

## Original Article

# The Effects of a Neonatal Critical Care Nurse Companionship with Parents during Hospital–Home Transfer of Preterm Infants on Mothers' Mood Status

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### ABSTRACT

**Background:** Hospital discharge and transfer of a preterm infant from hospital to home are usually stressful for parents. **Objectives:** This study evaluated the effects of a neonatal critical care nurse companionship with parents during hospital–home transfer of preterm infants on mothers' mood status. **Methods:** This randomized clinical trial was conducted on 64 mothers of preterm infants discharged from the neonatal intensive care unit of a teaching hospital in Isfahan, Iran. Participants were randomly and equally allocated to an intervention and a control group. Each mother in the intervention group was accompanied by a nurse immediately from hospital discharge up to 3 h afterward. The nurse also supported the mother during the first 3–4 postdischarge days. Mothers' mood status was assessed using the 21-item Depression, Anxiety, and Stress Scale both groups 3–4 days before hospital discharge and 72 h after hospital discharge. Data were analyzed through the Chi-square, the paired-sample *t*, and the independent-sample *t*-tests. **Results:** The pretest mean scores of depression, anxiety, and stress, respectively, were  $4.71 \pm 4.43$ ,  $6.51 \pm 4.04$ , and  $9.17 \pm 5.40$  in the intervention group and  $4.91 \pm 2.59$ ,  $6.59 \pm 2.92$ , and  $8.77 \pm 3.58$  in the control group. The between-group differences respecting the mean scores of depression, anxiety, and stress were not statistically significant ( $P > 0.05$ ). These mean scores significantly decreased in the intervention group after the intervention ( $P < 0.05$ ) while did not significantly change in the control group ( $P > 0.05$ ). **Conclusion:** Nurse companionship with parents during the transfer of preterm infants to home improves mothers' mood status.

**KEYWORDS:** Anxiety, Depression, Preterm infant, Stress, Transfer

## INTRODUCTION

More than 15% of infants are hospitalized after birth in the neonatal intensive care unit (NICU) due to prematurity, congenital problems, or other health conditions. There are around five million hospital beds throughout the world for care delivery to premature infants.<sup>[1]</sup>

Generally, infants are discharged from hospital a few days after birth. Therefore, the unexpected hospitalization of an infant in the NICU is associated with high levels of anxiety and stress for parents and causes them great frustration.<sup>[1,2]</sup> Studies showed that 28%–70% of mothers

with preterm infants experience severe stress. They also experience different levels of stress, anxiety, and mood problems during their infants' NICU stay.<sup>[3,4]</sup>

Unfamiliarity with the fearful and stressful environment of NICU and sophisticated NICU equipment is one

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of the most common causes of stress and anxiety for parents.<sup>[3,4]</sup> Moreover, discharged preterm infants are still at risk for health problems and may need home-based oxygen therapy or cardiopulmonary support and monitoring. Thus, parents' stress and anxiety are further complicated by their concerns over their perceived inability to accurately use medical equipment, accurately detect any health risk for their preterm infants, and deliver appropriate care to their preterm infants at home.<sup>[5]</sup> Besides, official rules in Iran require the early discharge of infants from hospital to prevent nosocomial infections and shorten mother–infant separation. Such requirement also adds to parents' stress and anxiety over home care delivery to their preterm infants.<sup>[6]</sup> In some cases, stress and anxiety among these parents last even for 2 years after the birth of their preterm infants.<sup>[7]</sup>

Parent education and support are potentially effective strategies to reduce parents' stress and anxiety over home care delivery to their preterm infants. Education can improve parents' knowledge about using medical equipment, detecting potential health risks, and delivering care to their preterm infants. Education and support are critically important during the transfer of preterm infants from hospital to home. Therefore, a nurse who accompanies, educates, and supports parents during this transfer can help improve parents' care-related knowledge, reduce their stress and anxiety,<sup>[8]</sup> and improve their independence in care delivery. Yet, there is neither official program for such nurse companionship nor reliable data over its effectiveness. The only postdischarge program in Iran for preterm infants who are discharged from NICU is a single home visit made 48 h after discharge. The present study was done to fill this gap.

### Objectives

The purpose of this study was to evaluate the effects of an NICU nurse companionship with parents during hospital–home transfer of their preterm infants on mothers' mood status.

## METHODS

### Study design and participants

This clinical trial was conducted in 2018 on 64 mothers whose preterm infants were discharged from the NICU of Shahid Beheshti Hospital, Isfahan, Iran. Sampling was done conveniently. Inclusion criteria were basic literacy skills, age over 18, no history of taking psychiatric medications, gestational age of <37 weeks at childbirth, no defect which undermined the ability to care delivery to infant, an NICU discharge order, and no infantile congenital anomalies or acute physical health problems. Exclusion criteria were inability to accompany infant

during transfer from hospital to home (for any reason including hospitalization or physical problems), inability to deliver care to infant at home, and any serious postdischarge health problem for infant which required re-hospitalization and medical interventions. Participants were randomly allocated to an intervention and a control group using drawing cards.

Sample size was calculated based on the result of a pilot study on 10 mothers. Before the intervention, the mean and standard deviation of the mothers' stress score were  $9.81 \pm 5.90$  and reduced to  $6.87 \pm 3.85$  after the intervention. Then, with a Type I and II errors of 0.05 and 0.2, respectively, and considering  $S_1 = 5.90$  and  $S_2 = 3.85$  and  $\mu_1 = 9.81$  and  $\mu_2 = 6.87$ , the needed sample for each group was estimated at 32.

### Instruments

Data were collected using a demographic questionnaire (with items on mother's and infant's characteristics) and the 21-item Depression, Anxiety, and Stress Scale (DASS-21). The 21 items of the self-report DASS-21 are grouped into the three seven-item subscales of depression, anxiety, and stress and are scored from 0 ("never") to 3 ("very much"). The psychometric properties of this scale were assessed and confirmed in several studies. For instance, Sahebi *et al.* translated this scale into Persian, evaluated its psychometric properties in a sample of 970 Iranians, and reported that the Cronbach's alpha values of its depression, anxiety, and stress subscales were 0.77, 0.79, and 0.78, respectively.<sup>[9-11]</sup>

### Intervention

The study intervention was the companionship of an NICU nurse with each participant in the intervention group during the transfer of her preterm infant from hospital to home after hospital discharge. Three to four days before hospital discharge, the nurse individually provided all participants in both groups with educations about detecting warning signs of health risks, performing cardiopulmonary resuscitation, removing oral and nasal secretions, feeding through gastric tube, cup, or breast, performing daily care measures (such as dressing and bathing infant), creating a safe environment, and using medical equipment (such as pulse oximeter and oxygen tank).

After hospital discharge, each infant in the intervention group was transferred to home with parents in companionship with the accompanying NICU nurse. On the home way, the nurse answered parents' questions and provided them with necessary information. Upon arrival at home, she assessed home environment, assisted parents in the placement of medical equipment, and re-provided

them with educations about daily care measures, using medical equipment, detecting warning signs, performing cardiopulmonary resuscitation, and removing oral and nasal secretions. Depending on mother's and infant's conditions, this companionship and home visit lasted 2–3 h. During the first 72 h after transfer, the nurse contacted mothers through telephone call, short message system, social network, or home visit to provide them with educations and counseling. Educations were provided based on three checklists regarding discharge readiness, safe transfer, and home visit. Infants in the control group were discharged from hospital without the accompanying a nurse. Mothers' mood status was assessed in both groups 3–4 days before hospital discharge in hospital and 72 h after hospital discharge at home. For posttest mood status assessment in the intervention group, the nurse referred to participants' homes, re-provided them with the same educations to ensure their accurate understanding of the educations, and then asked them to re-complete DASS-21.

### Data analysis

Data were analyzed using the SPSS software v. 16.0 (SPSS Inc, Chicago, IL, USA). The measures of descriptive statistics (namely frequency, mean, and standard deviation) were used for data description. The Chi-square and the independent-sample *t*-tests were performed to compare the groups regarding categorical and numerical data, respectively. Moreover, the paired-sample *t*-test was performed for within-group comparisons. The level of statistical significance was set at <0.05.

### Ethical considerations

This study was approved by the Ethics Committee of Isfahan University of Medical Sciences, Isfahan, Iran (code: IR.MUI.REC.1396.30646) and was registered in the Iranian Registry of Clinical Trials (IRCT20180130038554N1). Permissions for entering the study setting were obtained from Isfahan University of Medical Sciences and provided to the authorities of the study setting. Written informed consent for participation was obtained from each participant, and they were assured about the voluntary participation and confidentiality of their personal information.

## RESULTS

In total, 64 mothers were recruited to the study – 32 in each group. Four mothers from the intervention group were excluded due to aggravation of their infants' physical conditions before hospital discharge [Figure 1]. Study groups did not significantly differ from each other respecting participants' gestational age, age, educational

level, employment status, route of delivery, and their infants' birth rank, birth weight, and age at hospital discharge [ $P > 0.05$ ; Table 1].

The results of the independent-sample *t*-test showed no significant between-group differences, regarding the pretest mean scores of depression, anxiety, and stress ( $P > 0.05$ ). The results of the paired-sample *t*-test showed significant decreases in the mean scores of depression, anxiety, and stress in the intervention group ( $P < 0.05$ ) and no significant changes in these mean scores in the control group [ $P > 0.05$ , Table 2].

**Table 1: Between-group comparisons respecting participants' characteristics**

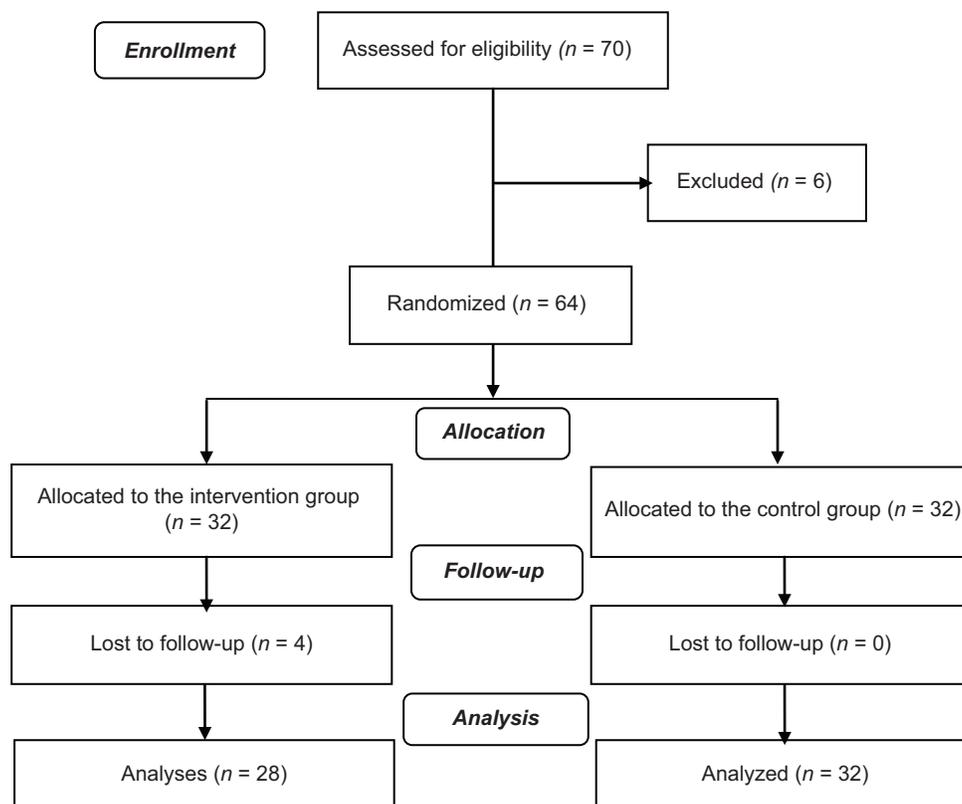
Characteristics	Group <sup>a</sup>		<i>P</i> <sup>b</sup>
	Intervention	Control	
Infant's birth weight (g)	1353.21 ± 356.37	1476.29 ± 369.91	0.22
Gestational age (weeks)	30.61 ± 1.95	31.44 ± 2.71	0.18
Infantile age at discharge (days)	22.63 ± 10.06	19.17 ± 13.25	0.27
Mother's age	30.04 ± 3.93	30.52 ± 5.84	0.71
Infant's birth rank			
First	13 (46.4)	14 (43.8)	0.63
Second	12 (42.9)	12 (37.4)	
Third	3 (10.7)	6 (18.8)	
Education level			
Below diploma	2 (7.1)	5 (15.6)	0.15
Diploma	8 (28.6)	12 (37.5)	
University	18 (64.3)	15 (46.9)	
Route of delivery			
Cesarean section	22 (78.6)	24 (75)	0.74
Vaginal	6 (21.4)	8 (25)	
Employment status			
Homemaker	22 (78.6)	28 (87.5)	0.28
Employed	6 (21.4)	4 (12.5)	

<sup>a</sup>Data presented as mean ± SD or *n* (%), <sup>b</sup>The results of the  $\chi^2$  or the independent-sample *t*-test. SD: Standard deviation

**Table 2: Within- and between-group comparisons respecting the mean scores of depression, anxiety, and stress**

Outcomes	Time		<i>t</i> ( <i>P</i> ) <sup>a</sup>
	Before	After	
Depression			
Control group	4.91 ± 2.59	4.75 ± 2.58	0.39 (0.70)
Intervention group	4.71 ± 4.43	2.86 ± 2.62	
Anxiety	0.84	0.04	
Control group	6.59 ± 2.92	6.31 ± 2.97	0.61 (0.54)
Intervention group	6.51 ± 4.04	3.75 ± 3.11	
Stress	0.92	0.0014	
Control group	8.77 ± 3.58	8.93 ± 3.49	0.26 (0.79)
Intervention group	9.17 ± 5.40	6.70 ± 3.75	
<i>P</i> value	0.74	0.01	

<sup>a</sup>The results of the paired-sample *t*-test, <sup>b</sup>Independent sample *t*-test



**Figure 1:** The flow diagram of the study

## DISCUSSION

This study evaluated the effects of an NICU nurse companionship with parents during hospital-home transfer of their preterm infants on mothers' mood status. Findings showed that such companionship significantly improved mothers' mood status. The accompanying nurse educated and supported parents during patient transfer and also during home visits. A former study reported that since mothers have significant roles in promoting their infants' well-being, their preparation for discharge alleviates their tension, fosters a sense of confidence, and enables them to deliver care to their infants at home.<sup>[12]</sup> Another study also reported that the associated emotional and psychological stress can be managed through the collaboration of healthcare providers, family members, and relatives.<sup>[13]</sup> Several studies also recommended strategies such as mothers' involvement in care delivery to their infants, social support, and religious rituals to reduce hospitalization- and discharge-related stress and anxiety.<sup>[2,4,14]</sup> Yet, some studies reported that these strategies are sometimes not effective in some cases. For instance, a study in Iran showed that nursing support did not reduce stress among the mothers of infants who were hospitalized in the NICU.<sup>[15]</sup> Another study on a group of mothers showed that although nursing support reduced the stress associated with the abnormal appearance and

behavior of their infants, it was ineffective in reducing general stress associated with changes in their parental roles.<sup>[16]</sup>

The discharge of an infant from hospital is a distressful event for parents. While parents may be happy about the discharge of their infants from hospital, they may feel anxiety, depression, and concern over the unavailability of medical equipment and professional support at home.<sup>[12]</sup> Our findings showed that NICU nurse companionship with parents during the transfer of their preterm infants from hospital setting to home was effective in significantly reducing maternal depression, anxiety, and stress. Similarly, two earlier studies in Iran showed that participatory care program significantly reduced anxiety among the mothers of preterm infants.<sup>[4,17]</sup> Of course, those studies differed from the present study in that they only assessed anxiety, while we assessed depression, anxiety, and stress. Two other studies also reported that home-based postpartum care improved maternal ability to deliver care to their preterm infants, reduced the risk of re-hospitalization, increased infantile weight, and promoted infantile growth during the first 6 months after birth.<sup>[17,18]</sup> The significant effects of our intervention on mothers' depression, anxiety, and stress can be attributed to hospital discharge and postdischarge care based on the available standards as

well as nurse–mother communication during and after infant discharge.

The strength of the present study was the provision of support for parents during the first 3 h after hospital discharge, while previous studies in this area provided support to parents 24–48 h after discharge.<sup>[15,17]</sup> This study faced some limitations. Concurrent with our study, a home visit program for parents with preterm infants was launched by the Neonatal Health Department of the Ministry of Health of Iran, during which preterm infants were visited by hospital staff 2–3 days after hospital discharge. As mothers were sure that their infants would be visited at home under the program, some of them refused participation in the study. Moreover, the study sample was rather small, and hence, studies with larger samples are needed to produce more evidence regarding the effects of NICU nurse companionship with parents during the hospital–home transfer of infants on parental and infantile outcomes.

## CONCLUSION

This study concludes that the companionship of an NICU nurse with parents during the transfer of preterm infants from hospital to home significantly reduces mothers' depression, anxiety, and stress and enables them to deliver care to their infants at home. This strategy can be used to improve maternal and infantile outcomes after hospital discharge. Future studies are recommended to evaluate the effects of this strategy on mothers' competence in care delivery to their infants as well as on their stress and anxiety coping strategies.

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## Conflicts of interest

There are no conflicts of interest.

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