Original Article

The impact of sleep healthy behavior education on the quality of life in the pregnant women with sleep disorder: A randomized control trial in the year 2012

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Abstract

Background: About 79% of pregnant women in the world suffer from sleep disorders. These disorders result from physiological changes during pregnancy, originate from different factors, and can affect pregnant women's quality of life before, during, and after delivery. This study aimed to investigate the effect of sleep healthy behavior education on the quality of life among pregnant women with sleep disorders in the second trimester.

Materials and Methods: This is a clinical trial conducted on 112 pregnant women with sleep disorders referring to two selected health care centers in Makou affiliated to Urmia University of Medical Sciences during June-Oct 2012. Data collection tools included demographic characteristics questionnaire, Pittsburgh Standard Sleep Quality questionnaire, and World Health Organization, Quality of Life (WHOQOL-BREF) WHOQOL-BREEF questionnaire. Sampling was done by convenient sampling. Firstly, Pittsburg Standard Sleep Quality Questionnaire was completed and the pregnant women with sleep disorders were selected as the subjects. After completion of sampling, the subjects were randomly assigned to two groups of study and control. Education of sleep health behavior was provided in the study group by the researcher during four 1-h sessions. Then, WHOQOL-BREEF and Pittsburg Standard Sleep Quality questionnaire were completed again in two groups in the first follow-up session (1 month after educational intervention) and in the second follow-up session (2 months after educational intervention) held by the researcher. Control group only received conventional prenatal care. The obtained data were analyzed by Chi-square test, independent *t*-test, Fisher's exact and repeated measure tests through SPSS 18.

Results: Mean scores of quality of life showed an increase in 1 and 2 months after intervention in the study group compared to the control group. A significant difference was observed in the QOL in the two groups, 1 month ($P < 0.000$) and 2 months ($P < 0.001$) after intervention.

Conclusions: Education of sleep healthy behaviors was effective on the QOL of pregnant women with sleep disorders. The results obtained in the present study can be used to support the pregnant women with sleep disorders and sleep disorders clinics, as well as for administration of prenatal care.

Key words: Iran, pregnant women, quality of life, sleep disorder

Introduction

Pregnancy is one of the most vulnerable and joyful periods of a woman's life.[1] It can affect pregnant women's sleep pattern and ability in dealing with their daily activities due to systemic changes resulting from hormonal, mental, emotional, and physical changes in pregnancy.[2-4] Changes in sleep pattern increase from 13-80% in the first trimester to 66-97% in the third trimester.[5] Based on National Sleep Organization's report (2007), 79% of pregnant women in the world suffer from sleep disorders. Over 72% of women experience frequent wake up at midnight during pregnancy. Changes in sleep pattern cause dysfunction in daily activities and tiredness for the mother. In addition, lowered mental and psychological comfort due to insomnia leads to increased anxiety, fear of taking care of the infant and acceptance of motherhood role in the family.[6,7] Meanwhile, results of literature review studies on sleep disorders in pregnancy show higher risk of pre-term delivery, low birth weight (LBW), an increase in pregnancy period and intrapartum problems, prolonged discovery phases, assisted delivery, Cesarean sections,

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pregnancy and postpartum depression, a negative effect on family and indirectly on the society, and impose economic burden to the society.[8-11] The strategies to lower mortality in pregnancy period in developed countries led to development of pregnancy period care and maternal health outcome. According to World Health Organization's (WHO) statement, health refers to physical, mental, and social welfare without existence of a disease and disability. However, prenatal care in developed countries goes beyond traditional preventive help, diagnosis and management of problem and factors effective on maternal health, and focuses on vast actions to support and encourage the family to adapt with the mental aspects related to child birth and to increase social awareness toward birth, delivery, and their possible effects on the family. These developments of support reflect the development of quality of life (QOL).[12]

On the other hand, an increase in prenatal awareness and preparation makes it possible for the mothers to pass this stage of life with fewer complications more pleasantly, which can be fulfilled through a behavior change resulting from correct education. Therefore, researchers consider pregnancy as an appropriate time to make a behavior change.[13] Education of sleep healthy behaviors leads to improvement of pregnant women's sleep quality through increase of awareness.[14] Also, research showed that physical and social functions and vitality, as dimensions of QOL, are reduced during pregnancy.[15] On the other hand, sleep quality in pregnancy period affects the QOL of women, who are the central core of a family, through its effect on physical, mental, psychological, and social health. There is little research on the effect of sleep healthy behavior education on the sleep quality of pregnant women with sleep disorders in the world. In Iran, no studies have been conducted on this issue. With regard to the fact that individuals' concepts of QOL are influenced by their beliefs and cultures, the necessity of the research in this context is highlighted. The researchers decided to conduct a study in this context in order to increase the support of women during pregnancy in the direction of "a healthy child from a healthy mother" slogan. in the direction of "a healthy child from a healthy mother" slogan.

Materials and Methods

This is a clinical trial conducted on 130 pregnant women referring to two selected health care centers affiliated to Urmia University of Medical Sciences in Makou during June-Oct 2012. The sampling was done by convenient sampling (from all qualified women referring to the above-mentioned centers).

Three questionnaires that were adopted in the present study were a demographic characteristics questionnaire, Pittsburg Standard Sleep Quality questionnaire, and WHOQOL-BREEF. After preparation of the questionnaires and obtaining a written permission from the nursing and midwifery school and ethics committee of Tehran University of Medical Sciences, the qualified pregnant women were selected.

Inclusion criteria were age 20-40 years, gestational age 16-20 weeks (based on the first day of the last menstruation prior to pregnancy or the sonography result of the first trimester), no diagnosed physical and mental diseases (medicational and psychological), Iranian nationality, ability to read and write, not smoking, no drug abuse or consumption of alcoholic drinks, and not taking sleep and hormonal medications. After obtaining an informed written consent, a two-section questionnaire including women's demographic characteristics and Pittsburg Standard Sleep Quality questionnaire were distributed among the qualified individuals to fill them up. After revision of the questionnaires, the subjects with scores ≥5 were diagnosed as subjects with sleep disorders (N = 112). Immediately following this, WHOQOL-BREEF was given to them to be filled up in a quiet place. Then, the subjects with sleep disorders were randomly assigned to two groups of study (n = 56) and control (n = 56) based on random numbers chart. This was a single-blind design. Education of sleep health behavior was administered to the study group participants during weekly four 1-h sessions with different contents in the form of three 12-member groups and two 10-member groups in one of the health care centers through lecture and slides show accompanied with distribution of an educational booklet to the subjects. Control group just received conventional prenatal care [Diagram1]. Both the groups were blind to the type of education given. The outline of education of sleep health behavior administered in each week is as follows:

First week

Characteristics of natural sleep, sleep changes in pregnancy and their causes.

Second week

Education of modification of most complaints concerning physical problems disturbing sleep in pregnancy, such as nausea, vomiting, headache, excessive sleep and tiredness, heart burn, low back pain, leg cramps, flatulence, constipation, urine frequency, and lack of daily activities due to fear of a miscarriage.

Third week

Education of strategies to follow healthy sleep habits (sleep and wake up at regular time, reduce the time needed to fall asleep and increase the length of sleep to improve the sleep quality, leave the bed in case they could not fall asleep in 30 min after

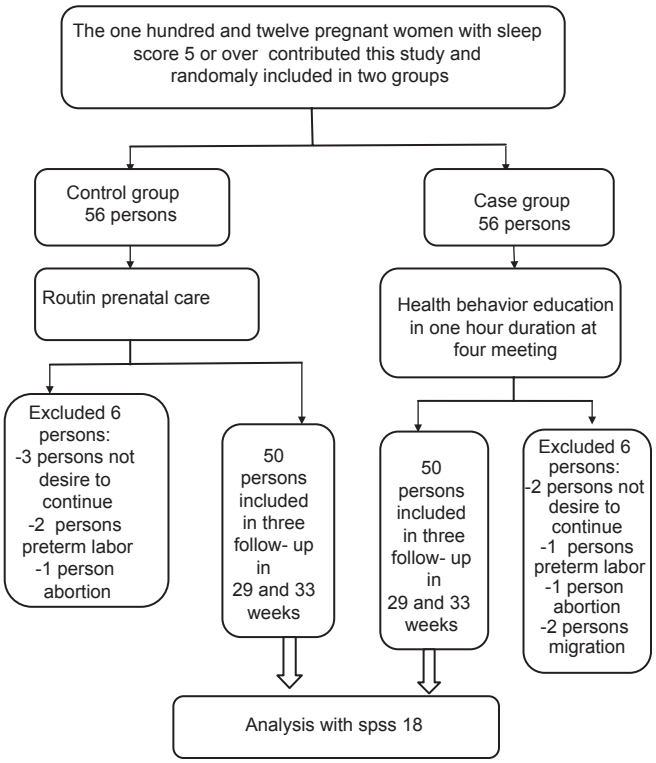

Diagram 1: Study methods design

going to bed, and afterward either watch TV or read books to fall asleep, prevention of afternoon naps), environment (bed room temperature and light, noise, comfortable mattresses and sheets), encouragement of participants to sleep in lateral position for more comfort and peace.[16,17]

Fourth week

Education on diet control, alcohol consumption, smoking, and taking caffeinated drinks (like tea or coffee, 4-6 h prior to sleep), as well as appropriate intake of calcium and magnesium in the daily diet, recommendation of drinking a glass of warm milk with sugar to facilitate their night sleep.[17-19] Playing sports, especially in the evening, can increase health, regulate physiological and psychological stress, and improve the sleep quality.[20]

Then, the first and second follow-up sessions were conducted to fill the WHOQOL-BREEF and Pittsburg Standard Sleep Quality questionnaires in 1 and 2 months after educational intervention for the subjects of both groups. There were 12 subjects who were left out including 6 in the control group (3 due to loss of interest to remain in the study, 2 due to preterm delivery, and 1 due to miscarriage) and 6 in the study group (2 due to loss of interest to remain in the study, 1 due to preterm delivery, 1 due to miscarriage, and 2 due to immigration to other cities). The data were analyzed by independent *t*-test, Chi-square, Fisher's exact, and repeated measure tests through SPSS 18.

Pittsburg Sleep Quality Index is a retrospective self-report questionnaire to investigate sleep patterns and disorders in the past month, and scores the sleep quality from 0 to 21. Index scores <5 show good sleep and Pittsburg Sleep Quality Index scores ≥5 show bad sleep. Pittsburg Standard Sleep Quality questionnaire was finally designed by Buysse *et al.* in 1989 with a sensitivity of 89-6% 89%, specificity of 86.5%, validity of 88% ($r = 0.88$), and reliability of 83%. Its validity and reliability were confirmed by research in other countries,[21-23] and in Iran,[24,25] through content validity and test-retest. WHOQOL-BREEF questionnaire measures QOL in four domains. The items are scored based on a five-point Likert's scale, which ranges 1-7 with a total score of 130. Its validity and reliability were calculated by Nejat *et al*. Its reliability was determined by WHO in 2006 (Nejat *et al.*) with Cronbach's alpha 0.75-0.84 and by numerous studies conducted in Iran.[26] This study was approved by the ethics committee of nursing and midwifery school in Tehran University of Medical Sciences and an informed consent was obtained from all subjects.

Results

In this study, the findings were analyzed by independent *t*-test, Chi-square, Fisher's exact and repeated measure tests and are presented in four charts and five diagrams. As presented in Table 1, comparison of subjects' personal and fertility characteristics between the two groups showed no significant difference. As presented in Table 2, sleep quality and its dimensions were compared in the study and control groups before intervention and showed no significant difference (subjects were homogenous). As observed in Table 3, comparison of sleep quality 1 and 2 months after intervention showed a significant difference in sleep quality compared to before intervention, as the mean scores of sleep quality showed a reduction after intervention compared to before intervention. As presented in Table 4, Figures 1-5, comparison of QOL and its dimensions showed no significant difference before intervention in the study and control groups, as the groups were not different concerning physical, mental, social, environmental health, and QOL. QOL and its above-mentioned domains showed a significant difference 1 and 2 months after intervention in both groups.

Discussion

The findings in the present study are consistent with previous studies reporting low quality of sleep as the main problem in general health. Inadequate sleep, especially due to frequent sleep disorders, is accompanied with problems in various domains of life including physical, mental, social health, as well as dysfunction in daytime activities.[27] Frequent sleep disorders notably lead to smoking, lack of physical activity, obesity, and drinking alcohol heavily, and

Table 1: Demographic status of a sample of pregnant women living in Makou township

Demographic status	Case		Control		*P* value*
	n (%)	Mean±SD	*n* (%)	Mean±SD	
Mother's age					
20-25	19 (38)	26.72±6.31	21 (42)	27±6.77	0.83
26-30	18 (36)		12 (24)		
31-35	10 (20)		14 (28)		
36-40	3 (7)		3 (7)		
Mother's education					
Primary	18 (36)	-	25 (50)	-	0.33
Steerage secondary school	14 (28)		10 (20)		
Diploma	12 (24)		7 (14)		
Collegiate	6 (12)		8 (16)		
Mother's job					
Homemaker	45 (90)	-	43 (86)	-	0.53
Employee	5 (10)		7 (14)		
Gravida					
1	22 (44)	1.8±0.93	20 (40)	2.06±1.07	0.37
2	15 (30)		14 (28)		
3	10 (20)		9 (18)		
≥4	3 (6)		7 (14)		
Gestational age (weeks)					
15-17	22 (44)	18.12±1.79	28 (56)	17.64±1.66	0.16
18-20	28 (56)		22 (44)		
Economic status					
Good	8 (16)	-	9 (18)	-	0.86
Moderate	40 (80)		38 (76)		
Bad	2 (4)		3 (6)		
Husband support					
Good	39 (78)	-	25 (50)	-	0.06
Moderate	9 (18)		21 (42)		
Bad	2 (4)		4 (8)		
Life satisfaction					
Yes	49 (98)	-	48 (96)	-	1.000
No	1 (2)		2 (4)		
Tendency of pregnancy (mother)					
Yes	46 (92)	-	39 (78)	-	0.57
No	4 (8)		11 (22)		
Tendency of pregnancy (husband)					
Yes	48 (96)	-	43 (86)	-	0.16
No	2 (4)		7 (14)		
Smoking mother					
Yes	0 (0)	-	1 (2)	-	1.000
No	50 (100)		49 (98)		
Smoking husband					
Yes	24 (48)	-	16 (32)	-	0.102
No	26 (52)		34 (68)		
Total	50 (100)	-	50 (100)	-	-

*The *P* values were tested using the *t*-test, Chi-square and Fisher's exact tests. SD: Standard deviation

Table 2: Comparison of seven components of sleep quality before intervention in pregnant women

Component of sleep quality	Case		Control		*P* value*
	n (%)	Mean±SD	*n* (%)	Mean±SD	
Subjective sleep quality (component 1)					
Very good	4 (8)	-	1 (1)	-	0.08
Good	40 (80)		29 (58)		
Bad	5 (10)		16 (32)		
Very bad	1 (2)		4 (8)		
Sleep latency (component 2)					
0	6 (12)	2.84±1.73	4 (8)	2.96±1.47	0.70
1-2	15 (30)		15 (30)		
3-4	22 (44)		26 (52)		
5-6	7 (14)		5 (10)		
Sleep duration (component 3)					
>7 h	18 (36)	6.22±1.12	22 (45.8)	6.54±1.70	0.27
6-7 h	14 (28)		15 (31.2)		
5-6 h	16 (32)		8 (16.7)		
<5 h	2 (4)		3 (6.2)		
Habitual sleep efficiency (component 4) (%)					
>85	5 (10.9)	72.75±12.22	10 (21.3)	74.55±12.54	0.46
75-84	14 (30.4)		17 (36.2)		
65-74	13 (28.3)		15 (31.9)		
<65	14 (30.4)		5 (10.6)		
Sleep disturbances (component 5)					
0	1 (2)	9.70±4.00	0 (0)	9.5±3.57	0.79
1-9	27 (54)		28 (56)		
10-18	22 (44)		21 (42)		
19-27	0 (0)		1 (2)		
Use of sleeping medication (component 6)					
0	-	0	-	0	-
Daytime dysfunction (component 7)					
0	10 (20)	3.38±2.24	3 (6)	2.92±1.74	0.25
1-2	8 (16)		16 (32)		
3-4	16 (32)		22 (44)		
5-6	16 (32)		9 (18)		
Sleep quality					
5-21	50 (100)	8.58±2.65	50 (100)	8.66±2.99	0.88

*The *P* values were tested using the *t*-test and Chi-square test. SD: Standard deviation

Table 3: Comparison of sleep quality before and 1 and 2 months after intervention in pregnant women

Sleep quality	Mean±SD		*P* value*
	Case	Control	
Before intervention	8.76±2.33	8.38±2.37	0.461
One month after intervention	7.30±3.33	7.80±2.89	0.009
Two months after intervention	6.88±3.06	8.21±2.85	0.034

*The *P* values were tested using the repeated measure test

indirectly result in worsening of QOL (similar to chronic heart failure CHF and clinical depression) by disturbing physical, mental, and psychological health. Therefore, changing these high-risk behaviors is more crucial than modification of sleep-related problems in the general population. In other words, sleep-related problems due to unhealthy behaviors even worsen chronic diseases by disturbing all dimensions of QOL and their effect on patients' mental status function.[28,29] The findings of the present study, with emphasis on the importance of sleep quality in improvement of QOL in pregnant women in the second and third trimesters, confirmed the results of previous studies. The pregnant women had low quality of

Table 4: Quality of life scores before and 1 and 2 months after intervention in pregnant women

Domains of quality of life	Score	Groups	Before intervention		One month after intervention		Two months after intervention	
			Mean±SD	*P* value*	Mean±SD	*P* value*	Mean±SD	*P* value*
Physical health (domain 1)	1-35	Case	26.50±2.88	0.056	25.76±3.94	0.000	24.96±4.84	0.001
		Control	23.48±4.38		23.64±3.95		21.64±4.37	
Psychological health (domain 2)	1-30	Case	21.34±2.97	0.058	21.84±3.39	0.000	21.34±3.82	0.023
		Control	19.96±2.59		20.7±2.86		20.44±3.45	
Social relationships (domain 3)	1-15	Case	11.42±1.66	0.33	11.62±2.00	0.000	12±2.26	0.916
		Control	11.00±2.57		11.32±1.80		12.96±14.42	
Environmental quality of life (domain 4)	1-40	Case	28.96±3.5	0.06	29.84±4.33	0.004	29.54±4.64	0.007
		Control	26.26±3.91		27.28±4.22		27±4.57	
Total quality of life	1-130	Case	93.94±11.67	0.15	96.42±13.15	0.000	95.78±13.28	0.001
		Control	90.64±11.51		87.82±9.91		87.56±12.65	

*The *P* values were tested using the repeated measure test

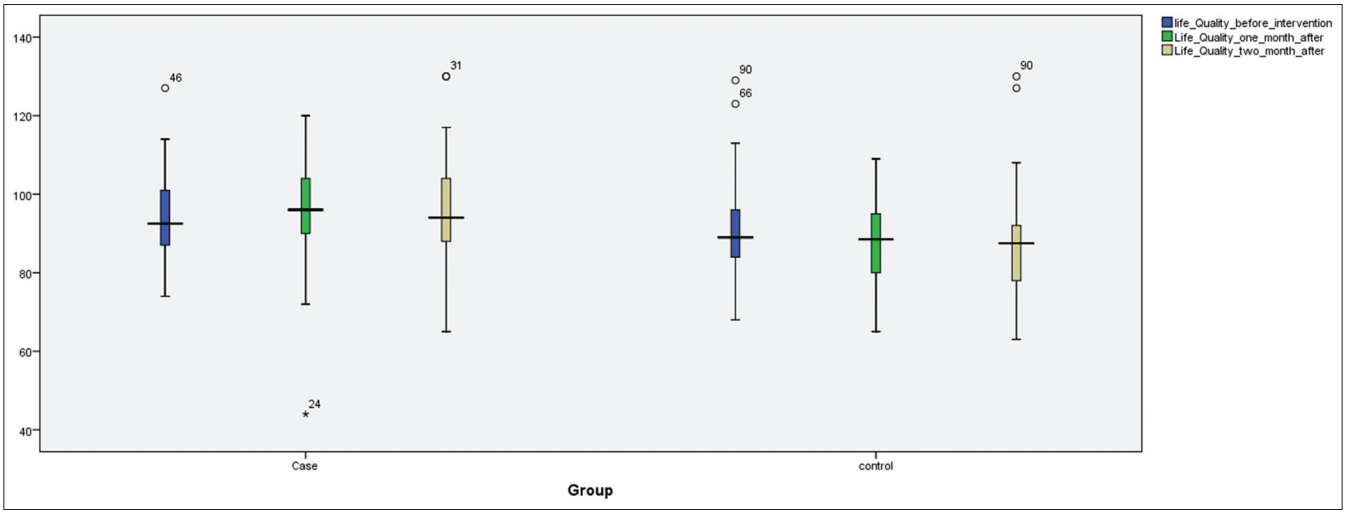

Figure 1: Quality of life scores before, 1 and 2 months afther intervention in pregnant women

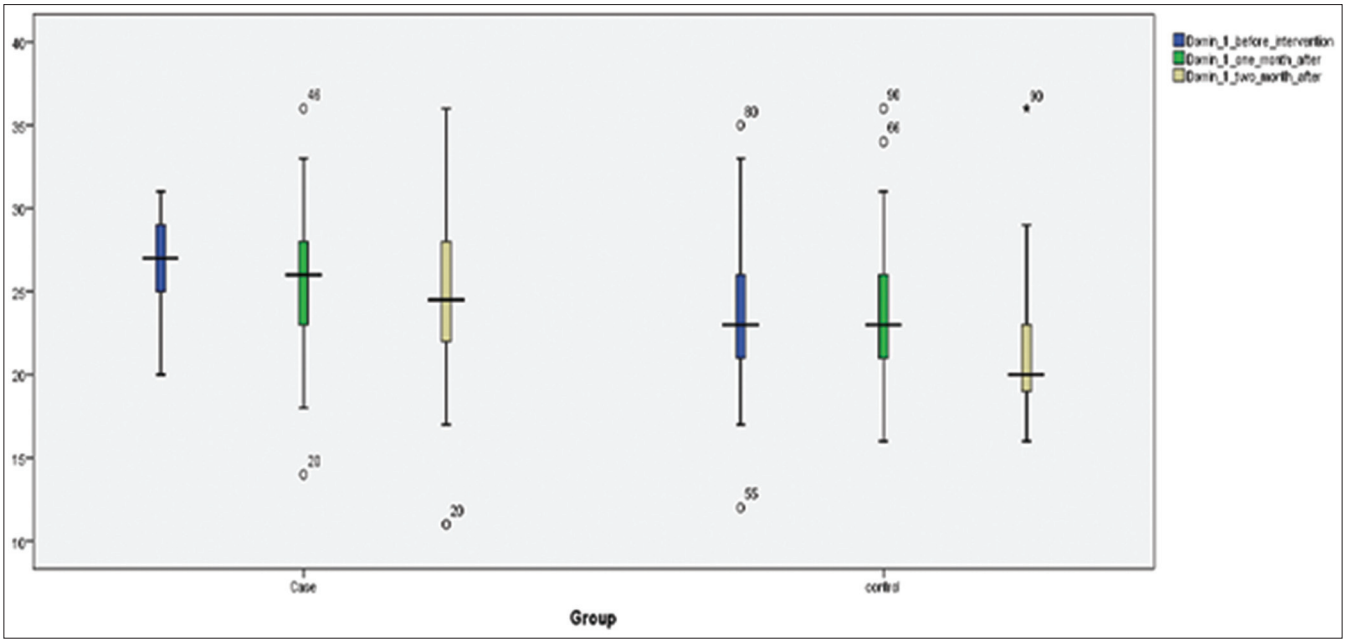

Figure 2: (Domain 1) Physical health scores before, 1 and 2 months afther intervention in pregnant women

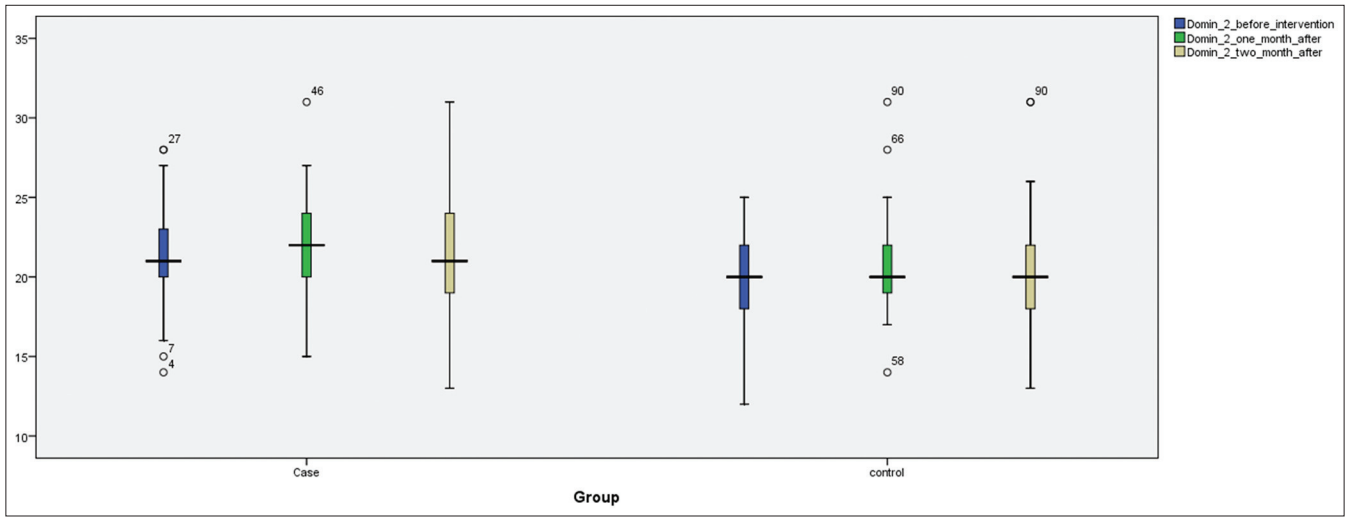

Figure 3: (Domain 2) Psychological health scores before, 1 and 2 months afther intervention in pregnant women

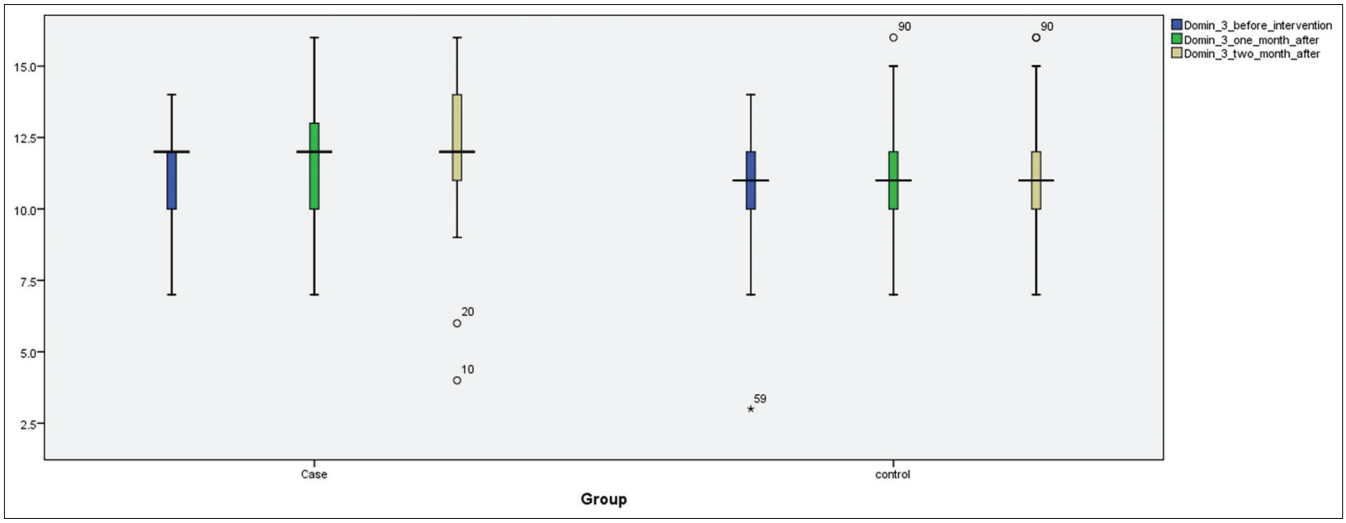

Figure 4: (Domain 3) Social relationships scores before, 1 and 2 months afther intervention in pregnant women

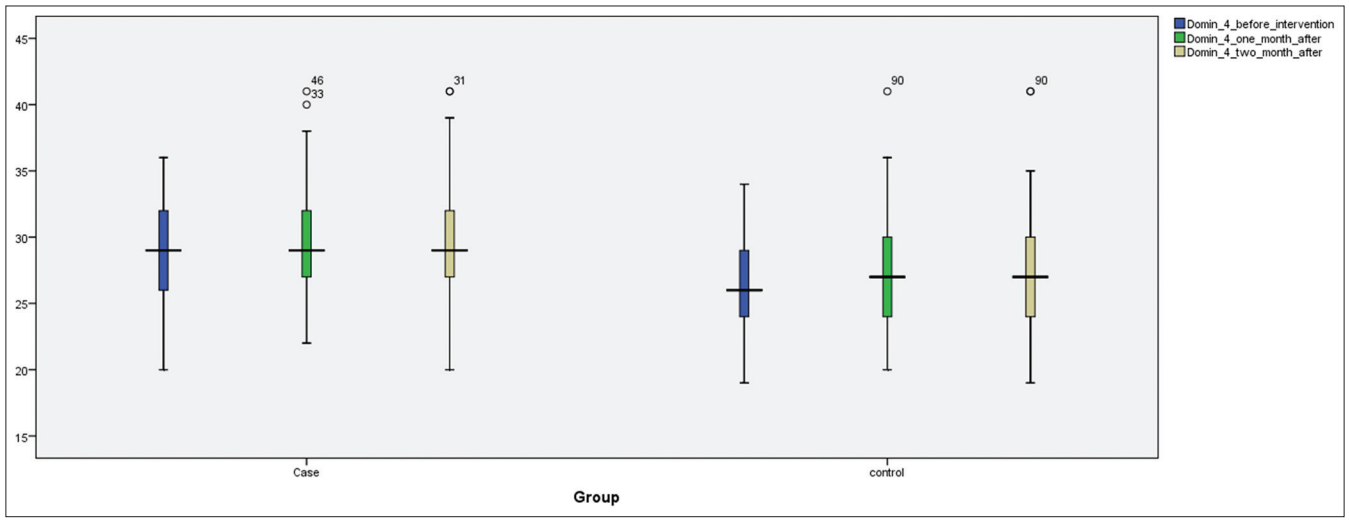

Figure 5: (Domain 4) Environmental Quality of life scores before, 1 and 2 months afther intervention in pregnant women

sleep and QOL at the beginning of the study, but education of sleep health behaviors improved QOL in its physical, social, mental and psychological, and environmental domains in pregnant women with sleep disorder through improvement of their sleep quality. Debhura *et al.*[20] showed reduction in physical and social functions and limitation of women in doing their duties due to the physical problems that women with sleep problems have. Ekaterina[10] also showed that discomfort, physical signs, and low-quality sleep or sleep problem had potential effect on QOL and signs of depression toward the end of pregnancy, which is consistent with the present study reporting the improvement of physical, social, mental and psychological, environmental domains, and QOL through promotion of sleep quality as a result of sleep healthy behavior education in pregnancy. Tara and Daniel[30] showed that inadequate sleep in 14 days of a month was associated with general, physical and mental health, individuals' daily activities level, day time depression signs, suffering, pain, desire to smoke and drink alcohol, lack of physical activities, and obesity, which is consistent with the present study results that suggest strategies to modify physical, mental and psychological problems, and to provide an environment effective on QOL and its dimensions in pregnancy. Bendad and Abedian[15] showed that the causes of sleep disorders in pregnant women included physical problems (nausea, vomiting, heart burn, low back pain, urinary frequency, fetal movements, leg cramps, abdominal edema, heat intolerance, headache, itching, short breath, load of negative thoughts, unplanned pregnancy, and fear) and environmental problems (noise at home, phone caller, sleep partner, environmental noise, lack of adequate darkness, inappropriate temperature and bed, and insects), which are consistent with the present study reporting the positive effect of modification of physical, psychological, and environmental problems on sleep quality in pregnancy. Sleep disorders are among the common complaints of pregnant women and are less noticed as they are considered as a normal issue in pregnancy while they can result in numerous problems in pregnancy, delivery, and postpartum period.

With regard to the importance of preservation of pregnant women's physical, psychological, social, and environmental health, it is suggested to include education of sleep healthy behaviors in conventional prenatal care as a routine disciplinary care plan as well as an appropriate counseling in this period to prevent sleep disorders in an effort to improve maternal health and for fulfillment of the slogan "a healthy child from a healthy mother". This study, like other studies, faced limitations including little effect of respondents' psychological characteristics on their answers to the questions asked by the researcher, which were out of researchers' control.

Conclusion

A large number of pregnant women suffer from sleep disorders in the pregnancy period, and based on our obtained results, education of sleep healthy behaviors improves QOL and physical, psychological, social, and environmental health in this period. It is suggested to include application of healthy behaviors educational methods in the list of midwifery educational textbooks. It is also suggested to include routine application of healthy behaviors education in countrywide continuing education for all midwives, which they should consider in their maternal care, patients' delivery, and postpartum period, as well as in health care system of Iran, hopefully, to bring about new ideas in this context.

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