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Original article

Sleep hygiene education during prenatal care visits: A quasi–experimental study

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Abstract

Background: The effect of individual sleep hygiene education on sleep quality components remains largely unknown during pregnancy. This study aimed to assess the effect of a short-term sleep hygiene education during prenatal care visits on pregnant women with poor sleep quality.

Methods: A quasi-experimental study, designed as a pre- and post-test with a single group, was conducted on 32 pregnant woman with poor sleep quality. All the participants completed the Beck Depression Inventory (BDI), Perceived Stress Scale (PSS), and Pittsburgh Sleep Quality Index (PSQI). The women with good sleep quality and symptoms of severe depression and high stress were excluded from the study. Sleep hygiene education was presented face to face within 25 minutes. A Persian educational booklet, according to the routines of prenatal care visits during the first trimester of pregnancy, was also provided. PSQI, as the primary outcome, and sleep hygiene index (SHI), as the secondary outcome, were measured at the third trimester (34-36 weeks) of pregnancy.

Results: The two components of PSQI (sleep latency and daytime dysfunction) improved, whereas the score for component 3 (sleep duration) worsened. No statistically significant differences were found in the mean global sleep quality scores after the intervention. The sleep hygiene index significantly improved by sleep hygiene education ($P = \leq 0.0001$).

Conclusion: A short-term sleep hygiene education program during prenatal care visits cannot effectively improve sleep quality in pregnant women with poor sleep quality. Thus, it is highly imperative that further considerations for the use of sleep hygiene education during pregnancy be seriously taken into account.

Keywords: Sleep, Sleep hygiene, Sleep quality, PSQI, Education, Pregnant women

Introduction

It is generally assumed that pregnancy is a serious part of a woman's life, which can be associated with numerous psychological and physiological alterations leading to changes in the sleep quality (1). It is also thought that poor sleep quality and short sleep durations are common symptoms during pregnancy (2). Moreover, hormonal, behavioral, physical, and psychological changes may contribute to poor sleep quality during pregnancy (3). It is estimated that changes in sleep pattern occur in 13-80% in the first trimester of pregnancy (4). In the same vein, a study conducted in Iran reported 87.2%, which confirmed the claim (5). It is generally presumed that the most common causes of poor sleep quality during pregnancy are: frequent urination, backache, abdominal distress, and fetal movement (6). It is also believed that poor sleep quality may increase the risk of obesity, gestational hypertension, preeclampsia, gestational

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diabetes, intrauterine growth restriction, preterm birth, cesarean delivery, low birth weight and depression (7-10).

It is widely thought that most sleep medications are categorized in category X drug. According to the recommendation of Food and Drug Administration (FDA), pregnant women must not be exposed to category X. Therefore, any attempts to improve the quality of sleep in pregnant women could be complicated, which needs to be carefully considered by both physicians and women (11). Research findings indicate that sleep hygiene comprises different necessary practices, which can promote good sleep quality (12). Research also depicts that one of the crucial requirements to improve the sleep quality among pregnant women is sleep hygiene education (13). The goal of the routine sleep hygiene education is to prevent individual behaviors that can disrupt the normal sleep pattern (14).

Furthermore, it is generally thought that the main duty of midwives, in their prenatal care visits, is to preserve the physiological and psychological health of women during pregnancy. They need to pay heed to the normal sleep changes during pregnancy and its likely reasons, reduce the stress of pregnant women, provide a good sleep environment, encourage regular exercise, and control their diet, tobacco smoking and alcohol use (10, 15). To this end, the following research question was formulated: Can a routine short-term sleep hygiene education during prenatal care visits improve sleep quality in pregnant women?

Materials & Methods

The research design of the current study was quasi-experimental, the pretest-posttest measurements of a single group. The aim of the study was to assess the effect of a short-term sleep hygiene education during prenatal care visits on pregnant women with poor sleep quality. The ethics committee of Babol University of Medical Science approved this study (Ethic ID: IR. MUBABOL.HRI.REC. 1397. 032).

The inclusion criteria for the study were: uncompleted singleton pregnancy and women, between 18-35 years of age, with poor sleep quality. In order to accurately assess the effect of sleep hygiene education on sleep quality, women with symptoms of severe depression; women with a history of chronic illnesses such as diabetes, hypertension and cardiac distress; those who had psychiatric consultations prior to pregnancy; women with night shifts at work; those who smoked or consumed alcohol; and women with the history of abortion in their previous pregnancies were excluded from the study. Also, women with changes in their sleep patterns due to travel or the death experience of close relatives during pregnancy were excluded from the study.

The following instruments were used for the measurements:

The socio-demographic questionnaire: This instrument was a semi-structured questionnaire used for collecting such data as age, educational level, occupation, income, monthly expenditures, income satisfaction, and the gravidity of the participants.

Pittsburgh Sleep Quality Index (PSQI): PSQI is a common method of examining the quality of sleep during pregnancy. The questionnaire was designed by Buysse et al. in 1989 (16). It includes 9 questions and seven components. These components include subjective sleep quality, sleep duration, sleep latency, sleep disturbances, the use of sleeping medication, daytime dysfunction habits, 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 seven component scores gives the global PSQI score. Having a total score greater than or equal to 5 (5–21 points) indicates a poor sleep quality. The cronbach's alpha of this questionnaire was calculated to be (0.73) (16). Hossein Abadi, et al. (1387) reported the reliability (r = 0.88) and the reliability of the questionnaire via retest (r = 0.84) in Iran (17). In our study, the cronbach's alpha of this questionnnaire was calculated 0.81.

Sleep Hygiene Index (SHI): SHI is used as a self-report questionnaire, which can measure sleep hygiene. SHI has 13 items, rating on a scale from 0 (never) to 4 (always). The global assessment score of SHI ranges from 0-52. Higher scores of SHI (score ≥ 16) indicate poor sleep hygiene (18). The reliability of the questionnaire (0.66) was estimated by Mastin et al. in 2006 (19). In a study conducted by Chehri et al. (2015) in Iran, the reliability of this questionnaire was calculated to be 0.83 (20).

Perceived Stress Scale (PSS): The PSS assesses the stress level during the past months. It has 14 questions and was constructed by Cohen et al. in 1983. The PSS is graded based on a 5-point Likert scale, and the questions are scored from 0 to 4. Some questions need

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to be scored conversely. The score range for this tool is 0-56. A high score indicates higher levels of stress, and a low score indicates lower levels of stress. Having a total score greater than or equal to 28 (28–56 points) indicates high perceived stress (21). The reliability of PSS was confirmed by Salehi Ghadri et al. (1373) in Iran. He reported the cronbach's alpha coefficient of 0.75 for this tool (22).

Beck Depression Inventory (BDI): The depression level was assessed using the 13-item Beck Depression Inventory, which was developed by Beck et al. (23). Each substance has 4 options and sets various degrees of depression from mild to severe (0-3). The maximum score in this questionnaire is 39, and the least is zero. According to a study by Rajabi, this questionnaire was a reliable and valid scale for screening depression in psychiatric outpatients in Iran (24).

78 eligible pregnant women, with the gestational age of 8-14, were recruited at a prenatal clinic in Babol, Iran, between June 2018 and July 2019. Initially, the procedure and the purpose of the research was explained to the participants, and then written informed consent forms were obtained from all willing participants. In order to selecting subjects matching the inclusion criteria, the symptoms of depression and the stress of the subjects were measured by the beck depression inventory (BDI) and perceived stress scale (PSS), respectively. Women with severe depression (score $\geq$ 16) and high stress (score > 28) were excluded. After considering the other exclusion criteria, 60 women filled out Pittsburgh sleep quality index (PSQI) and sleep hygiene index (SHI). Finally, based on the sample size formula, 32 pregnant women with poor sleep quality (PSQI $\geq$ 5) were included in the study (Figure 1).

The sleep health education intervention was provided according to published articles, text books, and guidelines (14, 25, 26). This educational package contained key information regarding a) the importance of healthy sleep habits during the pregnancy; b) the description of normal adult sleep patterns and the nature of adult sleep; c) the avoidance of many activities to improve sleep such as taking daytime naps, stressful activities or heavy meals close to bed time, vigorous exercise, any other activities except for sexual intercourse, and caffeine/ tea consumption close to bed time d) the recommendation to establish a bedtime routine such as taking a bath, listening a soothing music or reading a book e) the encouragement to maintain a sleep conductive environment such as eliminating noise from the environment, maintaining a cool, dark, comfortable, and quiet environmental condition; and f) exercising regularly a few hours before bedtime.

The sleep hygiene education was presented face-to-face within 25 minutes during the first trimester of pregnancy for each participant. After the training, the participants were allowed to ask their questions. At the end, all participants received an educational booklet providing recommendations for good sleep (26).

The primary outcome was to measure the sleep quality in the third trimester (34-36 weeks) using the PSQI. The secondary outcomes were the changes in score of SHI before and after the intervention.

Statistical Analysis

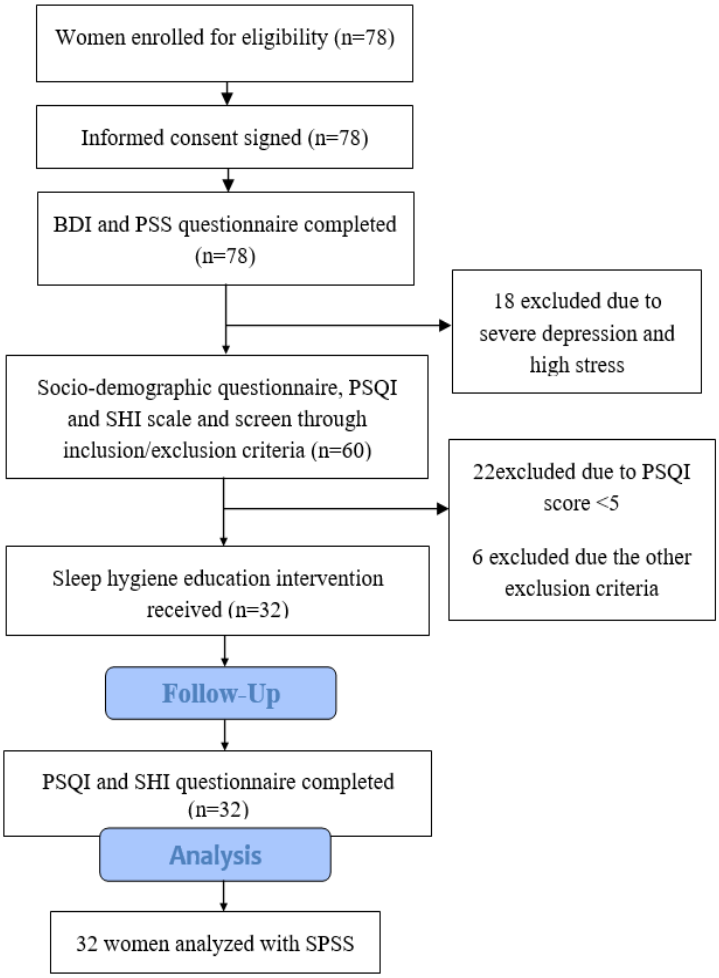
All analyses were performed using SPSS Statistics, version 20. Descriptive statistics were used for such summarized categorical and continuous variables as frequencies /percentages and the mean ± SD, respectively. For comparing PSQI and SHI before and after the intervention, paired t-test was used. All tests were set with level p less than 0.05.

Results

The mean ± SD age of the participants was 28.4±3.8. Approximately, half of the participants had secondary or diploma education and most of them (87.5 %) were housewives. Additionally, two-third of the participants (68.8%) reported that they had adequate monthly income. The mean scores of BDI and PSS were 4.2 ± 3.3 and 20.6 ± 5.8, respectively. The range of SHI score was between 0- 35, with the mean of 22.0 ± 7.5. Most of the participants (71.9%) had a poor SHI score (Table 1). The results of the screening test demonstrated that 45.0% (78/32) of the participants scored greater than or equal to five on the PSQI, suggesting a need for improved sleep.

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As shown in Table 2, the results of paired t-test showed no statistically significant differences in the mean scores of global sleep quality after the intervention. While, improvement was observed in two components (component 2 and component 7) of PSQI at the post analysis stage. The mean (SD) sleep latency (component 2) was reduced significantly ($p < 0.000$) from 2.78 (1.64) to 1.47 (0.95) after the intervention. Moreover, the mean (SD) scores of daytime dysfunction (component 7) decreased significantly after intervention from a mean of 1.53 (1.48) to 0.94 (1.08) ($p <0.040$). On the other hand, the mean (SD) sleep duration scores (component 3) increased from 0.72 (0.89) to 1.22 (1.18) ($p < 0.027$). No significant differences were found in subjective sleep quality, habitual sleep efficiency, sleep disturbance, and sleep medication in post-intervention. Also, there were significant improvements in the scores of SHI at the post-analysis stage (from 22.0 ± 7.5 to 10.7 ± 5.4).

Discussion

Changes in sleep patterns during pregnancy can supposedly affect somatic complaints and prenatal mood disturbance (27, 28). Despite the fact that sleep health education can cause changes in behavior, several studies have already shown sleep hygiene education as a treatment for insomnia only (12, 29). In this study, the healthy pregnant women were initially evaluated through PSQI and SHI questionnaire prior to sleep health education. Over half of the participants had good sleep quality, and 20% of them had a low sleep health index. This study indicated no significant differences in the global score of PSQI at the post intervention stage compared to the pre-intervention stage. Also, based on PSQI, the sleep duration component was worsened after the intervention. Nonetheless, 21.9% of the participants had a good sleep quality after the intervention.

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Table1. Characteristics of pregnant women (n = 32)

Variables	N	%
Age (years)		
<30	18	56.2
≥30	14	43.8
Education level		
Diploma	16	50.0
Over diploma	16	50.0
Occupation		
In work	28	87.5
Out work	4	12.5
Family income (Rials*)		
<20,000,000	10	31.2
≥20,000,000	22	68.8
Income satisfactory		
Yes	16	50.0
No	16	50.0
Gravidity		
1	19	59.4
2-3	13	40.6
BDI**		
No depression (0-4)	19	59.4
Mild (5-7)	8	25.0
Moderate (8-15)	5	15.6
Severe (≥ 16) ***	0	0
Sleep hygiene index (SHI)		
Good (0-15)	9	28.1
Poor (16-52)	23	71.9
Perceived Stress Scale (PSS)		
Low	32	100
High****	0	0

* 1000 Rial= 0.02 US Dollar; **Beck depression inventory; ***the women with severe depression were excluded from the beginning of the study; **** the women with perceived stress were excluded from the beginning of the study

Also, two sleep quality components, including sleep latency and day time dysfunction, were improved in healthy pregnant women. This finding is in agreement with a study confirming the contribution of behavioral-sleep educational intervention to sleep quality in the first months for primiparous women (30).

Nevertheless, a quasi-experimental study conducted by Hanan et al. (2018) to investigate the effect of health behavior education on the quality of sleep among pregnant women in Egypt indicated a significant improvement in total sleep quality and the components of PSQI, which include sleep latency, sleep duration, subjective sleep quality, habitual sleep efficiency, daytime dysfunction, sleep disturbances (31).

In addition, we expected that the sleep hygiene education intervention would reveal improved posttest SHI scores. Post test data demonstrated that 100% of the pregnant women had improved sleep hygiene index (< 16 score) at the third trimester of their pregnancies.

Table 2.Comparisons of sleep quality components and sleep hygiene before and after intervention in pregnant women (n = 32)

Sleep quality components	Before intervention Mean ± SD	After intervention Mean ± SD	P-value
Subjective sleep quality	1.19 ± 0.40	1.34 ± 0.65	0.201
Sleep latency	2.78 ± 1.64	1.47 ± 0.95	0.000
Sleep duration	0.72 ± 0.89	1.22 ± 1.18	0.027
Habitual sleep efficiency	84.99 ± 11.52	81.76 ± 15.24	0.216
Sleep disturbances	7.31 ± 4.31	8.06 ± 4.45	0.384
Use of sleep medication	0.16 ± 0.63	0.03 ± 0.17	0.292
Daytime dysfunction	1.53 ± 1.48	0.94 ± 1.08	0.040
Global PSQI	7.81 ± 2.68	7.09 ± 3.37	0.200
Sleep hygiene index (SHI)	22.0 ± 7.5	10.7 ± 5.4	≤ 0.0001

These results are similar to those of the previous studies (32).

As for the limitations, this research had several limitations. First of all, the sample size was small, and the design was quasi-experimental. Also, having a control group without sleep health education is an unethical concern. Another limitation was the use of self-reporting technique to measure the sleep quality, which may have induced response bias.

Conclusion

This study can provide valuable insights about the response of pregnant women with poor sleep quality to routine sleep hygiene education during prenatal care visits. The results suggest that a short-term sleep hygiene education during the prenatal care visits cannot effectively improve sleep quality among pregnant women with poor sleep quality. Therefore, it is recommended that further considerations for the use of sleep hygiene education during pregnancy be taken into account.

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Conflicts of Interest

There are no conflicts of interest.

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