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# Comparing the impact of educational behavioral interventions on maternal sleep between face-to-face and electronic training groups, during the postpartum period

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## Abstract:

**INTRODUCTION:** The postpartum period is a transition to a critical stage. Moreover, the rapid changes experienced after delivery, expose the mother to unpleasant experiences such as changes in sleep patterns. Trying to an appropriate training method is necessary. This study aims to conduct a comparative study between the impact of face-to-face training and e-training on maternal sleep during the postpartum period.

**MATERIALS AND METHODS:** The present study was empirically conducted on 110 postpartum mothers who visited the selected healthcare centers of Isfahan in 2015. Mothers randomly divided into three groups (face to face, electronic and control). Data collection tools included demographic and fertility questionnaire and Pittsburgh Sleep Quality Index. Intervention groups were received training such as mothers with necessary instructions regarding the health approaches, relaxation techniques, sleeping place, and energy-saving techniques. Mothers' quality of sleep was measured and compared before training (until the 10<sup>th</sup> day after childbirth) then in the second and third cares (from the 10<sup>th</sup> to 30<sup>th</sup> day after childbirth) in all three groups. Data were analyzed using descriptive statistics and ANOVA and analyze variance with repeated measures in SPSS (SPSS Inc., Chicago, IL, USA,) version 17.

**RESULTS:** The results showed there was a significant difference among the sleep quality scores in the three times in the e-training ( $P < 0.001$ ) and face-to-face groups ( $P < 0.001$ ) and in the control group ( $P = 0.01$ ), but the improvement in the sleep quality score has been higher in the two groups; e-training and face-to-face, than in the control group. In addition, the mothers' mean sleep quality score was different between the control group and face-to-face group as well as between the control group and e-training group. While, no statistically significant difference was found between the e-training group and face-to-face group.

**CONCLUSION:** Training through both methods; face-to-face and electronic, had the same impact on maternal sleep quality during the postpartum period. Therefore, despite the belief that in-person trainings are more effective, the findings of this research showed the effectiveness of electronic methods too, and determined that this method, has the same effectiveness as the face-to-face method has.

## Keywords:

Electronic training, face-to-face training, postpartum, sleep quality

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## Introduction

The postpartum period is a transitional phase that has a decisive effect on a

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mother's physical and mental health.<sup>[1]</sup> According to what was said, the postpartum period can affect different aspects of a woman's life including sleep disorders. In fact, disrupted sleep patterns and its

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decreased quality as a result of delivery may persist for several weeks or months, and in case of continuation and intensification, may cause many problems for women and their families.<sup>[2]</sup>

Women, who have recently become a mother, have naturally experienced 20% of increased wakefulness during sleep in the postpartum period.<sup>[3]</sup> The results of a study by Ko and Lee have shown that circadian rhythm sleep disorders in the postpartum period have been reported in more than 95.4% of women in this period.<sup>[4]</sup> Among the most important consequences of poor sleep quality are as follows an increased incidence of postpartum depression,<sup>[5]</sup> discontinuity of breastfeeding, a decreased infant-mother attachment, mood disorders,<sup>[6]</sup> fatigue or boredom, weight gain, irritability, mood disorder, changes in immune system function, mood, and efficiency.<sup>[7]</sup>

Considering the diversity of scientific sources, there are numerous methods that one can become familiar with, to reduce sleep disorders. One of these methods is cognitive behavioral training that includes a range of muscle relaxation training, employing stress management techniques, and sleep hygiene.<sup>[8]</sup> In cognitive behavioral training, one learns how to stop trying to control sleep, and to communicate differently with their thoughts and feelings.<sup>[9]</sup> In fact, the quickest way to achieve public health is preventive medicine and increasing one's knowledge through training.<sup>[10]</sup> So far, various training methods are employed in different fields. In the meantime, the increasing access to appropriate hardware and software for e-training has put a new horizon before training institutes. E-training refers to an educational system where the trainer and learner communicate with each other with the aid of equipment and tools which are put at their disposal.<sup>[11]</sup> Of course, computer-assisted training has its own limitations, for instance, it may not be able to be a substitute for a teacher, emotional and human interactions, and face-to-face communication that occur in the classroom.<sup>[12]</sup> However, one of the disadvantages of face-to-face training is that it is time-consuming. On the other hand, studies have shown that most of the information that people have received verbally during an in-person consultation, either was not understandable or has been forgotten.<sup>[13,14]</sup> A literature review shows that the effectiveness of face-to-face training and e-training has been reported differently in different studies some of which have placed emphasis on the face-to-face method, in some others of which the efficiency of the electronic method has been verified, and yet in some cases of which no statistically significant difference has been reported among the applications of different methods. In this regard, the results of a study by Rajabi *et al.* in relation with investigating the effect of training through multimedia software and

face-to-face training on pregnant mothers' knowledge about prenatal and postnatal danger signs showed that training through both methods had the same impact on improving the pregnant mothers' knowledge about the danger signs.<sup>[15]</sup> In addition, a study by Stremler *et al.* showed that educational interventions in the postpartum period were effective in the improvement of maternal and infant sleep, such that the maternal sleep duration has increased at night, the infant slept longer, and the number of times the infant woke up during the night has become smaller.<sup>[16]</sup>

Using new technologies such as electronic methods, some of the problems in the field of training mothers, such as lack of time, can be overcome. In addition, also use of face-to-face methods has a valuable place, due to their usability for people with low education and understanding levels. In the meantime, the optimal choice of training methods by midwives can be of considerable importance. Therefore, before providing necessary trainings to mothers, a decision has to be made about choosing an appropriate training method. Accordingly, the present research has been designed and conducted with the aim of evaluating and comparing the impact of the two training methods: Face-to-face and electronic on maternal sleep quality during the postpartum period.

## Materials and Methods

The present research is an empirical study of the type of three-group, three-stage, and multivariable clinical trials whose clinical trial code is IRCT2015062722939N1. One hundred and ten mothers during postpartum period who had visited the selected health-care centers of Isfahan from May 22 to September 23, 2015, formed our study samples. Simple sampling has been conducted in all three groups, and samples have been allocated in random assignment technique based on the weekdays. The inclusion criteria for the study included the following: married women with Iranian nationality, mothers who have had a full-term, live, singleton, and healthy birth, mothers who are breastfeeding not experiencing intrapartum and/or postpartum hemorrhage the individuals' maximum postpartum hospitalization must be 3 days, lack of suffering from the underlying disease (asthma, kidney disease, congestive heart failure, etc.) that cause sleep disorders, lack of depression during the study, absence of hazardous conditions during pregnancy and exclusion criteria were unwillingness to continue the cooperation of each research unit during the study, failure to fully and correctly complete the questionnaire in the three periods postpartum depression during the study indication of any new disease, or disorder during the study that have an impact on the mother's and baby's sleeping.

The data collection tool in this study included a two-part questionnaire whose first part was dedicated to the personal characteristics and fertility of the units being studied. Moreover, the second part included the Pittsburgh Sleep Quality Index (PSQI). The PSQI assesses seven components of sleep including changes in subjective sleep quality, sleep latency, actual sleep duration, habitual sleep efficiency, changes in sleep disturbances, daytime dysfunction, and the overall sleep quality index.<sup>[6]</sup>

The PSQI standard questionnaire. The Pittsburgh sleep quality index standard questionnaire consists of 4 single-answer questions with short answers, and a question based on the 4-point Likert scale. In total, a score >5 indicates poor sleep quality, and scores equal to or lower than 5 indicate good sleep quality. First, the Edinburgh questionnaire was completed by the units being studied. Necessary trainings about hygiene approaches, relaxation techniques, creating and developing appropriate expectations relevant to maternal sleep, planning to maximize the opportunities for sleep and rest, eating, sleeping place, wearing appropriate clothing, and energy storage were given to the face-to-face training group, on the 10<sup>th</sup> day after delivery. In addition, in the e-training group, the educational content was put at the disposal of the units being studied, in the form of CDs. In addition, a video-training program was sent through bluetooth and installed in their cell phones. This CD contains the same educational content taught in the face-to-face group. In the control group, without providing any advice, they have only continued to contacting with individuals on the 10<sup>th</sup> day after delivery and the days of second and third postpartum cares, to complete the questionnaires simultaneously with both face-to-face and e-training groups. In the interval between the 10<sup>th</sup> day after delivery and the days of second and third postpartum cares, health SMS messages were sent to individuals in the face-to-face and e-training groups. The validity and reliability of the PSQI questionnaire are verified, and it has been used in domestic and foreign research. The validity and reliability of the Iranian version of this questionnaire were examined and approved by Reza *et al.*<sup>[17]</sup>

Obtained data were analyzed using one-way ANOVA and analysis of variance with repeated measures.

## Results Findings

The results show that the mean age of the units being studied has been 29 years. The mean age of the infants has been 1.5 weeks. The maximum number of pregnancy and delivery has been 2 times. The maximum number of the children of units under study has been 2 children.

The majority of units being studied, have not had any abortion, dead birth, or a history of infertility. The findings of this research showed that all three groups studied were homogeneous in terms of the education level of the mother and her spouse, the occupation of the mother and her spouse, intentional pregnancy, type of delivery, time of delivery, infant gender, the type of mother and infant's bed, and the number of times the mother wakes up during the night [Table 1]. In addition, the results showed that before the intervention, there was no significant difference among the mothers' mean sleep quality scores in the three groups ( $P = 0.3$ ). The repeated measures ANOVA test showed that there was a significant difference among the mean sleep quality scores in the three times, in all three groups; the e-training group ( $P < 0.001$ ), face-to-face group ( $P < 0.001$ ), and the control group ( $P = 0.01$ ); however, the improvement in the sleep quality score has been higher in the e-training and face-to-face groups than in the control group. In addition, the least significant difference *post hoc* test showed that the mothers' mean sleep quality score was different between the control group and face-to-face group as well as between the control group and e-training group; however, it was not different between the e-training group and face-to-face group [Table 2]. Whereas, the one-way ANOVA test showed that the mean change in the maternal sleep quality score in the second time ( $P < 0.001$ ) and third time ( $P < 0.001$ ), was significantly different among the three groups.

## Discussion

The results of the research showed that the effectiveness of the two training programs; face-to-face and electronic, on maternal sleep quality during the postpartum period, were not drastically different. Therefore, despite the belief that in-person trainings are more effective and despite the advantages such as the presence of the trainer and their interaction with mothers, the findings of this research showed the effectiveness of electronic methods too, and determined that this method, despite the lack of a live and active training element, has the same effectiveness as the face-to-face method has. This means that if a training program is implemented by examining the scientific principles and correctly identifying the needs of mothers and their problems, and based on a scientific model, it can be as effective as the face-to-face method is.

The results of a study by Mohammadi *et al.* with the aim of determining the effect of e-training and pamphlets on women's knowledge about postpartum hygiene showed that before the intervention, there was no statistically significant difference between the knowledge scores in the intervention and control groups. Whereas, 2 weeks after the intervention, there

**Table 1: Frequency distribution of some characteristics of postpartum mothers, in three groups**

Details	e-training, n (%)	Face-to-face training, n (%)	Control, n (%)	The result of Chi-square test	
				$\chi^2$	P
Mother's occupation					
Homemaker	29 (84.8)	34 (89.5)	31 (81.6)	6.30	0.17
Employed	5 (15.2)	4 (10.5)	7 (18.4)		
Mother's education level					
Lower than high school diploma	3 (8.8)	6 (15.8)	6 (15.8)	0.96	0.61
High school diploma or higher	31 (91.2)	32 (84.2)	32 (84.2)		
Spouse's occupation					
Employee	11 (32.4)	11 (27)	14 (36.8)	3.11	0.53
Self-employed	23 (67.6)	27 (73)	23 (60.5)		
Spouse's education level					
Lower than high school diploma	8 (23.5)	10 (26.3)	6 (15.8)	1.30	0.52
High school diploma or higher	26 (76.5)	28 (73.5)	32 (84.2)		
Type of pregnancy					
Intentional	27 (81.8)	30 (78.9)	30 (78.9)	0.11	0.94
Unintentional	7 (18.2)	8 (21.1)	8 (21.1)		
Type of delivery					
Vaginal	11 (32.4)	15 (39.5)	14 (36.8)	0.39	0.81
Cesarean	23 (67.6)	23 (60.5)	24 (63.2)		
Time of delivery					
Morning	19 (55.9)	19 (50)	22 (57.9)	1.48	0.82
Evening	10 (29.4)	12 (31.6)	8 (21.1)		
Night	5 (14.7)	7 (18.4)	8 (21.1)		
Infant gender					
Girl	19 (55.9)	23 (60.5)	17 (44.7)	2	0.36
Boy	15 (44.1)	15 (39.5)	21 (55.3)		
Type of mother and infant's bed					
Roommate	32 (94.1)	36 (97.3)	34 (94.4)	0.54	0.76
Separate room	2 (5.9)	2 (2.7)	3 (5.6)		
Number of times the mother wakes up during the night					
Once or twice	9 (26.5)	5 (13.2)	7 (18.4)	1.29	0.52
3-4 times	14 (41.2)	18 (47.4)	18 (47.4)		
>4 times	11 (32.4)	15 (39.5)	13 (34.2)		

was a significant difference between the knowledge scores in the intervention and control groups, such that the knowledge score of mothers was higher in the e-training group ( $P = 0.013$ ).<sup>[18]</sup>

The results of a study by Sohrabi *et al.* with regard to investigating the effect of a computer-based training package and face-to-face training on maternal knowledge about breastfeeding during the postpartum period showed that training through both methods had the same impact on improving the pregnant mothers' knowledge.<sup>[19]</sup> In the present study, maternal and infant fatigue and sleep have been investigated, whereas in Sohrabi's study, breastfeeding training has been investigated. Breastfeeding training is a part of usual cares in health-care centers, and the staff mainly works on these issues, while investigating maternal and infant fatigue and sleep, and strategies to treat them, are not a routine part of these cares. However, to compare the training methods above, it seems that there is still room for research.

The findings of the present research is consistent with the results of a research conducted by Stremler *et al.* which has dealt with investigating the effect of behavioral-educational intervention on the improvement of maternal and infant sleep in the postpartum period, such that the duration of maternal and infant sleep has increased at night, and the number of times they woke up during the night, has decreased. Mothers had 57 min longer, and their infants had 46 min longer nighttime sleep duration in the intervention group than in the control group.<sup>[16]</sup>

The results of a research conducted by Merdasi *et al.* showed that a foot massage had been effective on maternal sleep disorders in the postpartum period, such that the mean Pittsburgh sleep quality in the intervention group, was different in the stages before, immediately after, and 1 week after the massage, and this difference was statistically significant ( $P < 0.001$ ).<sup>[20]</sup>

**Table 2: The mean and standard deviation of maternal sleep quality score in three groups in the first, second, and third postpartum care**

Time	e-training		Face-to-face training		Control		One-way ANOVA test	
	Mean	SD	Mean	SD	Mean	SD	F	P
First care (the 10 <sup>th</sup> day)	14.7	5.4	14.5	4.9	16.2	5.5	1.2	0.3
Second care (until the 30 <sup>th</sup> day)	7.5	3.01	8.4	3.5	14.8	6.06	28.9	<0.001
Third care (until the 60 <sup>th</sup> day)	6.4	3.4	5.1	2.27	12.2	5.9	29.3	<0.001
Repeated measures ANOVA test								
F	36.01		38.71		4.11			
P	<0.001		<0.001		0.01			

**The results obtained from the two-by-two comparison of the groups using the LSD *post hoc* test**

Groups	Second care (P)	Third care (P)
Between control and e-training	<0.001	<0.001
Between control and face-to-face training	<0.001	<0.001
Between e-training and face-to-face training	0.4	0.199

ANOVA=Analysis of variance, LSD=Least significant difference, SD=Standard deviation

A study by Malekzadegan *et al.* showed that relaxation training had had an effect on sleep disorders in the third trimester of pregnancy and had reduced its frequency, such that in 51.1% of cases, pregnant women who suffered from sleep disorders at the beginning of the study, recovered after performing relaxation exercises. The findings also showed that the severity of sleep disorders had decreased in 80.9% of the study samples.<sup>[21]</sup>

In addition, a study by Kempler *et al.* on determining the effectiveness of educational interventions about sleep in pregnancy and investigating it in the postpartum period showed that educational interventions had improved maternal sleep quality in the postpartum period.<sup>[22]</sup>

In line with the results of this research, a study which was conducted by Mirmohammadali *et al.* on investigating the effect of exercise on maternal sleep quality in the postpartum period, significant improvement was observed in maternal sleep quality in the experimental group, during the 8-week follow-up. Although the interaction effect between time and group on sleep quality was significant ( $P = 0.02$ ), later, comparing the mean sleep quality separately in each period between the experimental and control groups, showed that the intended intervention had been effective in improving maternal sleep quality ( $P < 0.001$ ).<sup>[23]</sup>

In another study by Stremmer *et al.*, the behavioral-educational intervention has not been effective on the improvement of maternal and infant sleep and other consequences in the 1<sup>st</sup> month after delivery. In its justification, it can be said that there was a possibility of use of other information sources by women, and thus the possibility of independent use of maternal sleep approaches by the control group, and also the content of sleep intervention may not be effective enough to apply changes in maternal sleep. It

is also possible that some of the recommendations have conflicted with the viewpoints of some parents, and as a result, performing the intervention components has decreased.<sup>[24]</sup>

## Conclusion

The results of this research indicate the identical effectiveness of the e-training and face-to-face training on maternal sleep quality during the postpartum period. Findings of this research showed that the majority of women had poor sleep quality in the postpartum period. To solve this problem, necessary trainings should be given, so that the problems can be reduced to some extent. It can be suggested that mothers reduce their fatigue and drowsiness by taking a nap or short breaks during the day, dividing the hours of the day among their husbands and relatives for attending the infant, and by using relaxation techniques and postpartum exercises. It is worth mentioning that, in the present study, training had a therapeutic role, because the mothers who suffered from sleep disorders, reported an improvement in their sleep quality after training.

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## Conflicts of interest

There are no conflicts of interest.

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