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A Comparative Study between Face-to-Face Training and E-Learning for Mothers, and Their Effects on Infant Sleep

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Abstract

Aim: Babies form the most sensitive and most vulnerable group in every society. Some studies have shown that improving the quality of infant sleep is a way to improve the quality of his/her life.

Methods: The present interventional study was conducted on 110 mothers and babies using random sampling in three groups (face-to-face, e-learning and control). Educational interventions included the researcher's individual meetings with the mothers in the face-to-face training group and giving educational CDs in the e-learning group to improve the quality of infant's sleep. Information was completed in the parents' diary registration forms. ANOVA and analysis of variance with repeated measures were used to analyze the data.

Findings: The mean scores of infant sleep quality in the first care before and after the intervention between the three groups of face-to-face training, e-learning and control were not significantly different. While in the second and third cares, infant sleep in e-learning and face-to-face groups was better than in the control group. Moreover, at certain hours of the day, infants in face-to-face group had better sleeping in comparison with those in the e-learning group, and the difference was significant.

Conclusion: Due to lack of statistically significant difference between the three groups in terms of infant sleep and given that increased sleep can be considered as a normal phenomenon in infants, more studies are needed in this area to achieve accurate results.

Keywords: Electronics education, Face- to -face education, Infant sleep, Iran

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Introduction

Like maternal health, infant health is also of particular importance in the postpartum period. Paying attention to infant sleep is one of the essential issues in this period. Thirty-five percent of parents have problems to calm down their infants during the night. Evidence shows that, if left untreated, infant sleep problems will continue until the end of childhood [1]. Also decreased sleep in infants has a negative effect on their growth [2]. On the other hand, infant sleep conditions affect maternal sleep and cause fatigue in mothers as well [3].

On average, sleep duration in newborns is 16 hours, which is equally divided between night and day, i.e. eight hours occur during the nighttime and eight hours during the daytime. Then the nighttime sleep gradually increases to such an extent that during the first month, the total sleep time reaches 15.5 hours, out of which eight to nine hours occur during the night and seven hours during the daytime. Then this period decreases to 15 hours in the third month, out of which nine to ten hours occur during the night and four to five hours during the daytime [4].

Sleep disorder is common in infants and children; about 25% of children under five years of age experience a type of sleep disorder [5, 6]. The results of a study conducted by Shakiba et al. (2009) showed that 71% of infants had a delayed onset of sleep, and 62% had bad habits for sleeping such as eating milk from the breast or bottle [7].

Considering the diversity of scientific sources, there are numerous methods to reduce sleep disorders in infants. One of these methods is cognitive behavioral training for mothers that includes a range of how to give milk to the infant during the night, controlling the infant's waking up at night, coordinating maternal and infant sleep, and sleep hygiene [8].

There are several methods to teach patients including face-to-face training, lecture instruction, group training, and use of electronic software [9]. In face-to-face (in-person) training, the instructor can provide the opportunity for active learning in real conditions, while presenting desirable patterns proportionate to individual characteristics [10]. This is while, in new educational methods, it is no longer necessary to always offer training inside the training centers in a closed environment, rather it can be available to public on a large scale, with the necessary flexibility, and regardless of a particular time and place [11].

E-learning is the most important application of information technology, which is offered in the form of online learning in a variety of ways such as computer-based learning, web-based learning, and offline learning [12].

The results of a study by Ko (2009) showed that the knowledge score of the e-learning group was significantly higher in the postpartum period than in the control group [13].

In a study conducted by Mokhtari et al. (2014) on nursing mothers, face-to-face training was recognized as the most effective method for increasing the knowledge of nursing mothers [14].

Considering the description of midwives' duties and their role in promoting the health of women and their infants in different cycles of life, paying attention to the postpartum period is of great importance and helps solve the problems of this period. It can be said that providing postpartum training programs promotes maternal confidence through increasing their knowledge and awareness about their infants. Therefore, the knowledge of society and healthcare providers about the influence of educational programs should be enhanced, especially for midwives who are in close contact with mothers.

Many studies have so far been conducted in the field of sleep quality, but less attention has been paid to sleep quality in infants and conducting effective interventions. In this regard, further research is needed to achieve the enhanced maternal and infant sleep health. Also, due to the lack of research in the field of infant sleep disorder in Iran and its impact on the mother and infant, and considering the prevalence of sleep disorder among infants, it seemed necessary to conduct this study.

The researchers have many times been witnessing the problem of sleep disorders among infants during the years that they were observing postpartum mothers in the workplace. This question has always been in their mind that how these mothers can be helped in this regard. Therefore, we decided to investigate the effects of the two educational methods (e-learning and face-to-face training) on the quality of sleep in infants, and inform the relevant officials in order to pave the way for the use of effective educational methods in the society as appropriately as possible.

Materials and Methods

This is a three-group three-stage clinical trial (clinical trial code no. IRCT2015062722939N1). The research environment included a selection of healthcare centers in Isfahan City, Iran.

The study population consisted of mothers and their infants, who presented themselves at the vaccination, maternal and child health, and family planning units of the selected healthcare centers in Isfahan City from the 10th to the 60th day after delivery. Simple sampling was carried out in all the three groups, and replacement of samples was done using the random assignment technique based on the weekdays, such that those who visited

the centers on Saturdays and Tuesdays were assigned to the face-to-face training group, those on Sundays and Wednesdays to the e-learning group, and those on Mondays and Thursdays to the control group. The inclusion criteria for the study were: being of Iranian nationality, having a full-term, live, singleton, and healthy birth, breastfeeding, and that the infant should have not been hospitalized after delivery. The exclusion criteria for the study were: unwillingness of each of the subjects to continue the cooperation during the study, failure to complete the questionnaires (fully and correctly), incidence of any new diseases or disorders during the study, which may affect infant sleep, infectious diseases causing fever, prolonged fevers, and hospitalization of the infant in the hospital. This way, the effects of many confounding factors on the results were controlled.

The data collection tool was a two-part questionnaire, whose first part was dedicated to the personal characteristics and fertility of the subjects, and the second part was dedicated to the parents' recording their memories about the duration and time of their infant's sleep. This tool was in the form of four rulers, each with 6 hours of the day inserted on, with a precision of 5 minutes. The mother was asked to mark the mean values of the infant's behaviors on the ruler based on the duration of each of the conditions.

On the 10^{th} day after delivery, the face-to-face training group was provided with necessary training about health approaches, how to give milk to the infant during the night, how to control infant waking at night, and how to coordinate the maternal and infant sleep. Also the e-learning group was given the educational content in the form of CD. In addition, a video training program was sent via Bluetooth and installed in their cell phones. This CD contained the same educational content taught in the face-to-face training group. In the control group, without providing any advice, the researchers only contacted the subjects on the 10^{th} day after delivery and the days of second and third postpartum cares to complete the questionnaires simultaneously with the face-to-face training and e-learning groups. In the interval between the 10^{th} day after delivery and the days of second and third postpartum cares, health SMS messages were sent to the individuals in the face-to-face and e-learning groups. The parental memory recording form to measure infant sleep quality is a standard international instrument, whose content validity and reliability were assessed and approved in Iran using the test-retest method with a Kappa score of 0.80 by Mir-Mohammad Aliei et al. in 2011 [3].

Statistical and analytical methods (such as the one-way ANOVA test) were used with the aid of SPSS 17 software to analyze the data. P

values less than 0.05 were considered significant. In this study, the type of training (e-learning and face-to-face training) was considered as an independent variable, infant sleep quality as a dependent variable, and the following items as underlying variables: type of delivery, infant gender, time of delivery, the number of times the mother wakes up during the night, the infant's age in weeks, and the amount of infant sleep during the night.

Results

The results showed that in terms of the type of pregnancy, the highest percentages were related to intentional pregnancy (80.1%) and with no history of infertility (94.3%). Most of the deliveries were performed by cesarean section (63.7%), and most of them resulted in girl babies (53.7%). In terms of the time of delivery, the highest percentage of mothers gave birth in the morning (54.6%), and most of them slept next to their infants (95.2%). Regarding the number of times mother wakes up at night, the highest percentage of women stated that they woke up three to four times at night (45.3%). Also the majority of the mothers enjoyed support from their spouse (98.2%) and family (91.9%). Most of the subjects stated that sometimes they were in coordination with their infant's sleep (45.4%), and the mean age of the infants was 1.5 weeks.

The results of the one-way ANOVA test (Table 1) showed no significant difference between the three groups in terms of the mean score of infant sleep quality in the first care. The mean scores of infant sleep quality were not statistically significant after the intervention either. Whereas in the second care (6 am to 12 pm) and third care (12 pm to 6 pm), the infant sleep decreased further in the face-to-face training and e-learning groups compared to the control group (P=0.02) though a higher and significant decrease was seen in the face-to-face group.

The results of the one-way ANOVA test (Table 2) also showed no significant difference between the mean change in the infant sleep quality score after and before the intervention. But regarding the three care times, during the first care time (12 am to 6 am), the infant sleep increased more in the face-to-face group and then in the e-learning group than in the control group. During the second care (6 am to 12 pm) and third care (12 pm to 6 pm), the infant sleep decreased more in the face-to-face group and then in the e-learning group than in the control group, and the difference became significant.

Table 1: Comparing the mean and standard deviation of the infant sleep quality score in the three groups (face-to-face training, e-learning, and control) in the first, second and third postpartum cares

Time		e-learning		Face-to-face training		Control		One-way ANOVA test	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	F	P-value
10th day (before the intervention)	12 am to 6 am	3.66	1.07	3.59	1.28	3.73	1.20	0.12	0.88
	6 am to 12 pm	3.60	0.99	3.64	1.13	3.59	0.87	0.02	0.97
	12 pm to 6 pm	3.69	1.26	3.57	1.06	3.73	0.97	0.2	0.81
	6 pm to 12 am	3.36	1.35	3.76	1.16	3.43	1.15	1.1	0.33
Second care: (after the intervention)	12 am to 6 am	4.69	0.75	4.51	1.03	4.66	1.1	0.37	0.69
	6 am to 12 pm	3.77	0.91	3.49	1.01	4.05	0.7	3.85	0.02
	12 pm to 6 pm	0.36	1.04	3.49	1.02	3.68	0.81	1.03	0.36
	6 pm to 12 am	2.81	1.02	3.29	0.97	3.11	0.79	2.4	0.09
Third care: (after the intervention)	12 am to 6 am	5.13	0.96	5.38	0.55	4.98	0.9	2.3	0.1
	6 am to 12 pm	3.8	0.91	3.57	0.94	3.7	1.03	0.5	0.6
	12 pm to 6 pm	2.88	1.15	2.4	1.06	3.16	1.33	3.97	0.02
	6 pm to 12 am	2.44	1.3	2.44	1.03	2.2	1.14	0.53	0.58

Table 2: Comparing the mean and standard deviation of changes in the infant sleep quality score in the second and third cares relative to those before the intervention in the three groups

Changes in the scores relative to those before the intervention	e-Learning		Face-to-face training		Control		One-way ANOVA test	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	F	P-value
Second care: (12 am to 6 am)	1.02	0.22	0.92	0.23	0.93	0.2	0.06	0.93
Third care: (12 am to 6 am)	1.5	0.2	1.8	0.19	1.25	0.21	0.82	0.04
Second care: (6 am to 12 pm)	0.17	0.23	-0.15	0.24	0.46	0.15	0.91	0.035
Third care: (6 am to 12 pm)	0.19	0.19	-0.07	0.2	0.11	0.18	0.5	0.6
Second care: (12 pm to 6 pm)	-0.33	0.25	-0.08	0.17	-0.05	0.15	0.57	0.56
Third care: (12 pm to 6 pm)	-0.8	0.3	-1.2	0.17	-0.5	0.24	2.89	0.037
Second care: (6 pm to 12 am)	-0.55	0.3	-0.46	0.21	-0.31	0.23	0.22	0.79
Third care: (6 pm to 12 am)	-0.91	0.31	-1.32	0.19	-1.23	0.22	0.71	0.49

Discussion

Since infant sleep disorder is very common during the postpartum period, and affects maternal sleep, thus during this period, the mother should set her own sleep hours according to her infant's to make the best use of sleep. Mothers and their husbands, and family members need to be trained on how to give milk to the infant during the night, how to control the infant waking at night, and how to coordinate maternal and infant sleep in order to make it possible to reduce maternal and infant sleepiness in the postpartum period. In this study, the mothers were taught about their infants' sleep using the two educational methods of face-to-face training and e-learning. As a result, the infants' sleep pattern changed a few times after the intervention compared with that in the control group. These changes occurred in the face-to-face training group, then in the e-learning group, and then in the control group. It can be said that the low impact of the training programs was due to the mothers' forgetfulness about their infants' sleep hours. On the other hand, the training programs improved the infants' sleep during some hours of the day. For instance, it could increase the infants' sleep during the night, and reduce it during the daytime. But, overall, it did not really affect the entire 24-hour sleep.

The results of a study by Stremler et al. showed that the maternal and infant sleep duration increased at night in the intervention group, and the frequency of maternal and infant waking up was lower during the night. The infants had 46 minutes longer nighttime sleep duration in the intervention group than in the control group. In Stremler's study, like in the present study, post-intervention follow-ups were done 4 and 6 weeks after delivery, and its inclusion criteria were similar to those of the present study. It can be said that the effectiveness of Stremler's study (2006) on infant sleep was due to the use of actigraphs to accurately record the infants' sleep and waking hours, whereas, in the present study, due to lack of access to actigraphs, the mothers were questioned about the mean hours of their infants' sleep. It was also possible that the mothers could not exactly remember their infants' sleep hours. On the other hand, changes in infant sleep on different days can affect the mothers' answers. Therefore, the present study failed to have a significant effect on infant sleep [1].

In the study of Stremler, the behavioral-educational intervention was not found to be effective, and no changes occurred in the infant sleep pattern. These results are consistent with those of the present study. To justify this, it can be said that there was a possibility of use of other information sources by the women, and thus the possibility of independent use of infant sleep approaches by

the control group. It is also possible that the content of sleep intervention was not effective enough to be able to improve the infants' sleep status. In addition, it is possible that some of the recommendations were not acceptable for the parents, and thus they were not put in action correctly [15].

To improve infant sleep, other methods such as foot massage have also been mentioned in some other studies. In the studies conducted by Mir-Mohammad Aliei et al. and Roozbehani et al., the mean increase in the infants' sleep duration was greater in the massage groups than in the the non-massage groups ($P < 0.001$), and the nighttime sleep increased further than the 24-hour sleep. In Roozbehani's research, the mothers were questioned about their infants' sleep duration in 24 hours and their nighttime sleep, and the answers were recorded in a checklist. But in the present study, the parental daily memory recording form was used to record the infants' sleep and waking hours, and the circadian sleep was divided into four parts of six hours with a precision of five minutes. Therefore, it seems that the the difference between the results is due to the precision of the method used for the infant sleep. The other reason can be the division of infant sleep hours that has affected infant sleep in some of these divided parts; however, it has not affected the entire 24 hours. Whereas, in Roozbehani's research, sleep was not divided but measured in the entire 24 hours [16].

Also a study by Jody et al. showed that, in the intervention group, a significant improvement was observed in the infant's delayed onset of sleep, and a decrease in the infant's frequency of waking at night ($P < 0.001$) [17].

In a study by Hauck et al. on infant waking at night, 21 mothers reported decreased infant waking at night, 46 reported no changes, and 11 reported increased infant waking at night ($P = 0.018$). The results of Hauck's study confirm the results of the present study [18].

Conclusion

Considering the absence of statistically significant differences between the effects of the training programs on infant sleep, and given that the increasing trend of infant sleep can be considered as a natural process, thus in the end, it is suggested that further studies are needed in order to achieve more credible results regarding the impact of maternal education about infant sleep approaches.

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