

Effectiveness of an Empowering Nurses Program on Educating Mothers for Neonatal Respiratory Management

Khorasani P.*¹ PhD, Namnabati M.² PhD, Taghian F.² MSc

¹ "Nursing and Midwifery Care Research Center" and "Department of Community Health Nursing, School of Nursing and Midwifery", Isfahan University of Medical Sciences, Isfahan, Iran

² Department of Pediatric and Neonatal Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract

Aims: Nurses' empowerment in educating mothers to take care of infants at discharge is a critical issue that prevents potential adverse consequences and re-admissions. This study examined the effectiveness of an empowering nurses' program in educating mothers about neonatal respiratory management.

Materials & Methods: Two before-after quasi-experimental studies were conducted simultaneously in the neonatal intensive care unit of Shahid Beheshti Hospital in Isfahan City, Iran, in 2017. Nurses were selected by convenience sampling, and their performance in educating mothers was assessed before and after the program with validated checklists. Simultaneously, two mothers (n=70) groups were assessed for their knowledge and practice of neonatal respiratory management before and after the intervention.

Findings: Nurses' performance was significantly higher after intervention (76.0 ± 7.4) compared to before (17.3 ± 8.5 ; $p < 0.001$). Also, mean scores of mothers' knowledge and practice were significantly ($p < 0.001$) higher at discharge time in the second group of mothers (75.4 ± 10.1 and 91.4 ± 9.7 , respectively), compared to the first group (16.1 ± 6.7 and 24.7 ± 22.2 , respectively).

Conclusion: Implementation of an empowerment program in mothers' education concerning respiratory management of premature neonates with respiratory distress during the days of admission and presentation of educational materials in the form of simulation by nurses in the post-interventional period have positive effects on mothers' knowledge and practice in the care of their neonates from discharge until a week later.

Keywords

Infants, Premature [<https://www.ncbi.nlm.nih.gov/mesh/68007234>];
Respiratory Management [Not in MeSH];
Nurses, Mothers [Not in MeSH];
Discharge Planning [Not in MeSH];
Capacity Building [<https://www.ncbi.nlm.nih.gov/mesh/?term=Capacity+Building>];
Empowerment [<https://www.ncbi.nlm.nih.gov/mesh/2030829>]

*Corresponding Author

Tel: +98 (31) 37927588

Fax: +98 (31) 36699398

Post Address: Department of Community Health Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Hezar Jarib Street, Isfahan, Iran.

Email: khorasanip@nm.mui.ac.ir

Received: January 11, 2023

Accepted: May 4, 2023

ePublished: May 30, 2023

Introduction

Neonates are among the most vulnerable groups in all societies; particular attention should be paid to them. About 12% of neonates in Iran are premature [1]. One of the most important complications of prematurity is ARDS (Acute Respiratory Distress Syndrome), which is responsible for 30% neonate mortality rates [2], and the main reason for their re-hospitalization is respiratory problems [1]. This complication sometimes occurs after discharge at home due to the lack of adequate care provided by the parents [2]. In recent decades, the role of family in the care of neonates has completely changed. Now, the empowerment of families in the care of hospitalized neonates is an essential approach in the field of neonatal nursing. One way of reducing morbidity and neonatal mortality is by enabling mothers to care for neonates [3].

Education during discharge is important in enabling parents to care for the neonate. Mothers' education changes their knowledge, attitude, and practice in care; the more the mothers' knowledge is, the more they care for their neonates more specifically. Meanwhile, their practice will be better and more efficient. One of the critical roles of nurses is to contribute to patient education a brief review of nurses' positions worldwide indicates that nurses are key members of the healthcare team who have the appropriate scientific and practical ability to administrate patient education they are often the first staff who assess clients' condition. So, they could empower mothers for better respiratory management of their neonates [4, 5]. However, there are barriers to implementing patient education and the ability of mothers with premature neonates that can be addressed by empowering nurses [6].

The impact of the empowerment of nurses can be followed by examining the outcome (Management of care by the mothers) because increasing the nurses' ability effectively influences the mothers' ability to care for the neonates [7].

Since there was no study to assess the effectiveness of nurses' empowerment in promoting nurses' ability in mothers' education and improving the knowledge and practice of mothers, the aim of this study was to determine the effectiveness of the Empowering Nurses Program regarding respiratory management of premature neonates by their mothers.

Materials and Methods

Two before-after quasi-experimental studies were conducted simultaneously in the neonatal intensive care unit of Shahid Beheshti Hospital in Isfahan City, Iran, in 2017.

In the first sub-study, all nurses in the research environment were selected by convenience sampling (n=36). A 22-item 5-point researcher-made checklist was used to assess "nurses' empowerment in educating mothers about neonates' respiratory

management". This instrument was implemented before and after ENP. This checklist was based on the content of the educational booklet that included nurses' proper communication with mothers to provide the best education for discharge time and educating mothers on ten dimensions of nurses' performance according to the content of the ENP program. ENP, as the intervention, was a 12-hour nurses' continuing education training course for better mothers' discharge education, which was provided to nurses through a face-to-face slideshow, scenarios, and an educational booklet. Course content and training methods of empowerment and mothers' education were prepared by valid texts and articles and confirmed by a sub-specialist of pediatrics, three academic members of Isfahan School of Nursing and Midwifery and Shahid Beheshti School of Nursing and Midwifery, and two clinical nurses (The heads of education and NICU of the hospital) and administrate through evidences-based educational methods (Demonstration, simulation and practical exercises) for nurses, so that they can empower mothers of newborns in their neonates' respiratory management based on their training and provide effective patient education. The booklet chapters and ENP sessions, based on the educational needs assessment of mothers, included familiarizing the mothers with relevant symptoms and complications and diagnosis of neonate's respiratory distress, attaining skills in connecting and using pulse-oximetry, technique of oxygen therapy, symptoms and severity of apnea, first aid training at home, introduction of respiratory stimulator, prevention of sudden death syndrome and consumed medications, and learning how to bathe and feed a neonate with respiratory distress. All the topics were considered in the program effectiveness checklist.

In the second quasi-experimental sub-study, 70 mothers with premature neonates admitted to this NICU were selected in two groups before-ENP (n=35) and after-ENP (n=35). After entering the subjects, mothers' demographic information was collected in both groups of mothers. Inclusion criteria for mothers were the gestational age at the birth of the neonate as 33 to 37 weeks, the interest and satisfaction to participate in the study, the ability to understand and translate the materials in Persian, no use of psychotropic and anti-anxiety drugs, absence of cognitive problems, blindness, deafness, or any factors that prevent participation in the study such as mental disorders. Also, in case of events such as the mother's reluctance to continue to participate in the research, the neonate's death before the end of education, the neonate's transfer to another ward or hospital, withdrawal of the mother or any problems preventing her from continuing participation in the study, the subjects would be excluded from the study. The sample size in each group was estimated to be 32 with a confidence level of 95% and a test power of 80%, with a subject's drop of 10%, for consideration

of the mean difference between the two groups, being more than 0.7 of the standard deviation of the variable, to be significant. For data gathering, the researcher referred to the neonatal intensive care unit daily and selected the mothers who had the characteristics of the subjects under study and were willing to participate in the research as control and study groups after explaining the research objectives and completing the consent forms. To prevent the dissemination of information between the two groups of mothers, the time block was used so that the researcher selected mothers eligible to participate in the study first in the group whose nurses did not receive the ENP of nursing empowerment among the qualified subjects. After that subject collection had been completed in this group, sampling stopped for four weeks to allow the group's mothers to be discharged and the nurses to participate in the empowerment program. Then, the same nurses teach mothers about the respiratory management of their neonates in the NICU with correct methods and materials (Through a computer and video projector, using simulation, demonstration, and practical exercises) during the hospitalization and discharge period. Sampling continued for this group in the same method for five months.

To assess the knowledge and practice of the mothers, a researcher-made 35-item questionnaire and checklist were used for data collection. Face and content validities of all instruments were assessed by ten faculty members and experts. The questionnaire and checklist were administered to 10 mothers to determine reliability, and then the internal consistency was determined by Cronbach's alpha test. Since Cronbach's alpha coefficient was higher than 0.7, the reliability and internal correlation of questions were confirmed. The responses to the questionnaire were scored based on a five-point Likert scale ranging from 1 to 5 with a total score of 100. Observation of the knowledge and practice of mothers was conducted by the co-researcher before and after education for blinding the study. In the end, the group errors that had been seen were noted to observe the ethical considerations.

The effect of the empowerment program on the nurses' performance and mothers' knowledge and practice was compared through a two-stage score before and after ENP. Data were analyzed using Chi-Square, Mann-Whitney, independent T-test, and Paired T-test through SPSS 18 software with a significance level 0.05.

Findings

There were no significant differences between the two groups in demographic, baseline, and confounding parameters (Table 1).

The mean total score and ten dimensions of nurses' performance scores showed significant improvement

after receiving the empowerment program ($p < 0.001$; Table 2).

Table 1. Comparison of demographic, baseline, and confounding parameters between the two groups

Parameter		Before	After	p Value
Mother's age (year)		27.14±5.07	26.70±4.62	p ¹ =0.71
Number of children		1.69±0.76	2.00±0.91	p ¹ =0.12
Gestational age (weeks)		34.63±1.13	34.99±1.22	p ¹ =0.20
Birth weight (gr)		2199±270	2236±338	p ¹ =0.50
Apgar	5 th minute	7.89±0.83	7.86±0.77	p ¹ =0.88
	10 th minute	9.46±0.92	9.54±0.56	p ¹ =0.64
Hospitalization length (day)		8.29±3.20	7.51±3.10	p ¹ =0.31
Type of delivery	Normal	10 (29%)	7 (20%)	p ² =0.40
	C/S	25 (71%)	28 (80%)	
Mother's employment	Housewife	17 (50%)	16 (47%)	p ² =0.81
	Employed	17 (50%)	18 (53%)	
Mother's education	Illiterate	3 (8.6%)	2 (6%)	p ³ =0.56
	Elementary	1 (2.8%)	6 (17%)	
	Diploma	29 (57%)	16 (46%)	
	BS and MS	8 (23%)	9 (26%)	
	PhD	3 (8.6%)	2 (6%)	
Baby's rank	birth First	14 (40%)	11 (31%)	p ³ =0.22
	Second	16 (45%)	14 (40%)	
	Third	4 (11%)	8 (23%)	
	Fourth	1 (2.9%)	2 (6%)	

p^1 : Independent T-test; p^2 : Chi-square test; p^3 : Mann-Whitney test

Table 2. Comparison of the total score and ten dimensions mean (0-100) of nurses' performance in training respiratory management of the newborns before and after the intervention ($p < 0.001$ in all cases)

Dimension	Before	After
1. Communication with mother	23.5±13.4	71.0±11.5
2. Educating RDS Definition	18.1±17.0	78.5±15.3
3. Educating Medicine	19.2±13.3	77.8±15.4
4. Training Pulse-Oximetry	18.5±15.5	75.4±10.6
5. Training Oxygen Therapy	20.0±12.9	81.6±11.6
6. Training Feeding and Nutrition	30.7±21.9	78.5±15.0
7. Educating apnea situation	12.3±13	74.7±13.0
8. Training First aids	11.4±17.5	72.1±17.9
9. Educating Respiratory stimuli	11.4±12.6	79.2±12.8
10. Educating Sudden infant death	8.5±14.7	70.7±16.5
Total score	17.3±8.5	76.0±7.4

The mean score of mothers' knowledge and practice during discharge and one week after discharge in the group receiving ENP was significantly higher than those who did not receive the ENP ($p < 0.001$; Table 3).

Table 3. Comparison of the mean score (0-100) of mothers' knowledge and practice in the management of respiratory newborns before and after the intervention

Parameter	Before	After
Mother's knowledge		
Discharge time	16.1±6.7	75.4±10.1
A week after the discharge	16.6±7.4	75.8±10.6
p Value (paired T-test)	$p=0.37$	$p=0.28$
Mother's practice		
Discharge time	24.8±22.2	91.4±9.7
A week after the discharge	24.7±21.7	92.3±9.7
p Value (paired T-test)	$p=0.27$	$p=0.99$

Discussion

This research with two sub-studies aimed to evaluate the effectiveness of the ENP regarding educating and training mothers on respiratory management of their premature neonates at discharge through nurses' performance on mothers' education and the effectiveness of this program on mothers' knowledge

and practice at discharge time, as well as longevity of mothers' learning up to one week after discharge in the second sub-study.

Nurses' performance in mothers' education improved significantly in all dimensions of mothers' education and training. Estiri & Zendehtalab showed the effectiveness of family-centered care in neonates hospitalized in the NICU based on the health belief model through significant differences in participation scores of mothers in the care of neonates after the intervention. Also, there was a significant difference among all the health belief model constructs after the intervention than before [8].

Mothers' mean knowledge and practice scores were significantly higher at discharge and a week after implementing the ENP compared to before that. Aslani *et al.*, in an action-research study, showed that after the empowerment workshops, 73% of the required training was given to patients, and the patients had partial independence in doing their daily activities [9]. Cooper *et al.* also confirm the effect of a family empowerment program in the NICU. They reported increased mothers' self-confidence to participate in caring for their premature neonates in the study group [10].

In the present study, the mothers had better knowledge and practice in managing the respiratory problems of their premature neonates after empowering Nurses. They had better learn at the time of discharge. This difference in knowledge and practice of mothers between after and before ENP can result in better performance of nurses and related educational methods and equipment. The positive impact of intervention in this study can be related to the application of evidence-based educational methods by nurses who practice in the ENP course. The present study demonstrated and simulated the educational method of empowerment nurses and mothers' discharge education in audio-visual format (Booklet, video, face-to-face, and practice inward). In this regard, Brown *et al.*, in a three-group study, concluded that the level of mothers' knowledge and maternal-neonatal interactions were higher in two intervention groups in which the audiovisual method was used, compared to the control group in which the training was as group training sessions without audiovisual aids [11]. Webster *et al.* concluded that the women with sufficient empowerment experienced a higher quality of life score regarding physical, mental, social, and environmental health [12]. Those results align with the present study, according to the educational methods used in the ENP Course for nurses and thereafter in the discharge pieces of training and education of nurses to mothers.

Other results of this study showed no significant differences in mothers' mean knowledge and practice scores at discharge and a week later in both groups. This condition shows that mothers' information at the time of discharge can be sustained for at least one

week (Which is usually a significant time for the possible recurrence of respiratory distress in discharged neonates). On the other hand, such results in the group whose nurses did not receive the empowering program pointed out that mothers have received no information from other sources during this period. Thus, the mother's information exposure and discharge education can be very valuable and necessary because the immediate and short-term effect of discharge time education on mothers' knowledge and practice is the same. Mothers' learning was sustained one week after discharge. This is consistent with the results of Panahi *et al.* in the study on the effect of parental education on their practice of exclusive breastfeeding until four months of age. They reported a difference between the practice scores before and after the intervention and one week after. Still, there was no difference between the practice scores one week after the intervention and four months later. They concluded that the impact of training on the practice is equal in the short and long term [13].

Khorasani *et al.* conducted the nurse educator's role expansion action research project. They concluded the role of nurse educators could be enhanced by empowering nurses' workshops besides redesigning the hospital's patient education structure and regulations for purposive strategic and operational programs [14]. In this regard, Akbarian *et al.* conducted a study on the mothers' information support and provision from admission, which continued education to mothers through tele-nursing until one week after the discharge. They described this intervention as a program to improve the discharge process [15]. Nam-Nabati *et al.* and Valizadeh *et al.* also mentioned the benefits of parents and neonates from earlier discharge education and programs [16, 17].

Empowering mothers by implementing an educational program for nurses based on their needs is an effective strategy for improving mothers' learning concerning the care of their premature neonates. Since mothers received their education via discharge information and their knowledge and practice did not increase within one week after discharge, the importance of paying attention to mothers' education at discharge from NICU is revealed. It is essential to correctly educate mothers of premature neonates during discharge with appropriate audiovisual facilities and through the presentation of the educational booklet and with respect to the role of mothers and nurses in this field. The necessity of expanding nurses' educational roles should be determined. It is suggested that educational courses be held to strengthen the nurses' skills and increase the quantity and quality of efficient education to mothers of premature neonates in managing their neonates' respiratory function at discharge in the continuing education programs of NICU nurses.

Conclusion

Implementation of an empowerment program in mothers' education concerning respiratory management of premature neonates with respiratory distress during the days of admission and presentation of educational materials in the form of simulation by nurses in the post-interventional period have positive effects on mothers' knowledge and practice in the care of their neonates from discharge until a week later.

Acknowledgments: None declared by the authors.

Ethical Permissions: None declared by the authors.

Conflicts of Interests: None declared by the authors.

Authors' Contribution: Khorasani P (First Author), Introduction Writer/Main Researcher (40%); Namnabati M (Second Author), Methodologist/Discussion Writer (30%); Taghian F (Third Author), Assistant Researcher/Statistical Analyst (30%)

Funding/Support: None declared by the authors.

References

- 1- Blencowe H, Cousens S, Oestergaard MZ, Chou D, Moller AB, Narwal R, et al. National, regional, and worldwide estimates of preterm birth rates in 2010 with time trends since 1990 for selected countries: A systematic analysis and implications. *Lancet*. 2012;379(9832):2162-72.
- 2- Ghorbani F, Asadollahi M, Valizadeh S. Comparison the effect of sleep positioning on cardiorespiratory rate in noninvasive ventilated premature infants. *Nurs Midwifery Stud*. 2013;2(2):182.
- 3- Aliabadi T, Bastani F, Haghani H. Effect of mothers' participation in preterm infants' care in NICU on readmission rates. *J Hayat*. 2011;17(2):71-7. [Persian]
- 4- Bastable S, Gramet P, Jacobs K, Sopczyk D. Health professional as educator: Principles of teaching and learning. Massachusetts: Jones and Bartlett Learning; 2010.
- 5- Kelly P. Nursing leadership and management. Massachusetts: Cengage learning; 2011.
- 6- Khorasani P, Rassouli M, Parvizy S, Zagheri Tafreshi M, Nasr Esfahani M. Nurse-led action research project for

expanding nurses' role in patient education in Iran: Process, structure, and outcomes. *Iran J Nurs Midwifery Res*. 2015;20(3):387-97.

7- Polit DF, Beck CT. Essentials of nursing research: Appraising evidence for nursing practice. Pennsylvania: Lippincott Williams and Wilkins; 2010.

8- Estiri A, Zendehtalab H. Promotion of family-centered care in neonates hospitalized in the NICU based on health belief model. *Iran J Neonatol*. 2013;4(2):16-20. [Persian]

9- Aslani Z, Alimohammadi N, Taleghani F, Khorasani P. Nurses' empowerment in self-care education to stroke patients: An action research study. *Int J Community Based Nurs Midwifery*. 2016;4(4):329.

10- Cooper L, Gooding J, Gallagher J, Sternesky L, Ledsky R, Berns S. Impact of a family-centered care initiative on NICU care, staff, and families. *J Perinatol*. 2013;27(S2):S32-7.

11- Browne JV, Talmi A. Family-based intervention to enhance infant- parent relationships in the neonatal intensive care unit. *J Pediatr Psychol*. 2015;30(8):667-77.

12- Webster J, Nicholas C, Velacott C, Cridland N, Fawcett L. Quality of life and depression following childbirth: Impact of social support. *Midwifery*. 2011;27(5):745-9.

13- Panahi F, Simbar M, Lotfi R, Rahimzadeh M. The effect of parents' training on their knowledge, attitudes and practice in exclusive breastfeeding up to four months: A randomized clinical trial. *Iran J Obstet Gynecol Infertility*. 2017;20(5):48-57. [Persian]

14- Khorasani P, Rassouli M, Parvizy S, Zagheri Tafreshi M, Nasr Esfahani M. Nurse-led action research project for expanding nurses' role in patient education in Iran: Process, structure, and outcomes. *Iran Journal Nurs Midwifery Res*. 2015;20(3):387-97.

15- Akbarian M, Dashti F, Baraz S. The effect of phone counseling for mothers of premature infants discharged from the hospital on infants' readmission. *Int J Pediat*. 2017;5(8):5441-50. [Persian]

16- Namnabati M, Taleghani F, Sadeghnia A. Home-based care needs of preterm infants discharged early from the neonatal intensive care unit: A descriptive qualitative study. *Iran J Neonatol*. 2017;8(4):74-82. [Persian]

17- Valizadeh L, Ajoodaniyan N, Namnabati M, Zamanzadeh V. Nurses' viewpoint about the impact of Kangaroo mother care on the mother-infant attachment. *J Neonatal Nurs*. 2013;19(1):38-43.