Research Paper

Comparison of Sleep Quality in Pregnant Women With Preeclampsia and Control: A Case-Control Study

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ABSTRACT

Background and Aim Preeclampsia is a common complication of the second half of pregnancy. Sleep disorders can cause high blood pressure by causing oxidative stress and endothelial dysfunction. Therefore, the present study was performed to determine the relationship between sleep disorders and preeclampsia.

Methods & Materials This is a case-control study that was performed on 240 women referred to the affiliated university hospitals in Mashhad. Sampling was performed in the case group of hospitalized women with a definite diagnosis of preeclampsia (n=90) and in the control group (n=150) among pregnant women without preeclampsia referred to the obstetrics clinic. Data collection tools included demographic information questionnaire and gynecological/obstetric records, Pittsburgh Sleep Quality Questionnaire and clinical evaluation form to determine the symptoms and severity of preeclampsia. Data analysis was performed using SPSS statistical software (version 22) and Mann-Whitney, Chi-square and Fisher tests. A P value of less than 0.05 was considered significant.

Ethical Considerations The present paper is the result of a research project approved by the Vice-Chancellor for Research of Mashhad University of Medical Sciences (Code: IR.MUMS.NURSE.REC.1397.042).

Results The mean amount of real sleep at night in the group of healthy individuals (8.4±2.3) was significantly higher than patients (8.0±2.2) (P=0.028). In terms of loud snoring, waking up in the middle of the night was most frequent in the affected group (P<0.001). There was a statistically significant difference between the two groups in terms of sleep quality score level (P<0.001) based on logistic regression test in women with severe sleep problems at risk of preeclampsia (P<0.001, 95% CI 2.9-42.2, OR: 11/11) (11/11) was equal compared to healthy women.

Conclusion The present study showed that sleep disorders in pregnancy are associated with an increased risk of preeclampsia.

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Extended Abstract

Introduction

High blood pressure disorders are one of the most important and controversial unresolved issues in obstetrics. This complication is one of the causes of maternal death and disability in mothers and babies, and every year more than 4 million women in the world face this problem [1, 2]. Sleep disorder is one of the most common problems during pregnancy and 79% of pregnant women in the world suffer from a sleep disorder [10]. Sleep disorders are associated with oxidative stress and endothelial dysfunction. In addition, they can increase adrenal hormones and cortisol, activate sympathetic nerves, and increase tumor necrosis factor-alpha, and these factors are effective in increasing blood pressure [11]. Considering the prevalence and importance of sleep disorders in pregnancy and the conflicting results regarding the relationship between sleep disorders and preeclampsia, this study was conducted to determine the relationship between sleep disorders and preeclampsia.

Materials and Methods

This research was a case-control analytical study that was conducted in 2017 on 240 women who were referred to the affiliated university hospitals of Mashhad (Imam Reza, Qhaem, Umm Al-Banin, and Hasheminejad). After obtaining the Ethics Committee's approval from the Mashhad Nursing and Midwifery School and obtaining other necessary permissions, data collection began. The inclusion criteria included Iranian nationality, gestational age of 28 to 40 weeks, no speech, hearing, or mental problems, no stressful experience in the previous 6 months, pre-eclampsia in the case group, and no pre-eclampsia in the control group. The exclusion criterion during the study included the unwillingness to continue participating in the study.

Preeclampsia was diagnosed based on blood pressure equal to or greater than 140/90 along with proteinuria of more than 300 mg in 24-hour urine or equal to or greater than 1 plus in strip test. This information was obtained by studying the clinical file and blood pressure measurement by the researcher and confirmed by the gynecologist. The control group (healthy group) was selected from pregnant women without preeclampsia referring to the midwifery clinic for prenatal care and maternity wards of the mentioned hospitals. The data collection tool included a demographic information questionnaire containing gynecology/obstetrics records, a Pittsburgh sleep quality questionnaire, and a clinical evaluation form to determine the symptoms and severity of preeclampsia, which was completed by the researcher for each person in the case and control groups.

Results

The average age of the mothers in the control group (healthy group) was 29.0±6.5 and in the case group (preeclampsia group) was 31.5±0.7 years, and based on the Mann-Whitney test, a statistically significant difference was observed between the two groups (P=0.008) (Table 1). The actual sleep at night was 8.4±2.3 hours in the healthy group and 8.0±2.2 hours in the case group, and a statistically significant difference was observed between the two groups (P=0.028). In terms of loud snoring, waking up in the middle of the night was the most frequent in the case group, and there was a statistically significant difference between the two groups according to the Mann-Whitney test (P<0.001). There was a statistically significant difference between the two groups in terms of sleep quality scores (P<0.001) so that 27.8% of people in the preeclampsia group had serious sleep problems compared to 6% of people in the healthy group (Table 2).

Based on the logistic regression test, removing the effect of age, body mass index, and gestational age, the risk of preeclampsia in women with a history of waking up in the middle of the night or early morning once a week was 7.03 times that of women without a history of waking up in the middle of the night (P<0.001), and the risk of preeclampsia in women with a history of loud snoring twice a week was 9.45 compared to women without a history (P<0.001). The risk of preeclampsia in women with serious sleep problems was 11.11 times that of women in the control group (P<0.001). Also, the risk of preeclampsia in women with a history of waking up three times due to extreme heat per week was 2.40 times compared to healthy women (P=0.029).

Discussion

In the present study, the highest frequency of loud snoring (38.8) was observed in the group of women with preeclampsia. In the case-control study by Kordi et al. (2015), which was conducted on 150 pregnant women with preeclampsia and 150 non-affected pregnant women, there was a significant relationship between sleep quality and preeclampsia (P<0.001), which is consistent with the results of the present study [12].

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Table 1. Demographic variables of the studied sample in two groups of healthy and preeclampsia

Variables		Group		P*
		Peeclampsia (n=90)	Healthy (n=150)	
		No. (%)		
Mother's education	Illiterate	5(5.5)	4(2.6)	0.213
	Primary	27(30)	39(26)	
	Tips	24(26.6)	41(27.3)	
	High school	23(25.5)	56(37.3)	
	University	11(12.2)	10(6.6)	
Mother's job	housewife	81(90)	137(91.3)	0.118
	Employee	4(4.4)	0(0)	
	Freelance	5(5.5)	13(8.6)	
Location of residency	City	61(67.7)	98(65.3)	0.623
	Village	29(32.2)	52(34.6)	
Income	Less than enough	55(61.1)	91(60.6)	0.583
	Enough	34(37.7)	59(39.3)	
	More than enough	1(1.1)	0(0)	
Spouse's job	Unemployed	5(5.6)	5(3.3)	0.010
	Student	0(0.0)	2(1.3)	
	Freelance	48(53.3)	102(68.0)	
	Employee	8(8.9)	1 2(1.3)	
	Manual worker	29(32.2)	39(26.0)	

*Chi-Square

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Kesby et al. (2000) in a study on 25 patients with preeclampsia and 17 non-affected women found that sleep disorders were more common in affected women (P<0.001) [19]. In the study by Ekholm et al. (1992), the average number of nocturnal body movements was significantly higher in the group with preeclampsia (P<0.005) [20]. In the current study, 27.8% of people in the group of women with preeclampsia had serious sleep problems, which was 6% in the control group so that women with preeclampsia had poor sleep quality.

Gottlieb et al. (2006) in a cross-sectional study on men and women aged 100-40 years stated that people who sleep less than 6 hours a night have a higher average blood pressure compared to people who sleep 7-8 hours a night [24]. In the present study, 66% of women with preeclampsia had less than 5 hours of sleep, which is in line with other studies. The present study showed that sleep disorders in pregnancy are associated with an increased risk of preeclampsia and it is necessary to pay attention to the recognition and planning to control and treat sleep problems in pregnant women. Therefore, it is suggested that midwives, doctors, and other medical groups pay more attention to the pattern and quality of people's sleep in pre-pregnancy and pregnancy care, and assist by teaching self-care measures and early diagnostic and consider treatment measures in order to improve sleep quality and prevent the occurrence of subsequent disorders, such as pre-eclampsia.

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Table 3. Frequency of research samples according to sleep quality score and related items in the healthy and preeclamptic groups

Variables		Group		P*
		Peeclampsia (n=90)	Healthy (n=150)	
		No. (%)		
Falling asleep after 30 minutes	None	34(37.7)	47(31.1)	0.128
	Once a week	5(5)	7(4)	
	Twice a week	8(8)	5(3)	
	Three times a week	43(92.2)	91(60)	
Forced to take a shower before going to bed	None	83(92.2)	141(94)	0.687
	Once a week	3(3)	4(2)	
	Twice a week	0	1(0.6)	
	Three times a week	4(4)	4(2)	
Inability to breathe comfortably during sleep	None	67(74.4)	123(82)	0.188
	Once a week	7(7)	8(5.3)	
	Twice a week	5(5)	3(2)	
	Three times a week	11(12.2)	16(10.6)	
Feeling very cold during sleep	None	77(85.5)	134(89.3)	0.419
	Once a week	2(2)	4(2)	
	Twice a week	4(4)	6(4)	
	Three times a week	7(7)	6(4)	
Nightmare	None	71(78.8)	127(84.6)	0.326
	Once a week	14(15.5)	12(8)	
	Twice a week	2(2)	6(4)	
	Three times a week	3(3)	5(3)	
Sleep quality score level	No problem	4(4.4)	16(10.7)	<0.001
	Medium difficulty	61(67.8)	124(82.7)	
	Serious problem	25(27.8)	9(6)	
	Very serious problem	0	1(0.7)	

*Chi-Square test

Ethical Considerations

Authors' contributions

All authors equally contributed to preparing this article.

Conflicts of interest

The authors declared no conflict of interest.

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