90)	Crude OR (95% CI)	*p*-value	Adjusted* OR (95% CI)	*p*-value
Somatization	5.26 (2.02-13.6)	0.001	4.31 (1.96- 9.47)	<0.001
Obsessive-Compulsive	0.89 (0.28- 2.86)	0.850	-	-
Interpersonal Sensitivity	1.36 (0. 39-4.80)	0.630	-	-
Depression	0. 32 (0.09- 1.16)	0.080	-	-
Anxiety	0.99 (0.32- 3.07)	0.980	-	-
Hostility	2.552 (1.02- 6.37)	0.040	2.51 (1.13- 5.55)	0.020
Phobic Anxiety	1.11 (0.39- 3.18)	0.840	-	-
Paranoid	0.22 (0.09-0.54)	0.001	0.22 (0.11- 0.44)	0.001
psychotics	2.39 (0.51- 11.28)	0.270	-	-
Total SCL-90	1.71(0.91-3.22)	0.095	-	-

Discussion

In this study, based on PSQI, the prevalence of poor sleep quality was 54.7%. the prevalence in our study was closer to a meta-analysis study in China 54.2% (32). This was lower as compared with a research study done in Iran 77% (33) and Turkey 86% (34). In addition, the findings of this study were higher than those of the studies conducted by Demiröz and Taştan 15% (35) and Huong and Thuy 41.2% (36). It is suggested that the possible reasons for relatively higher and lower might be due to sample size, demographic characteristics, sociocultural, socioeconomic, period of pregnancy, and study design. This finding also showed that the characteristics of pregnant women with poor and good sleep were the same. We could not include those variables in multivariate statistical analysis.

In addition, our funding showed that the poor sleep quality in the third trimester of pregnancy was not associated with total score of psychological distress. However, women with poor sleep quality during the third trimester of pregnancy were 2.5 times more likely to have hostility and 4.3 times more likely to have somatization than those who were with good sleep quality. Interestingly, the adjusted odds ratios of having paranoid among the women with poor sleep quality were 78% lower when compared with good sleep women. A number of surveys examined sleep quality and mental disorder in pregnancy. They revealed that poor sleep quality was associated with the increased risk of psychological distress (19, 21, 36-40). But one study reported that poor sleep quality was associated only with postpartum depression and not anxiety (21). This could be due to the presence of prenatal depression is one of the most determining factors.

Based on these findings, we recommend that doctors and midwives discuss both sleep quantity and sleep quality with their pregnant patients as part of basic prenatal care. There is still a gap in knowledge why sleep quality disrupts during pregnancy? One of the reasons for sleep disturbance during pregnancy is the changing hormone levels. Hormonal changes may also have an inhibitory effect on muscles, which may result in snoring and increase the risk of developing sleep apnea in pregnant women. Moreover, it might be partly responsible for the frequent trips to the bathroom during the night. These interruptions and other pregnancy-related discomforts can result in significant loss of sleep. Sleep problems are common in pregnant women, and it is important to find effective ways to manage sleep problems (36). During the second trimester of pregnancy, many women fall asleep easily and rest more as they relieve nausea and their hormone levels decrease. At this time, women feel more comfortable and enjoy their pregnancies. But in the third trimester most pregnant women experience the sleep disorders. This can be due to the frequent urination, back pain, abdominal distress, fetal movement, muscle aches and general discomforts generally mark the third trimester as the body gets prepared for birth (41). Several studies showed that by the third trimester of pregnancy, the majority of women had sleep disorders, which might contribute to the development of higher levels of depressive symptoms later in pregnancy, In addition, poor sleep can affect postpartum depression (42-44).

Conclusion

There were several limitations in our study: Sleep quality and psychological distress were derived from

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self-reported questionnaires, which may be more susceptible to bias. Some researchers have previously used higher overall PSQI scores (+7) to distinguish between poor sleep and good sleep (45). Some score 6 or more PSQIs during pregnancy and up to six months Postpartum was considered a poor sleep (46). In a meta-analysis study, poor sleep quality was defined by a PSQI ≥ 5 score (27). Therefore, it is recommended that future studies be conducted on the cut-off point of the overall PSQI scores to distinguish between good and poor sleep.

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Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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