

Evidence Based Care Journal

<http://ebcj.mums.ac.ir/>

Comparing the Effects of Training Based on Continuous Care Model and Telehealth on Quality of Sleep in Pregnant Women

Fatemeh Jalal Marvi, Masoumeh Kordi, Fariborz rezaei Talab, Seyed Reza Mazlom

The online version of this article can be found at
http://ebcj.mums.ac.ir/article_11591.html

Evidence Based Care Journal 2019 08:35 originally published
online 01 January 2019

DOI: 10.22038/ebcj.2018.31717.1791

Online ISSN: 2008-370X

Address: Mashhad Nursing and Midwifery School, Ebn-e-Sina St., Mashhad, Iran

P.O.Box: 9137913199

Tel.: (098 51) 38591511-294

Fax: (098 51) 38539775

Email: EBCJ@mums.ac.ir



Comparing the Effects of Training Based on Continuous Care Model and Telehealth on Quality of Sleep in Pregnant Women

Fatemeh Jalal Marvi¹, Masoumeh Kordi^{2*}, Fariborz Rezaei Talab³, Seyed Reza Mazlom⁴

Received: 08/05/2018

Accepted: 26/09/2018

Evidence Based Care Journal, 8 (4): 35-44

Abstract

Background: Quality of sleep disorder is a common problem during pregnancy. Training based on continuous care model and telehealth has improved the quality of health care and may also ameliorate quality of sleep.

Aim: The present study was conducted to compare the effects of training on the quality of sleep in pregnant women on the basis of continuous care model and telehealth.

Method: This three-group clinical trial was performed in 2017 on 91 pregnant women visiting health centers in Mashhad, Iran. Orientation, sensitization, control and evaluation were carried out in the continuous care group, and four DVDs were watched by mothers in the telehealth group over the course of four weeks along with eight weeks of follow-up, and the routine care of health centers was administered for the control group. The Pittsburgh Sleep Quality Index (PSQI) questionnaire was completed at the end of weeks 8 and 12 after the start of the study. Data were analyzed in SPSS version 24 using Kruskal-Wallis statistical test.

Results: The three groups were homogeneous in terms of demographic variables ($P < 0.05$). The Kruskal-Wallis test results showed that the mean quality of sleep score before the intervention was homogeneous among the three groups ($P = 0.42$), but it was significantly different ($P < 0.001$) immediately after the intervention in the three groups of continuous care (4.4 ± 1.7), telehealth (4.4 ± 1.4), and control (9.0 ± 3.7), and there was a significant difference four weeks post-intervention in the three groups of continuous care (3.5 ± 2.1), telehealth (5.3 ± 1.8), and control (10.7 ± 3.1) ($P < 0.001$).

Implications for Practice: Training based on the continuous care model and telehealth can improve the quality of sleep in pregnant women. Considering that telehealth is a simpler and easier method, it can be used to boost the quality of sleep in pregnant women.

Keywords: Continuous care model, Pregnant women, Quality of sleep, Store and forward, Telehealth, Training

1. M.Sc. Student of Consultation on Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran
2. Assistant Professor, Nursing and Midwifery Care Research Center, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran
3. Assistant Professor, Department of Neurology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
4. Instructor, Nursing and Midwifery Care Research Center, Department of Medical Surgical Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

* Corresponding author, Email: Kordim@mums.ac.ir

Introduction

Reduced quality of sleep is one of the most common problems during pregnancy, with 75% of pregnant women complaining of sleep disorders (1). In Iran, the prevalence of this disorder in pregnant women has been reported to be 88% (2). Based on the results of a review study, the prevalence of sleep disorders was 14% in the first trimester, 20% in the second trimester, and 66-97% in the third trimester (3, 4). The prenatal quality of sleep disorder is associated with some complications including daily dysfunction, fatigue, increased risk of preeclampsia, impaired glucose tolerance, high frequency of cesarean section, postpartum depression, decreased quality of life, intrauterine growth restriction and preterm birth (5-9).

Pharmacological and non-pharmacological therapies are employed to promote the quality of sleep. Due to the potential risks of drugs on the fetus, non-pharmacological methods such as acupressure, auricular therapy, cognitive behavioral therapy (CBT) and training are considered as alternatives to ameliorate the quality of sleep during pregnancy (10-12).

One of the methods that may affect the quality of sleep is training of individuals based on established theories and models (10), among which the continuous care model has been developed by Ahamadi (2001) for patients with chronic coronary artery disease, which consists of four interconnected stages of orientation, sensitization, control and evaluation (13-15). In this model, the client is introduced as a factor of continuous care and influential in their health process. This continuous care is a systematic process for effective and consistent interaction between the client and the factor of continuous care (midwife) as a health care provider (10, 16). Hojat et al. (2015) examined the effect of continuous care model on the quality of sleep and dialysis adequacy in hemodialysis patients and demonstrated that the implementation of this model improved the quality of sleep in dialysis patients, but it did not affect their dialysis adequacy (17). Golafruz et al. (2012) also determined the effect of using continuous care model on the quality of sleep in patients with type 2 diabetes and reported the positive effect of continuous care model on the quality of sleep in these patients (10).

Another way to treat insomnia is to use telehealth (18). Telehealth involves provision of healthcare services via the use of electronic information and telecommunication technologies by voice, data and video across a vast geographical range. In this technique, healthcare workers apply cameras, equipment, video conferencing, telephones and videos to communicate with the authorities or the patient for purposes such as planning, intervention, assessment of the results of nursing care and midwifery or counseling and healthcare training (19, 20). In the telehealth method, one can communicate with the client through live video, real time, store and forward, and healthcare and home monitoring. In the store and forward method, the main subject can be presented to the client in the form of video, audio or electronic text, and the client can use it at home, and the communication between the specialist and the client is in a disconnected mode. This method does not require simultaneous presence of the two sides (21) and has been designed for tele-care to reduce healthcare costs (18). According to Holmqvist et al. (2015), the use of telehealth method improves insomnia in adults (18). Lichstein et al. (2013) examined the impact of telehealth with cognitive-behavioral therapy on insomnia and showed the positive effect of the telehealth method on insomnia in the elderly (22).

Frequent referrals to healthcare providers is difficult for pregnant women, and the telehealth method is one of the ways for women to communicate with healthcare providers at and outside of face-to-face care. The use of telehealth can lead to regular follow-up, adherence to determined exercises, increased satisfaction for pregnant women, quick access of women to better services, access to the most appropriate professional skills and reduced financial pressure (23). This technology helps to provide much-needed care interventions in the short term, and the care shifts from a hospital-centered to community-centered modes and from care-centered to client-centered status (24). Jenkins stated in his book that evidence-based studies for telehealth and its comparison with traditional methods require further examination (25).

According to former studies, the continuous care model and telehealth are ways to improve the quality of healthcare. In this regard, pregnant women who are chronically suffering (more than 6 months) from reduced quality of sleep are definitely in need of continuous care and attention to their problem (26). The continuous care model requires the presence of clients with one of their family members, but the telehealth approach makes it possible for people to have a virtual presence instead of having a physical presence (25). It is unclear whether or not this absenteeism can affect the quality and impact

of the data transmitted. No studies have been reported to compare continuous care model and telehealth with regards to the quality of sleep among pregnant women. Although both interventions can improve the quality of sleep in pregnant women, the telehealth approach seems to be more cost-effective considering easier implementation and lower costs. Therefore, the purpose of this study was to compare training based on the continuous care model and telehealth on the quality of sleep in pregnant women visiting health centers of Mashhad, Iran, in 2017.

Methods

The current three-group clinical trial was conducted in 2017 on 91 pregnant women with gestational age between 16 and 20 weeks, who visited health centers in Mashhad. The participants were selected using the multi-stage sampling method.

At first, out of the five centers of Mashhad, the Health Center No. 3 was selected through the convenience manner. The center included three accessible centers that were selected in terms of number of clients and social structure similar to each other with perfect setting for holding training sessions. In order to reduce communication and prevent the interaction of people in the three groups, a separate center was assigned to each group with random allocation by drawing method (the first sheet for the control group, the second for the continuous care group and the third for the telehealth group). Finally, sampling was performed from clients in each center using the convenience method.

The formula for comparing the means in two independent groups was used to determine the sample size in the group of training based on continuous care model, and according to Golafruz et al. in 2014 (10). In accordance with the mean scores of Pittsburgh Sleep Quality Index (6.8 ± 3.2 in the intervention group and 8.8 ± 3.8 in the control group) with 95% confidence interval and 80% test power, the sample size was calculated to be 24 persons in each group. Due to the fact that a similar study was not found for the telehealth group, the final sample size was determined by using a pilot study that was 22, but a larger number (24 people) was considered in each group. To provide the possibility of analyzing and discussing subgroups, the sample size was considered to be at least 30 in each group and with a probability of 5% drop-out, 95 subjects (32 in the continuous care group, 31 in the telehealth group and 32 in the control group) were enrolled. The sampling continued until the desired sample size was achieved, and follow-up was performed from July 2017 to January 2018. The inclusion criteria were Iranian nationality, residence in Mashhad, Persian language, maternal age of 18 to 35 years old, at least primary school education, gestational age of 16-20 weeks, singleton pregnancy, low-risk pregnancy, score of 5 or over from Pittsburgh Sleep Quality Index (PSQI), no history of or current physical and mental illnesses, non-use of hypnotic drugs and sedatives, lack of substance abuse or drug addiction, failure to deal with disasters and stressful events during three months before the study and no body mass index (BMI) greater than 30.

The exclusion criteria were reluctance to continue cooperation, the incidence of midwifery problems during the study, participation in other classes or sleep training programs, the use of hypnotic and sedative medications, childbirth during the research, the occurrence of stressful events and travelling or change of location during the study.

The data collection tools were a demographic and midwifery profile (containing 32 questions) and PSQI questionnaire. This questionnaire consisted of nine questions in seven domains (i.e., sleep quality, sleep latency, sleep duration, sleep adequacy, sleep disorders, hypnotic drugs and daily dysfunction) and measures the quality of sleep during the four previous weeks; the total seven-dimensional scores represent the overall score of the quality of sleep in the person. Scoring each dimension is based on a score range of 0 to 3, with a score of 3 indicating the maximum score on the Likert scale. The minimum and maximum scores obtained from this questionnaire are 0 and 21, respectively, with a score of 5 or more indicative of undesirable quality of sleep (27). The validity of this questionnaire was confirmed by Hossein Abadi et al. (2008) and Farrahi et al. (2009) (28, 29). In the study of Ahmadi Nejad et al. (2014), the reliability of the Persian version of this questionnaire was established with a Cronbach's alpha coefficient of 0.77 (2). At baseline, the reliability of this questionnaire was assessed and confirmed on 10 people by internal consistency method with Cronbach's alpha coefficient of 0.75.

In this study, three groups of control, continuous care model and telehealth were randomly assigned to one of the centers. The participants entered the corresponding group according to referral to each center (convenience sampling). After providing an explanation on the research methodology, the

mentioned research tools were completed in the training classes.

In the continuous care model group, a 30- to 45-minute session was held individually for orientation (i.e., model orientation, brief description of sleep during pregnancy, expression of expectations from the research unit and contact number exchange) in the training classes at the center for the research unit and one of the family members. Then, four individual 60- to 90-minute training sessions were held in the form of lecture, discussion and questionnaire response for sensitization within four weeks. The content of sessions included healthy sleep training, different sleep disorders, and physiological changes in pregnancy and adverse effects of poor sleep in pregnancy, the principles of sleep health and the best sleep conditions in pregnancy. Family sensitization was performed to encourage and follow-up the research units by a training booklet and phone calls. In order to investigate new problems in the control phase, maintain a relationship with the mother and answer questions and evaluate them, checklists (to review the implementation of the training recommendations given) were made during three weeks and a weekly 10-minute phone call or a face-to-face visit was made if necessary. The evaluation phase consisted of institutionalization and continuity of findings, the control of given trainings, tracking and modifying problems and evaluating the methodology immediately after the control phase during an in-person meeting at the end of the 8th week of the intervention. However, evaluation was ongoing at all the stages of the model (Table 1).

In the telehealth group, the store and forward of telehealth method was used; first, as in the continuous care group, at the respective health centers, a 30 to 45-minute training session was held for orientation, with the exception that there was no need for one of the family members. Then, four encoded DVDs with different contents (contents of each DVD were equal to the contents of the sessions in the continuous care model group) were given to them. It should be noted that the training DVDs were prepared by the researcher and with the assistance of the virtual training unit of the university and approved by a specialized research consultant. Next, the mothers were advised to

Table 1. The implementation method of continuous care model

Model phases	Periods	Sessions	Training contents	Training methods
Orientation	First week (16-20 weeks)		Completing informed consent form, Pittsburgh sleep quality index questionnaire and demographic information, midwifery and sleep form, orientation with the model stages and continuing communication	Lectures, questions and answers
	second week (17-21 weeks)	First	Training healthy sleep and types of sleep disorders, observing the instructions given, and phone contact with family through the training booklet	
Sensitization	Third week (18-22 weeks)	Second	Training physiological changes of maternal body during pregnancy and sleep disorders during pregnancy, communication with family through telephone and training booklet	Lecture with slide show, discussion, questions and answers
	Forth week (19-23 weeks)	Third	Discussing poor sleep complications during pregnancy and principles of sleep health, communication with family through telephone and training booklet	
	Fifth week (20-24 weeks)	Forth	Training necessity to observe the principles of sleep health, pregnancy problems associated with sleep and best sleep conditions during pregnancy, communication with family through telephone and training booklet	
Control	6th to 8th weeks (21-27)	Phone control for 10 minutes	Once a week and review the checklist	
Evaluation	End of week 8	A meeting in person	Institutionalizing and sustaining findings, controlling given training, following up and modifying problems, and evaluating work methods	

watch a DVD every week in order of numbered codes. During these four weeks and four weeks after that (8 weeks), phone counseling was performed for 10-15 minutes based on the client's need (once a week). Follow up and modification of the problems and assessment of the methodology were completed during a 60-minute meeting at the end of the 8th week and the intervention ended.

The routine healthcare of the centers was administered in the control group. Finally, the quality of sleep was evaluated immediately after the intervention and four weeks after it in all the groups in person (Table 2).

Two of the subjects from continuous care group (1 due to delivery during the study and 1 due to reluctance to continue cooperation), 1 out of the telehealth group due to travel, and 1 out of the control group due to midwifery problems were excluded from the study. Finally, data analysis was performed on 91 people (30 in the continuous care and telehealth groups and 31 in the control group). This research was approved by the Ethics Committee of Mashhad University of Medical Sciences. Prior to the study, a complete description of the research objectives was provided to all the participants, followed by obtaining written consent. The participants were assured of the non-occurrence of any side effects and that they would be allowed to withdraw from the study at each stage of the research, and that this would not make any changes to the routine healthcare provided. Data were analyzed by SPSS version 24 using descriptive statistics and statistical tests of Shapiro-Wilk, Kolmogorov-Smirnov, Kruskal-Wallis, Chi-square, Chi-square exact, one-way ANOVA, Mann-Whitney and Friedman. P value less than 0.05 was considered significant.

Table 2. The implementation method of telehealth-based training

Model phases	Periods	Sessions	Training contents	Phone call content	Training methods
First	First week (16-20 weeks)		Completing informed consent form, Pittsburgh sleep quality index questionnaire and demographic information, midwifery and sleep form, orientation with the model stages and continuing communication		Lectures, questions and answers
		End of first week (16-20 weeks)	DVD1	Training healthy sleep and types of sleep disorders and observing the instructions given	
Second	Second week (17-21 weeks)	DVD2	Training physiological changes of maternal body during pregnancy and sleep disorders during pregnancy	First part about counseling based on the content of training DVDs, and the second part about the specific needs of each client and the provision of suggested solutions	Watching training videos and using the training booklet
	Third week (18-22 weeks)	DVD3	Discussing poor sleep complications during pregnancy and principles of sleep health		
	Fourth week (19-23 weeks)	DVD4	Training necessity to observe the principles of sleep health, pregnancy problems associated with sleep and best sleep conditions during pregnancy		
Third	5th to 5th weeks (20-27 weeks)	5th to 8th phone calls for 10 to 15 minutes		First part about counseling based on the content of training DVDs, and second part about the specific needs of each client and the provision of suggested solutions	
Forth	End of week 8	A meeting in person	Following up and modifying problems, and evaluating work methods		

Results

The results of one-way ANOVA showed no significant difference in the mean maternal age between the three groups of continuous care (27.1±4.6 years), telehealth (26.9±4.5 years) and control (27.7±4.5 years). Also, there no significant different in the mean gestational age between the three groups of continuous care (17.7±1.1 weeks), telehealth (17.8±1.1 weeks) and control (17.8±1.4 years); thus, the three groups were homogeneous in terms of age (P=0.75) and gestational age (P=0.95). The results of Chi-square and Chi-square exact tests reflected homogeneity between the three groups in terms of the frequency of pregnancies (P=0.71), number of parities (P=0.29), maternal education (P=0.95), occupational status (P=0.69), monthly income level (P=0.58) and pregnancy status (P=0.82) (Table 3).

The Kruskal-Wallis test results revealed that the mean quality of sleep score before the intervention was homogeneous in the three groups (P=0.42), but it was significantly different (P<0.001) immediately after intervention in the three groups of continuous care (4.4±1.7), telehealth (4.4±1.4) and control (9.0±3.7). The results of Duncan's post hoc test showed that this difference was not significant in the case of continuous care with control (P<0.001) and telehealth with control (P<0.001) as well as continuous care with control (P=0.64). In addition, the results of Kruskal-Wallis test presented a significant difference four weeks post-intervention between the three groups of continuous care model (5.3±2.1), telehealth (5.3±1.8) and control (10.7±3.1) (P<0.001). Duncan's post hoc test revealed that this difference was not significant in the case of continuous care group with control (P<0.001) and telehealth with control (P<0.001) as well as the continuous care with telehealth (P=0.66) (Table 4).

According to Friedman test results regarding the intragroup comparisons of the continuous care group, the mean total scores of sleep quality in pregnant women were significantly different immediately post-intervention and four weeks after the intervention compared to baseline (P<0.001), such that the quality of sleep had declined immediately after the intervention (P<0.001) and four weeks post-intervention, compared to baseline (P<0.001; Table 4).

According to Friedman test results regarding the intragroup comparison of the telehealth group, the

Table 3. Frequency distribution of demographic characteristics of research units in different groups

Variables	Groups	Continuous care n=30	Telehealth n=30	Control n=30	Test results
Age	Mean ± standard deviation	27.1±4.6	26.9±4.2	27.7±4.5	*P=0.95
Gestational age	Mean ± standard deviation	17.7±1.1	17.8±1.1	17.8±1.4	**P=0.71
Gravidity (percentage)	1	12 (40.0)	13 (43.3)	9 (29.0)	**P=0.29
	2	11 (36.7)	10 (33.3)	15 (48.8)	
	≥3	7 (23.3)	7 (50.0)	7 (22.6)	
Parity (percentage)	0	15 (50.0)	15 (30.0)	10 (32.3)	***P=0.95
	1	8 (26.7)	9 (20.0)	16 (51.6)	
	≥2	7 (23.3)	6 (6.7)	5 (16.1)	
Maternal education number (percentage)	Primary school	3 (10.0)	2 (6.7)	3 (9.7)	***P=0.95
	Secondary school	2 (6.7)	3 (10.0)	2 (6.5)	
	Below high school	5 (16.7)	6 (20.0)	3 (9.7)	
	High school	9 (30.0)	9 (30.0)	13 (41.9)	
Occupational status number (percentage)	Academic	11 (36.7)	10 (33.3)	10 (32.3)	***P=0.69
	Housekeeper	20 (66.7)	19 (63.3)	24 (77.4)	
	Student	7 (23.3)	7 (23.3)	3 (9.7)	
	Self-employed	1 (3.3)	2 (6.7)	3 (9.7)	
Monthly income level number (percentage)	Employee	2 (6.7)	2 (6.7)	1 (3.2)	**P=0.58
	Less than enough	5 (16.7)	3 (10.0)	6 (19.4)	
	enough	25 (83.3)	27 (90.0)	25 (80.6)	
Pregnancy status number (percentage)	More than enough	0 (0)	0 (0)	0 (0)	**P=0.82
	Wanted	19 (63.3)	17 (56.7)	21 (66.7)	
	Unwanted	6 (20.0)	5 (16.7)	5 (16.1)	
	Unplanned	5 (16.7)	8 (26.7)	5 (16.1)	

* One-way ANOVA, **Chi-square, ***Chi-square exact

Table 4. Mean total score and sleep quality dimensions of pregnant women before the intervention, immediately after the intervention and four weeks post-intervention in the three groups of continuous care, telehealth and control

Variables	Groups	Continuous care Mean±standard deviation	Telehealth Mean±standard deviation	Control Mean±standard deviation	Kruskal-Wallis intergroup test results
Sleep quality mental score	Before the intervention	1.3±0.5	1.2±0.5	1.1±0.5	P=0.45
	Immediately the after intervention	0.8±0.5	0.7±0.4	1.5±0.6	P<0.001
	Four weeks after the intervention	1.0±0.5	0.9±0.2	2.0±0.6	P<0.001
	Friedman intragroup test result	P=0.002	P=0.001	P<0.001	
Duration of sleep latency score	Before the intervention	1.7±0.9	1.6±1.0	1.5±1.0	P=0.72
	Immediately after the intervention	1.0±0.6	0.8±0.7	1.8±1.0	P<0.001
	Four weeks after the intervention	1.2±0.7	1.0±0.7	2.0±0.9	P<0.001
	Friedman intragroup test result	P=0.005	P=0.002	P=0.002	
Sleep duration score	Before the intervention	0.9±0.9	0.8±0.9	0.8±1.1	P=0.02
	Immediately after the intervention	0.5±0.7	0.4±0.6	1.0±1.1	P<0.001
	Four weeks after the intervention	0.5±0.8	0.6±0.7	1.3±1.0	P<0.001
	Friedman intragroup test result	P=0.009	P=0.09	P=0.001	
Sleep adequacy score	Before the intervention	0.6±0.8	1.2±0.8	0.9±1.0	P=0.02
	Immediately after the intervention	0.2±0.6	0.4±0.6	1.1±1.0	P<0.001
	Four weeks after the intervention	0.4±0.8	0.6±0.8	1.4±0.9	P<0.001
	Friedman intragroup test result	P=0.02	P<0.001	P=0.004	
Sleep disorder score	Before the intervention	1.5±0.5	1.5±0.5	1.3±0.4	P=0.24
	Immediately after the intervention	1.0±0.1	1.1±0.4	1.5±0.6	P<0.001
	Four weeks after the intervention	1.1±0.3	1.1±0.3	1.1±0.5	P<0.001
	Friedman intragroup test result	P<0.001	P<0.001	P=0.04	
Sleep dysfunction score	Before the intervention	1.7±0.7	1.6±0.7	1.6±0.9	P=0.72
	Immediately after the intervention	0.7±0.5	0.8±0.4	1.9±0.7	P<0.001
	Four weeks after the intervention	0.8±0.6	0.9±0.4	2.0±0.6	P<0.001
	Friedman intragroup test result	P<0.001	P<0.001	P=0.06	
Total sleep quality score	Before the intervention	7.9±2.4	8.1±2.8	7.5±3.3	P=0.42
	Immediately after the intervention	4.4±1.7	4.4±1.4	9.0±3.7	P<0.001
	Four weeks after the intervention	5.3±2.1	5.3±1.8	10.7±3.1	P<0.001
	Friedman intragroup test result	P<0.001	P<0.001	P<0.001	

mean total scores of sleep quality in pregnant women was significantly different immediately post-intervention and four weeks after the intervention compared to baseline ($P < 0.001$), such that the quality of sleep had decreased immediately after the intervention ($P < 0.001$) and four weeks post-intervention relative to before the intervention ($P < 0.001$; Table 4).

According to the results of Friedman test regarding the intragroup comparisons of the control group, the mean total scores of sleep quality in the pregnant women were significantly different immediately post-intervention and four weeks after the intervention compared to baseline ($P < 0.001$), such that the quality of sleep had increased immediately ($P = 0.002$) and four weeks after the intervention compared to pre-intervention ($P < 0.001$; Table 3).

Discussion

The purpose of this study was to compare the effects of training on the quality of sleep of pregnant women on the basis of the continuous care and telehealth models. The findings indicated that training based on the continuous care and telehealth models improved the quality of sleep in pregnant women. Quality of sleep scores immediately and four weeks after the intervention was significantly different in the two groups of continuous care and telehealth compared to the pre-intervention stage. The results of this study were inconsistent with those of Holmqvist et al. (2014), who aimed to compare web-based and telehealth-based training using cognitive behavioral therapy on insomnia (18). They reported that both methods could be equally effective in treating chronic insomnia.

Sadegh Saba et al. (2006) in a study comparing the two methods of in-person and non-attendance education on increasing the rate of exclusive breastfeeding in pregnant mothers showed that in-person training was more effective than non-attendance training (30). These results were inconsistent with the findings of our study. In that study, pamphlets were provided to training staff in non-attendance training, and materials for the training group was accompanied by training sessions, lectures, videos and slides. The probable cause of the discrepancy in results can lie in the difference in methods use in non-attendance training. They also stated that exclusive breastfeeding had a downward trend from the third month to the sixth month, indicating the role of erosion of time and the impact of inhibitory factors on training, which was in line with the present study.

Additionally, the results of our study exhibited that the quality of sleep was increased with time in the continuous care group, while it decreased in the control group; the results of our study were in line with those of Khosravan et al. (2015) and Golafruz et al. (2014) who reported that the continuous care model improved the quality of sleep in patients with diabetes (10, 31), as well as Sadeghi et al. (2010) and Hojat et al. (2015) who found increased quality of sleep in hemodialysis patients (17, 32).

Achievement of the goals of the continuous care model and the process of continuity of care is of particular importance. There is no doubt that most suitable programs without control and follow-up lose their desired effect over time. Appropriate follow-up, systematic and effective physical presence during the implementation of the model, persistence of continuous care counseling, and contact through phone calls in accordance with care needs are the main prerequisites for achieving the desired outcome in this model, highlighting the reason behind the positive impact of this model in this study.

In our study, the quality of sleep had increased over time in the telehealth group compared to the control group. In the study of Lichstein et al. (2013), telehealth via cognitive-behavioral therapy was effective for insomnia and improved sleep satisfaction, sleep duration, and sleep adequacy and decreased insomnia (22), which is consistent with the results of our study.

The strengths of the present study were that the quality of sleep was measured at three different times and that model-based and telehealth-based training were very similar in terms of number of sessions and contents of the training materials, which makes comparison of the two groups easier and more reliable. Some of the limitations of this study were the impossibility of blinding the study and the long duration of both interventions that increased the likelihood of drop-out, which was controlled using encouraging gifts. Another limitation of this study was that the mothers in the telehealth group were asked to watch the DVDs at least once a week, but we did not address not watching them more than once.

Implications for Practice

Training based on telehealth and continuous care model could improve the quality of sleep in the pregnant women. Therefore, considering that the telehealth approach is easier and simpler, and

pregnant women do not need additional referrals during their pregnancy, this method can be used to improve the quality of sleep in pregnant women.

To select the most effective method for improving the quality of sleep in pregnant women, we recommend further studies comparing the effects of telehealth with the method of real-time video communication and store and forward method on the quality of sleep in pregnant women.

Acknowledgments

The current article has been derived from a dissertation approved by Mashhad University of Medical Sciences (Code: 960019) and registered in Iran Registry of Clinical Trials (IRCT2017060734378N1). The authors would like to thank the Deputy of Research of the university for their financial support, faculty members of the Faculty of Nursing and Midwifery, staff of the health centers of Mashhad and mothers who collaborated with us in this study.

Conflicts of Interest

None-declared.

References

1. Okun ML, Tolge M, Hall M. Low socioeconomic status negatively affects sleep in pregnant women. *J Obstet Gynecol Neonatal Nurs*. 2014;43(2):160-7.
2. Ahmadinejad F, Golmakani N, Asgharipour N, Shakeri MT. Investigation of sleep quality during the third trimester of pregnancy and some related factors in primigravida women referred to health care centers in Mashhad-2014. *Sci J Hamadan Nurs Midwifery Fac*. 2014;22(4):53-60. (Persian)
3. Gabbe SG, Niebyl JR, Simpson JL, Landon MB, Galan HL, Jauniaux ER, et al. *Obstetrics: normal and problem pregnancies*. 7th ed. New York: Elsevier Health Sciences; 2017.
4. Malekzadegan A, Moradkhani M, Ashayeri H, Haghani H. Effect of relaxation on insomnia during third trimester among pregnant women. *Iran J Nurs*. 2010;23(64):52-8. (Persian)
5. Ghaneii R, Rezaee K. The relationship between restless-leg syndrome and sleep quality disorder in pregnant women. *Iran J Obstet Gynecol Infertil*. 2012;15(15):1-7. (Persian)
6. Li G, Kong L, Zhou H, Kang X, Fang Y, Li P. Relationship between prenatal maternal stress and sleep quality in Chinese pregnant women: the mediation effect of resilience. *Sleep Med*. 2016;25:8-12.
7. Okun ML, Schetter CD, Glynn LM. Poor sleep quality is associated with preterm birth. *Sleep*. 2011;34(11):1493-8.
8. Alipour Z, Lamyian M, Hajizadeh E. Sleep quality in late pregnancy and postpartum depression. *Iran J Obstet Gynecol Infertil*. 2012;14(8):39-47. (Persian)
9. Wu M, Li X, Feng B, Wu H, Qiu C, Zhang W. Poor sleep quality of third-trimester pregnancy is a risk factor for postpartum depression. *Med Sci Monit*. 2014;20:2740-5.
10. Golafrooz M, Sadeghi H, Mousavi SQ, Tabraei Y. The effect of using continuous care model on sleep quality in people with type 2 diabetes. *J Sabzevar Univ Med Sci*. 2014;21(4):655-64. (Persian)
11. Zeraati F, Rabie MS, Araghchian M, Sabouri T. Assessment of quality of sleep and use of drugs with sedating properties in adult patients hospitalized in Hamadan Ekbatan hospital. *Sci J Hamadan Univ Med Sci*. 2010;16(4):31-6. (Persian)
12. Morin CM, Hauri PJ, Espie CA, Spielman AJ, Buysse DJ, Bootzin RR. Nonpharmacologic treatment of chronic insomnia. *An American Academy of sleep medicine review*. *Sleep*. 1999;22(8):1134-56.
13. Ahamadi F. Continuous care model designed to control coronary artery disease. [PhD Dissertation]. Tehran: Tarbiat Modares University; 2001.
14. Ahmadi F, Ghofranipour F, Abedi HA, Arefi SH, Faghihzadeh S. The design of continuous care model for the control of coronary artery disease. *Modares J Med Sci*. 2001;4(2):97-103. (Persian)
15. Mohammad A, Maghsoudi S, Behnam Vashani H, Salarhaji A. Comparing the effects of continuous care model and psychological support training package on self-care in patients with bipolar I disorder. *Evid Based Care J*. 2018;8(1):67-75.
16. Daei MM, Zeighami R, Arjeini Z, Alipour Heidari M. The effect of continuous care model on quality of life of patients after coronary angioplasty in Bou Ali Sina hospital. *Evid Based Care J*.

- 2014;4(1):61-70.
17. Hojat M, Karimyar JM, Karami Z. Effect of continuous care model on sleep quality and dialysis adequacy of hemodialysis patients: a clinical trial study. *Med Surg Nurs J*. 2015;4(1):31-8. (Persian)
 18. Holmqvist M, Vincent N, Walsh K. Web-vs telehealth-based delivery of cognitive behavioral therapy for insomnia: a randomized controlled trial. *Sleep Med*. 2014;15(2):187-95.
 19. Mah SS. A case study of telehealth usage in three first nation communities: understanding the role of technology users in health care practice. [PhD Dissertation]. Canada: University of Calgary; 2011.
 20. Enemuoh CJ. Implementation of telehealth for rural patients with congestive heart failure: evaluation of healthcare access and outcome. [PhD Dissertation]. Minnesota: The College of St. Scholastica; 2013.
 21. Nekouzad N, Lashgari M, Nezami Asl A, Khoshvaghti A, Kouchaksaraie M. Telemedicine: essential technology for education and health services at the level of the armed forces of the army of the Islamic republic of Iran. *J Educ Stud*. 2014;2(2):18-25. (Persian)
 22. Lichstein KL, Scogin F, Thomas SJ, DiNapoli EA, Dillon HR, McFadden A. Telehealth cognitive behavior therapy for co-occurring insomnia and depression symptoms in older adults. *J Clin Psychol*. 2013;69(10):1056-65.
 23. Seibert PS, Valerio J, DeHaas C. The concomitant relationship shared by sleep disturbances and type 2 diabetes: developing telemedicine as a viable treatment option. *J Diabetes Sci Technol*. 2013;7(6):1607-15.
 24. Khakbazan Z, Tehrani S, Payghambardoost R, Kazemnejad A. Effect of telephone counseling during post-partum period on women's quality of life. *Hayat*. 2010;15(4):5-12. (Persian)
 25. Jenkins MA. Communicating diagnostic information via telehealth: the patient's perspective. [PhD Dissertation]. Canada: Dalhousie University; 2003.
 26. Jahdi F, Rezaei E, Behboodi MZ, Hagani H. Prevalence of sleep disorders in the pregnant women. *Payesh*. 2011;12(6):629-35. (Persian)
 27. Buysse D, Reynolds CF, Monk TH, Berman S, Kupfer D. The pittsburgh sleep quality index (PSQI): a new instrument for psychiatric research and practice. *Psychiatry Res*. 1989;28:193-213.
 28. Hossein-Abadi R, Tabrizi K, Poor-Esmail Z, Karimloo M, Maddah SS. The effects of pressure massage on geriatrics sleep quality. *Rehabil J*. 2008;9(2):8-14.
 29. Farrahi J, Nakhaee N, Sheibani V, Garrusi B, Amirkaifi A. Psychometric properties of the Persian version of the Pittsburgh Sleep Quality Index addendum for PTSD (PSQI-A). *Sleep Breath*. 2009;13(3):259.
 30. Saba MS, Bazmamoun H, Razavi ZA. Comparison of face to face education with other methods to pregnant mothers in increase exclusive breast feeding. *Sci J Hamadan Univ Med Sci*. 2005;12(3):42-7. (Persian)
 31. Khosravan S, Alami A, Rahni SG. Effects of continuous care model based non-pharmacological intervention on sleep quality in patients with type 2 diabetes mellitus: a randomized controlled clinical trial. *Int J Community Based Nurs Midwifery*. 2015;3(2):96.
 32. Sadeghi HA, Azizzadeh Foruzi M, Haghdoost A, Mohammad Alizade S. Effect of implementing continuous care model on sleep quality of hemodialysis patients. *Iran J Crit Care Nurs*. 2010;3(1):12-8. (Persian)