



Comparing the effect of education through SMS with face-to-face method on awareness and care in mothers with premature neonates

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General Note



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ABSTRACT

This study aimed to compare the effect of education through smart phone SMS and face-to-face method for mothers on the awareness and care for premature newborns hospitalized in Valiasr hospital in Birjand, Iran. In this quasi-experimental study, 15 mothers of premature neonates hospitalized in NICU ward of Valiasr hospital in Birjand were chosen and then assigned into

intervention and control groups randomly. The required information was collected through mother and neonate demographics questionnaire as well as the questionnaire for measuring mothers' awareness about breast-feeding and premature neonatal care. The intervention group received education in a face-to-face session and then for four weeks through SMS. On the other hand, the control group received only one face-to-face educational session. After three months, we investigated the indices of neonatal development (height, weight, head circumference) and the premature neonate care measurement questionnaire. In order to compare the developmental indices regarding investigation of awareness and manner of care in both groups, independent t-test was used, with $P < 0.05$ considered significant. The neonatal development indices at the beginning of birth and three months later were measured which showed a significant difference in the intervention group. Furthermore, a significant difference was observed the two groups in terms of awareness and manner of care provided by their mothers ($p < 0.05$). Education through SMS to mothers with hospitalized neonates is effective in persistence of care and controlling the natural course of growth of premature neonates. Thus, as cell phone is economical and usable by the most individuals in the society, it can be employed to improve health and for education in follow-up and helping in improvement of health status of premature neonates.

Key words: Smart Phone, premature newborn, SMS Education, Face-to-Face Education

1. INTRODUCTION

The neonates who are born earlier than 37 weeks from the first day of the last menstruation are considered premature (Nasimi et al., 2016). Birth of premature neonates is one of the major causes of death among neonates in developed countries with a prevalence of 5-7% (Reyhani et al., 2014). Annually, 15 million premature neonates are born in the world, accounting for more than 10% of all neonates born worldwide. Out of this number, annually half a million premature neonates are born in the US. In Iran, around 12% of neonates are premature and low weight. In spite of the improvements in midwifery care and technological advances, the statistics have grown over the past two decades (Nasimi et al., 2015).

The birth of premature and low weight neonates is an important cause of mortality in the first year of life. Prematurity can lead to impaired activity of any organ or system of the body (Zahra Ameri et al. 2018). Therefore, premature neonates are at risk of a wide range of physical, psychological, and social problems (Kligeman, 2011). Specifically, they are at risk of developing pulmonary diseases, cerebral palsy, as well as respiratory, auditory, and visual problems, along with risk of mortality. In addition, economically, this condition causes staggering costs for their families and healthcare system (Leksukulchai and Cole, 2011).

In order to fulfill the physical and psychological development of the neonate, mother should provide proper care, which is dependent on the maximum communication between the mother and neonate (Giuliani et al., 2016). In different studies, implementation of pre-discharge education in NICUs has been considered as essential (Purdy et al., 2015). Lack of awareness of the mother in providing effective care for premature neonate affects the course of development, causing different diseases and re-hospitalization of the neonate. The health of premature neonates necessitates awareness of mothers about the way they should provide care. Therefore, the parents of these neonates need different types of education including awareness and information about the health status of the neonate and acquiring skills in providing care for infants (Franck et al., 2017). Understanding and investigating the educational needs of parents of premature neonates especially mother who is the first care provider for the neonate are essential to fulfill the care needs of premature neonates. Furthermore, the natural development of premature neonates is largely dependent on the exchange of emotional interactions between the mother and neonate. Therefore, the way the mother takes care of the neonate should be educated to her (Shimizu and Mori, 2018).

Education is one of the most essential and important ways to change, social progress, and promotion of care behavior (Chen et al., 2016). In the current era, alongside traditional methods of education, electronic methods of education are also growing rapidly. These methods cause saving time and costs and reducing commutes, as well as better and easier learning (Kazemi et al., 2017). Cell phone has extensive uses for education, which can claim a major share in promoting the health and care of patients through SMS for health promotion with the aim of modifying lifestyle (Mohammadi et al., 2017).

Since education the patients should be a continuous process, usage of an SMS service can be helpful and important in improving the communication between patients and nurses (Luanrattana et al., 2010). The educational techniques through SMS service are currently known as one of the essential methods of treating and controlling chronic diseases (Parizad et al., 2014). Based on the mentioned points, the present study was performed with the aim of investigating the effect of SMS education to mothers on the awareness and care provided for preterm neonates in NICU ward in Valiasr hospital, Birjand, 2017.

2. MATERIAL AND METHODS

This semi-experimental study has been performed with the aim of comparing the effect of education through SMS with face-to-face method to mothers on their awareness and provision of care for preterm neonates hospitalized in NICU ward of Valiasr hospital, Birjand, Iran. Thirty mothers of preterm neonates in NICU who qualified for the inclusion criteria were randomly assigned into intervention and control groups, 15 subjects per group (Abdollahimohammad and Firouzkoouhi, 2019). The inclusion criteria for mothers were Iranian citizenship, having the ability of understanding Persian, literacy (both reading and writing), and ability of using cell phones. On the other hand, the exclusion criteria were death of the neonate, existence of congenital physical disorders in the neonate, severe asphyxia, having respiratory diseases requiring ventilation, and high levels of bilirubin in serum which requiring phototherapy.

In this study, for the validity of the questionnaires, content validity method was used. In this regard, after preparing the items of the questionnaire through studying books, papers, articles, and development standards, they were provided for 10 relevant faculty members and specialists, whose corrective comments were considered in the questionnaire. In order to determine the reliability of the awareness questionnaire, test-retest method was used ($r=0.65$). In addition, for the performance questionnaire, Cronbach alpha coefficient internal consistency method was used ($\alpha=0.84$). The questionnaire for measuring the awareness and performance of mothers regarding breast-feeding and taking care of preterm neonates had 21 items with three options (correct, wrong, I do not know). To give scores to the awareness items, correct, incorrect, and I do not know were assigned scores 1 and 0. On the other hand, the questionnaire for measuring the performance of parents regarding taking care of preterm neonates consisted of 21 four-option items (no, sometimes, most of the time, always), where the scoring was considered as 0-3. Eventually, the scores of the two parts (awareness and performance) were generally converted to the percentage.

To perform the study, the ethical approval was achieved from the university research committee. Then, the study population who had inclusion criteria and consent to participate were randomly divided into two groups. They firstly completed the questionnaires and then received face-to-face information on how to care their babies. Besides, the intervention group received a four week follow-up SMS. The education was prepared and presented in the form of SMS based on an educational program (regarding skincare, umbilical cord, bathing, the method of breast-feeding, the adequacy of mother's milk, changing diapers and preventing old wound, skin contact, keeping and controlling the infant's body temperature, embrace care, drug guideline according to the physicians' order). In the intervention group, after one face-to-face educational session, for the follow-up, SMS education was used. Specifically, during one month, every day two SMS were sent to each mother at 8.00 a.m. and 8.00 p.m. and totally 120 SMSs. Furthermore, the method of using the SMS was trained to the mothers, and all of the problems and questions were addressed. The content presented in the SMS was similar to the content presented in the face-to-face education, and the sentences were composed and sent in an attractive, fluent, and regular way. To ensure delivery of messages, the researcher activated the delivery option in their cell phone and by receiving a short message suggesting, "Delivered" by the samples; he was ensured that the messages had been received on time and properly by the samples. Throughout this study, the researcher was available for the samples, and mothers could ask their questions through SMS. Furthermore, the researcher contacted the research units to ensure delivery of messages and application of educations at least once per week. In the control group, again mothers were trained by the researcher in a face-to-face session, while no other intervention was performed. In both groups, before initiating the education, the neonatal growth indices (height, weight, head circumference) of neonates as well as their awareness and performance were measured. Again, three months after completion of SMS and face-to-face education in the intervention and control groups, the neonatal growth indices (height, weight, head circumference) of neonates as well as their awareness and performance were investigated. To achieve the research objectives, the data were analyzed by SPSS 23, where $p<0.05$ was considered significant.

In order to compare the data, in both groups, independent t-test was used to investigate the growth indices (height, weight, head circumference).

This study was approved by the research ethics committee of the Zabol University of Medical Sciences, Zabol, Iran (ethical code: IR.ZBMU.REC.1397.044). The samples filled in the consent form and had the right to refuse to participate in the study.

3. RESULTS

The results of the study showed that most mothers in both groups lied within the age average of 30.53. Most of them had diploma and were housewives; most of them underwent C-section for delivery, and the mean age of delivery was 32.40 weeks. The mean duration of neonates' hospitalization was 2.53 days, and the weight of neonates at the time of birth was 1872 and 1757.67 g in the intervention and control groups respectively. Data analysis indicated that the mean weight in the third month in the intervention and control groups was 3802 and 3113.33 g, respectively, suggesting different weights in the groups, with the mean weight being

larger in the intervention group than in the control ($p=0.003$). The mean height in the third month in the intervention and control groups was 51.96 and 48.76 cm, respectively suggesting different heights between the two groups, where the mean height was larger in the intervention group than in the control ($p=0.01$). The mean head circumference in the third month was 46.1 and 39.1 cm in the intervention and control groups, respectively. This indicates different head circumferences between the two groups, such that the mean head circumference was larger in the intervention group than in the control ($p=0.005$). Furthermore, the scores of mothers' awareness and performance were also significantly different, suggesting the effect of SMS education on the growth indices of neonates (table 1 and Fig. 1).

Table 1 Comparison of mean of height, weight, head circumference infants and mother's knowledge and performance in two groups of SMS and face-to-face training

Variables	Mean(SD)		P value
	SMS group	Face-to-Face group	
Height baby before intervention(cm)	42.86(3.30)	42.46 (3.24)	0.741
Height baby after intervention(cm)	51.96 (3.38)	48.76 (2.94)	0.01
Baby weight before intervention(gr)	1872 (299.65)	1757.67 (314.87)	0.317
Baby weight after intervention(gr)	3802 (554)	3113.33(607.46)	0.003
Infant head circumference before intervention(cm)	30.76(1.38)	29.86(1.72)	0.127
Infant head circumference after intervention(cm)	36.70(1.46)	35.10 (1.39)	0.005
Mother's knowledge before intervention	11(3.38)	10.20(1.97)	0.437
Mother's knowledge after intervention	12.53(1.67)	10.33(1.67)	0.001
Mother performance after intervention	41.46(4.25)	37.93(4.43)	0.034

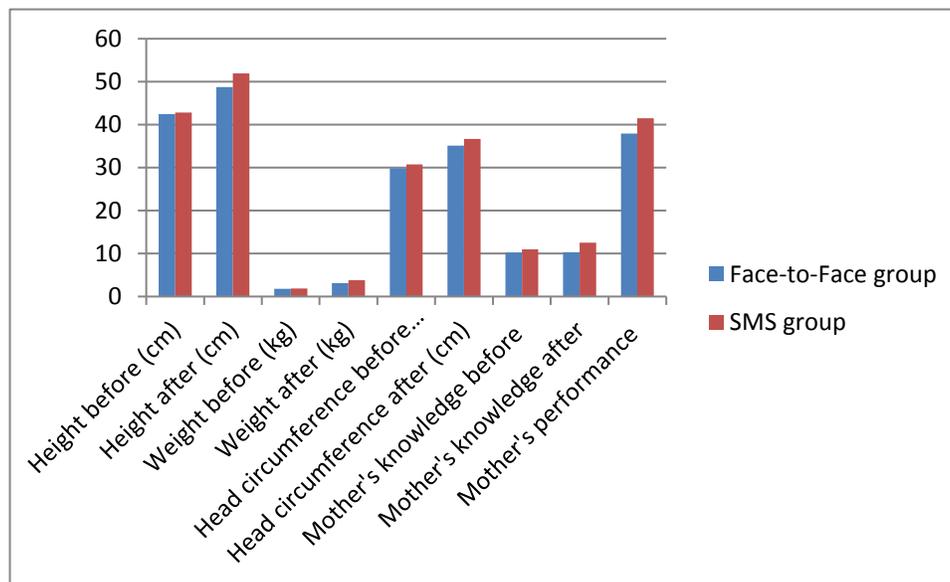


Figure 1 Comparison of mean of height, weight, head circumference infants and mother's knowledge and performance in two groups of SMS and face-to-face training

4. DISCUSSION

In this study, the results indicated that the growth indices (weight, height, and had circumference) of neonates before and after the intervention had a significant difference. This suggests that education through SMS to mothers of preterm neonates hospitalized in NICU has been effective.

In this regard, various studies have indicated that education through SMS to mothers concerning the nutrition of premature neonates is more effective than other face-to-face educational methods. Indeed, SMS encourages mothers and prompts them to pay attention to the care programs of preterm neonates requiring great care. Therefore, better nutrition can improve developmental indices that are associated with good nutrition and care (Shapiro et al., 2008; Poorman, 2015; Torres et al., 2016; Cocosila et al., 2008; Kerr et al., 2016). Furthermore, the results of the study by Raisi et al. (2013) suggests a significant relationship between sending SMS in enhancing care for preterm neonates and the breast-feeding by their mothers. At the end of the three months, in the control group, the neonates had not been hospitalized, and the growth indices including head circumference, weight, and height had increased (Raisi et al., 2013).

The study by Su et al. (2016) indicates that educational intervention through SMS to mothers has been effective on the health of newborns, causing changes in their developmental patterns (Su et al., 2016). Another result of the study was significance of the scores of mothers' awareness and performance following the SMS educational intervention, suggesting that the educational intervention through SMS is an effective method.

In line with the results of this study, the findings of other studies suggested that telephone follow-up is a good method for corroborating the results of educational sessions. The studies also indicated that telephone follow-up as a good method is first helpful for supporting mothers, and also causes enhanced awareness and performance in them regarding breast-feeding and taking care of the newborn (Tahir and Al-Sadat, 2013; Skouteris et al., 2014; Fu et al., 2014).

It seems that telephone follow-up and advice can act as a supportive method for mothers as well as their problems through presenting supportive information causing increased sense of peace in mothers and self-confidence in breast-feeding and taking care of newborns with problems. Therefore, skills for care and breast-feeding should first be educated to mothers and be further reinforced through suitable supportive methods. Various studies on telephone follow-up suggested that they have positive effects on the awareness and performance of patients with diabetes, heart failure, as well as on the performance of mothers in breast-feeding (Ericson et al., 2013; Shojaee et al., 2013; Tengku Ismail and Sulaiman, 2010).

In this regard, the result of a study by Frohlich et al. (2013) indicates that education leads to enhanced and improved performance. Furthermore, the knowledge of mothers increases in educational courses, whereby mothers are more encouraged to continue breast-feeding (Frohlich et al., 2013). Furthermore, the study by Arzani et al. (2017) indicates that if education at the time of hospitalization and after that continues, it leads to increased awareness of mothers and their performance with regards to taking care of preterm neonates (Arzani et al., 2017).

One of the strong points of the present study was precise sample selection, yielding a three-month follow-up period about taking care of their newborns. Furthermore, the SMS intervention was use of technology that has great applications in the society and can be helpful in follow-up of treatments. However, one of the limitations of this study was performing it in one hospital, which violates the generalizability of results, and as such further studies are required.

5. CONCLUSION

This study indicated the positive effect of education through SMS on the developmental indices of newborns in response to improve nutrition and care. It also confirmed the awareness and performance of mothers in relation to breast-feeding and care. Therefore, SMS education and follow-up are proposed in the care plans for premature newborns. In addition, education of mothers can be useful in their attachment to the neonatal care in reinforcing the breast milk nutritional behavior. Education of mothers on nutrition and care for their neonates helps them to control their anxiety and problems in breast-feeding, thereby improving the health of their babies.

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Competing interest

No any conflict interest among authors.

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REFERENCE

1. Abdollahimohammad A, Firouzkouhi M. Sample size estimation in randomized clinical trials (RCTs). *J Diabetes Nurs* 2019; 7: 739-742.
2. Arzani A, Zahedpasha Y, Zabihi A, Jafarian Amiri SR. Effect of Education on Awareness of Practice of Mothers in Care of Premature Infants. *J Babol Univ Med Sci* 2017; 19:42-7.
3. Chen Y, Zhang J, Bai J. Effect of an educational intervention on parental readiness for premature infant discharge from the neonatal intensive care units. *J Adv Nurs* 2016; 72:135-46.
4. Cocosila M, Archer N, Haynes RB, Yuan Y. Can wireless text messaging improve adherence to preventive activities? Results of a randomized controlled trial. *Int J Med Inform* 2009; 78:230–238.
5. Ericson J, Eriksson M, Hellström-Westas L, et al. The effectiveness of proactive telephone support provided to breastfeeding mothers of preterm infants: Study protocol for a randomized controlled trial. *BMC Pediatr* 2013; 13:73.
6. Franck LS, McNulty A, Alderdice F. The perinatal-neonatal care journey for parents of preterm infants. *J Perinat Neonatal Nurs* 2017; 31:244-55.
7. Froehlich J, Boivin M, Rice D, et al. Influencing university students' knowledge and attitudes toward breastfeeding. *J Nutr Educ Behav* 2013; 45:282-4.
8. Fu IC, Fong DY, Heys M, et al. Professional breastfeeding support for first time mothers: A multicentre cluster randomised controlled trial. *British j obst gyn* 2014; 121:1673-83.
9. Giuliani F, Cheikh Ismail L, Bertino E, et al. Monitoring postnatal growth of preterm infants: present and future. *Am J Clin Nutr* 2016; 103:635S-47S.
10. Kazemi MR, Hosseini M, Safi MH, et al. The Effect Of Self-Care Education Based On Short Message Service On Self-Efficacy And Adherence To The Medication Regimen In Adolescents With Epilepsy Referred To Iran Epilepsy Association Of In 2016. *J Nurs Edu* 2017;6:47-54.
11. Kerr DA, Harray AJ, Pollard CM, et al. The connecting health and technology study: a 6-month randomized controlled trial to improve nutrition behaviours using a mobile food record and text messaging support in young adults. *Int J Behav Nutr Phys Act* 2016; 13:52.
12. Kligeman R. Nelson Textbook of Pediatrics. 19th .Michigan: Judith Fletcher; 2011.Pp.11-59. Lekskulchai R, Cole J. Effect of a developmental program on motor performance in infants born preterm. *Austr J Physiothe* 2011; 47 :169-76.
13. Luanrattana R, Win K, Fulcher J, Iverson D. Mobile Technology Use in Medical Education. *J Med Sys* 2010; 36: 113-22.
14. Mohammadi B, Vahedparast H, Ravanipour M, Sadeghi T. Comparing the Effects of Heart Dysrhythmia Training Through Both Lecture and Multimedia Software Approaches on the Knowledge Retention of Nursing Students. *J Educ Dev Jundishapur* 2015; 6:115-21.
15. Nasimi F, Zeraati H, Shahinfar J, Boskabadi H, Ghorbanzade M. The Effect of Multisensory Stimulation on Weight Gain of Preterm Infants. *J Babol Univ Med Sci* 2016; 18:13-8.
16. Nasimi f, Behnam Vashani HR, Boskabadi h, ketabi d. Study the effect of quiet time protocol on physiological characteristics of preterm infants. *J Evid-based* 2015; 5:77-87.
17. Parizad N, Hemmati Maslakpak M, Khalkhali H. The Effect of Tele-Education by Telephone and Short Message Service on Laboratory Parameters in Patients with Type 2 Diabetes. *J Ardabil Univ Med Sci* 2014; 14:7-17.
18. Poorman E. Use of text messaging for maternal and infant health: A systematic review of the literature. *Matern Child Health J* 2015; 19:969–989.
19. Purdy I, Craig J, Zeanah P. NICU discharge planning and beyond: recommendations for parent psychosocial support. *J Perinat* 2015; 35:S24-S28.
20. Raisi Dehkordi Z, Raei M, Ghassab Shirazi M, Raisi Dehkordi SAR, Mirmohammadal M. Effect of Telephone Counseling on Continuity and Duration of Breastfeeding among Primiparus Women. *Hayat* 2013; 18:57-65.
21. Reyhani T, Aemmi SZ, Sannadgol V, Boskabadi H. The Effect of Creating an Artificial Night on Physiological Changes in Preterm Infants. *Int J Pediat* 2014; 2:407-12.
22. Shapiro JR, Bauer S, Hamer RM, et al. Use of text messaging for monitoring sugar-sweetened beverages, physical activity, and screen time in children: a pilot study. *J Nutr Educ Behav* 2008; 40:385–391.
23. Shimizu A, Mori A. Maternal perceptions of family-centred support and their associations with the mother–nurse relationship in the neonatal intensive care unit. *J Clin Nurs* 2018; 27:e1589-e99.
24. Shojaee A, Nehrir B, Naderi N, Zareaeyan A. Assessment of the effect of patient's education and telephone follow up by nurse on readmissions of the patients with heart failure. *Iran J Crit Care Nurs* 2013; 6:29-38.
25. Skouteris H, Nagle C, Fowler M, et al. Interventions designed to promote exclusive breast feeding in high income countries: A systematic review. *Breastfeed Med* 2014; 9:113-27.
26. Su Y, Yuan C, Zhou Z, et al. Impact of an SMS advice programme on maternal and newborn health in rural China: study protocol for a quasi-randomised controlled trial. *BMJ Open* 2016; 6:1-13.

27. Tahir NM, Al-Sadat N. Does telephone lactation counselling improve breastfeeding practices? A randomised controlled trial. *Int J Nurs Stud* 2013; 50:16-25.
28. Tengku Ismail TA, Sulaiman Z. Reliability and validity of a malay-version questionnaire assessing knowledge of breastfeeding. *Malays J Med Sci* 2010; 17:32-9.
29. Torres R, Soltero S, Trak MA, et al. Lifestyle modification intervention for overweight and obese Hispanic pregnant women: Development, implementation, lessons learned and future applications. *Contemp Clin Trials Commun.* 2016; 3:111–116.
30. Zahra Ameri, Fereshteh Ghaljaeiz, Ali Navidian, Mahmood Imani. Investigating the Effect of Fetal Position on the Sleep-Wake State of Premature Neonates in the Neonatal Intensive Care Unit: A clinical trial study. *Med Sci.* 2018, 22(94), 533-538