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Original article

The effectiveness of healthy behavior education on sleep quality in pregnant women with sleep disorder

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Abstract

Background: Sleep disorder accounts for high rampancy among pregnant women, especially in the third trimester of pregnancy. The present study was conducted to assess the effect of healthy sleep behavior education on the sleep quality of pregnant women with sleep disorders in the third trimester.

Methods: This study was a quasi-experimental design study, conducted on 30 pregnant women with sleep disorders referring to health centers in Tarome city, Iran. Convenient sampling was used. The subjects were allocated to the treatment and non-treatment groups by self-selection. The data collection tools were a demographic questionnaire and a Pittsburg Standard Sleep Quality questionnaire (PSQI). In the treatment group, the education of sleep health behavior was provided during eight sessions, four weeks during the third trimester. The non- treatment group received only the routine prenatal care.

Results: Based on the analysis of covariance of the dependent variable components, a significant and positive difference between adjusted mean scores of the two groups was observed in terms of sleep disturbance, habitual sleep efficiency, sleep duration, sleep latency, and subjective sleep quality ($p = 0.0001$), but there was no significant difference between the two groups in terms of the adjusted mean scores in daily daytime dysfunction.

Conclusion: The findings of this study indicated that healthy behavioral interventions and training could effectively improve sleep disorders in pregnant women.

Key words: Sleep, Education, Pregnant Women, Sleep Disorder

Introduction

Pregnancy and childbirth, as one of the three major life events beside puberty and marriage, is crucially debatable. Pregnancy, like any other crisis involves two groups of major physical and psychological changes, and any help to mothers' health depends on the understanding of these changes and their interactions, which can create varying clinical pictures in different people (1, 2). Insomnia is one of the most common disorders during pregnancy, which usually concerns awakening immediately after falling asleep and a combination of psychological changes (3, 4). In addition, increased depression can be regarded as one of the consequences of insomnia and drowsiness (5-7). Due to systematic changes caused by hormonal, mental, psychological, emotional, and physical factors, pregnancy period can disturb the normal sleep pattern, creating sleep disorders. From the twelfth week of pregnancy on, especially in the third trimester of this

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period (due to abdominal growth caused by an increase in the size of uterus, swelling of limbs, etc), until 2 months after the childbirth, sleep disorders emerge in the form of frequent nocturnal awakening, less night sleep, and decreased sleep efficiency. Over 72 percent of women experience frequent overnight awakening during pregnancy (8). Several hormones are secreted during 24 hours, some of which are produced in pregnancy, including growth hormone, prolactin, melatonin, cortisol, thyroid stimulating hormone, oxytocin, placental hormones whose cycle could have impacts on sleep and change during pregnancy. Sex hormones, particularly estrogen and progesterone, among neurotransmitters maintain their levels so that they can assure sufficient sleep, but immediately in the postpartum, a sharp decline in the amount of estrogen and progesterone can create sleep disorders in most women who usually have trouble sleeping and remaining asleep, even when it is not their responsibility to take care of the baby (9-12). The fatigue in pregnancy is a consequence of the disturbance in sleep pattern. The fatigue of pregnancy may affect women's ability to endure the labor pain and their effort for vaginal delivery (13).

Sleep disorder during pregnancy is more likely to be affected by high blood pressure, preeclampsia, gestational diabetes, preterm birth, increased pregnancy, labor problems, longer labor stages and intrauterine growth retardation (8, 14). It seems that the changes in the sleep quality of pregnant women in the third trimester of their pregnancy is the cause of anxiety, depression, reduced pain tolerance, and the reduced control of their emotions, all of which can basically affect labor outcome and consequences (15). Evidence indicates that sleep disorder is ensued by psychological changes (11, 16). Some researchers have recommended behavioral techniques as suitable methods to improve sleep quality in patients with sleep disorders (17, 18), however limited evidence is available with regard to their efficacy. In addition, considering the prevalence of the sleep disturbances in the third trimester of pregnancy and the adverse effects of sleep disturbance on maternal and fetal consequences, further studies need to be done to examine the effect of healthy sleep behavior education on sleep quality among pregnant women with sleep disorders in the third trimester of their pregnancy.

Materials and Methods

This study was a quasi-experimental design study conducted on pregnant women with sleep disorders referring to health centers in Tarome city, Iran. The Ethics Committee of the Islamic Azad University, Tonekabon, Iran approved the study (TONIAU.REC.1393.9169), and all subjects were given written informed consents prior to the study. The eligible participants were pregnant women from the prenatal class, who met the diagnostic criteria for sleep quality. These criteria were assessed by researchers using a standard Pittsburg Standard Sleep Quality questionnaire (PSQI).

The inclusion criteria for the study were primiparous women with gestational age of 28-30 weeks, ability to read and write, no use of drugs, no drinking alcohol, no history of severe depression, any sleeping drugs, and hormonal medications. The PSQI questionnaire measures people's sleep quality and patterns (19). It distinguishes the proper sleep quality from the improper one by evaluating seven sleep characteristics of people during the past months. The seven aspects are categorized into seven domains: the first domain regards subjective sleep quality or a person's general description of sleep quality. The second domain concerns sleep latency or delay in falling asleep. The third domain relates to sleep duration. The fourth domain is focused on sleep adequacy. The fifth domain deals with sleep disorder. The sixth domain pertains to the use of hypnotic drugs, and the seventh domain covers daily functioning as the experienced problems caused by sleeplessness. The questions regarding these domains are answered by the patient himself or herself. The answers are scaled from zero to 3, where the score of 3 represents the highest negative point in Likert scale. After summing up the final scores, a total score of 6 or higher indicates a sleep disorder or a poor sleep quality. It is worth noting that given the prohibition on the use of hypnotic drugs (the sixth domain) during pregnancy, and since the non-use of such drugs was a prerequisite for inclusion in the study, the score of this domain in calculation of the sleep score of the sample participants was invariably considered zero according to the opinions of the experts who determined the validity and the reliability of the questionnaire (10, 20). In Iran, Malekzadegan et al (2013) reported an internal consistency (Cronbach's alpha) of 0.88 for the PSQI (21). In a study by Buysse et al. (1989), a high validity and reliability was found for this questionnaire (19). In addition, Skouteris et al. (2009) found a satisfactory

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psychometry in pregnancy. Their study also showed sleep quality in the mid- and late pregnancy (16).

After obtaining informed written consents, the women with scores ≥5 were diagnosed as subjects with sleep disorders. The individuals with unwillingness for cooperation, abortion, and preterm labor were excluded from the study.

Forty seven pregnant women were found qualified according to the above mentioned criteria. Of this number, 24 individuals chose to be in the treatment group, and 23 selected the control group. The education for sleep health behavior was provided during eight sessions, for four weeks in the third trimester in the form of two 12-member groups in the health care centers. Lectures and slide shows, and a pamphlet were also given to the participants throughout education. The no treatment group received only the routine prenatal care. The content of the educational course on sleep health behavior included the characteristics of normal sleep and sleep changes in pregnancy, finding solution for most pregnancy complaints disturbing sleep during pregnancy, optimizing healthy sleep habits, reducing emotional stress, and controlling diet. Nine subjects in the treatment group and eight subjects in the no-treatment group were excluded from the study due to abortion, preterm labor, and unwillingness to continue the study. The PSQI were completed by the both groups before the treatment and 1 month after the intervention.

All analyses were done by SPSS 18 (SPSS Inc, Chicago, Illinois, and the United States). For the analysis of the dependent variable, the sleep quality, in the treatment group and the no-treatment group, the Bonferroni correction was used.

Table 1. The basic characteristics of pregnant women in treatment group and no treatment group

Variables	Treatment group N(%) (n=15)	No treatment group N(%) (n=15)	P-value
Age (years)			1.00
<25	6(40)	6(40)	
≥25	9(60)	9(60)	
Education level			0.53
<diploma	2(13.3)	3(20)	
Diploma	10(66.7)	11(73.3)	
Collegiate	3(20.0)	1(6.7)	
Job			0.07
Work in home	12(80.0)	15 (100)	
Work outside	3(20.0)	0(0.0)	

Results

The basic characteristics of the subjects in both groups showed no significant differences (Table 1). A statistically significant change was observed in the mean scores of sleep quality and its subscales in the treatment group compared with the no-treatment group in the third trimester ($P \leq 0.05$) (Table 2).

As presented in Table 3, based on the analysis of the covariance of the dependent variable components, there was a significant and positive difference ($p = 0.0001$) between the adjusted mean scores of the two groups in terms of sleep disturbance ($p = 0.0001$), habitual sleep efficiency ($p = 0.0001$), sleep duration ($p = 0.0001$), sleep latency ($p = 0.0001$), and subjective sleep quality ($p = 0.0001$). It should be mentioned that

Table 2. Sleep quality of pregnant women in treatment group and no treatment group

Variable	Treatment Group (n=15)		No treatment Control Group (n=15)	
	Pre-intervention (Mean±SD)	Post intervention (Mean±SD)	Pre-intervention (Mean±SD)	Post intervention (Mean±SD)
Sleep quality	13.9±2.5	3.5±0.9	13.3±4.3	14.9±3.0
Daytime dysfunction	1.3±0.8	0.4±0.6	1.5±0.9	1.5±0.9
Sleep disturbance	8.9±2.5	2.5±1.1	7.9±3.2	9.2±2.1
Habitual sleep efficiency	55.5±12.5	75.3±6.1	58.8±12.1	49.4±13.5
Sleep duration	236.0±47.7	352.0±59.4	244.0±66.0	204.0±63.3
Sleep latency	1.8±0.9	0.3±0.5	1.3±1.2	1.6±1.1
Subjective of sleep quality	1.7±5.9	0.4±0.5	1.7±0.6	1.7±0.6

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Table 3. The covariance analysis for performance of sleep quality in pregnant women

Source of changes	SS	*df*	MS	F	p-value	Effect size (η^2)	Power of test
Indp. var. & sleep quality pretest	647.27	1	647.27	202.69	0.0001	0.91	1.00
Indp. var. & Daytime Dysfunction pretest	1.71	1	1.71	3.83	0.064	0.15	1.00
Indp. var. & sleep disturbance pretest	258.91	1	258.91	165.18	0.0001	0.89	1.00
Indp. var. & Habitual sleep efficiency pretest	3121.50	1	3121.50	36.32	0.0001	0.63	1.00
Indp. var. & sleep duration pretest	104950.49	1	104950.49	28.56	0.0001	0.48	1.00
Indp. var. & sleep latency	10.54	1	10.54	19.17	0.0001	0.48	1.00
Indp. var. & subjective of sleep quality pretest	8.48	1	8.48	46.591	0.0001	0.69	1.00

there was no significant difference between the two groups in terms of the adjusted mean scores in daily daytime dysfunction.

Discussion

The results of the statistical analysis in the present study indicated a significant difference between the experimental group and the control group in terms of sleep quality and its constituents in the pregnant women in the third trimester of pregnancy after the behavioral training. Therefore, considering the significance of the mean differences at 99 percent confidence, the research hypotheses on the effectiveness of group behavioral treatment on the improvement of women sleep quality in the third trimester of pregnancy were confirmed. These results are consistent with the findings of Malekzadegan et al. (21), Da Costa et al. (15), Neau et al. (22), Pires et al (23), Stacey et al (24), Hall et al. (25), and Okun et al. (26).

The limitations of this research were as follows. First of all, this study used a quasi-experimental design to assess the effect of healthy behavior education on sleep Quality. The participants chose the treatment through self-selection, and there was no random assignment. In addition, the standard self-reporting PSQI was used to assess sleep quality in the participants. There is a possibility of reports overstating or understating the reality in answers. This could result in the misclassifications of individuals with sleep disorder as the ones without it. However, the exclusive use of PSQI for the assessment of sleep quality in pregnant women without performing a clinical interview demonstrated a high psychometric quality (2). Therefore, future clinical trial on this topic is recommended with randomized samples, which may yield more comprehensive results. Also, it is necessary to conduct clinical interviews for more generalizable results. In addition, in order to conduct research similar to the present one, it is necessary to consider the attendance of pregnant women's husbands for creating an appropriate environment, which can also lead to more efficacy of the treatment process.

Despite the limitations, the results of the present research could have important implications for future studies and sleep hygiene promotion programs. These findings can help improve sleep quality in pregnant women in the third trimester of their pregnancy. Since information regarding the sleep quality of pregnant women is essential, the validity of the self-reported sleep quality information should be taken seriously.

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Health care providers should provide pregnant women with an appropriate sleep quality questionnaire so that they can make more accurate assessment of health disorders during pregnancy.

In conclusion, applying no-drug and low-cost methods like this group behavioral treatment could effectively improve sleep disorders in pregnant women.

Conclusion

This study helped us realize the importance of early menarche age identifying factors affecting the health of pregnant women. The results of this study can persuade midwives, physicians, and health care practitioners to pay attention to menarche age before pregnancy. We did not find any association between irregular menstruations and gestational diabetes.

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Conflict of interest

None declared.

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