



Effect of NICU Department Orientation Program on Mother's Anxiety: a Randomized Clinical Trial

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ABSTRACT

Introduction: Neonatal intensive care unit induces the high level of anxiety for mothers. The aim of this study was to evaluate the effectiveness of NICU orientation program on the anxiety of mothers who had preterm newborns hospitalized in NICU.

Methods: This study was a randomized clinical trial (three parallel groups). Participants included 99 mothers with preterm newborns hospitalized in NICU of Al-Zahra hospital, affiliated to Tabriz University of Medical Sciences in 2015. Mothers were randomly assigned to one of three groups (film, booklet, and control). Mothers completed the State-Trait Anxiety Inventory before entering to the NICU, and then mothers in the experiment groups became familiar with the NICU environment through watching a film or reading booklet. After the first NICU visit, all mothers completed the STAI and Cattell's Anxiety Questionnaires. Data were analyzed using SPSS ver. 13 software.

Results: There was no significant difference between three groups regarding state-trait anxiety before the intervention. After the first NICU visit, a significant reduction in maternal state anxiety was seen in the both experiment groups. There was no statistical significant difference regarding trait anxiety. Data obtained from Cattell's anxiety questionnaire after intervention, showed significant difference in state anxiety between groups.

Conclusion: Employing film and booklet orientation strategy after preterm delivery can reduce the mother's anxiety and beneficent for the mother, baby, family and health care system.

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Introduction

Approximately ten percent of the infants are born prematurely which means that they are born before 37 completed weeks of gestation.¹ Hospitalization of premature infant in neonatal intensive care unit (NICU) is inevitable most of the time.²

Neonatal intensive care unit specializing in the care of ill or premature newborn infants. If newborn is sent to the NICU, the first question of parents probably will be "what is this place?"³ Valizadeh et al., showed that presence

of monitors and other special equipments in the NICU, presence of other infants under mechanical ventilation and continuous noise of the monitors, were the most important environmental stressors for parents of hospitalized infants who are born premature.⁴ The study results of Borimnejad et al., indicated that the most environmental stressors experienced by mothers with premature infants in NICU included "the sudden sound of the monitor alarm and special facilities and equipment's in the NICU".⁵

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Malakouti *et al.*, studied the mothers' experience of having an infant in the neonatal intensive care unit. They found that mothers cried because of watching special devices and unfamiliar equipment's in the NICU and they had left the unit because they had not knowledge about function of this device. As mother said "I would like to know what for are these things".⁶ When parents are given an explanation about the reason why monitors are used, about the meaning of alarms, and when the monitor's alarms are adjusted to appropriate limits, their stress and anxiety will be decreased.⁷

Regarding to the advanced technology of the NICU, familiarizing mothers with the NICU environment has many benefits for both mother and infant, strengthens maternal feeling, increases their self-esteem, and reduces their anxiety.^{7,8} Various orientation methods are available. One of them is an indirect method which has some benefits such as saving time, cost, staffing and sending quick message to large number of people (by using a booklet and film). The use of audio-visual equipment helps for better understanding of unfamiliar concepts, when the words unable to express the concepts.^{9,10} A study by Mettling *et al.*, showed that pictures or an online virtual tour of the high risk pregnant woman on bed rest about the NICU may help to decrease anxiety levels of mothers before their delivery.¹¹

Orientation for clients by using film and booklet has been studied and found to be an effective way for familiarization.¹¹⁻¹³ The use of educational booklet in health care is a common practice in the world health system. Handbooks for health care, guidelines, information leaflets and booklets are able to promote outcomes for educational activities.¹² Ruffinengo *et al.*, studied the effectiveness of an informative video on reducing anxiety levels in patients undergoing elective coronarography. They found that watching film increases orientation level and reduces the anxiety of patients.¹³ Moreover, booklets with color pictures and simple language written could be effective methods of orientation for

people with low education. As a result, it could improve the process of communication with staff and increase their participation in the care.¹⁴

The lack of attention to the mothers and their emotional and psychological concerns in the long term can affect their health and quality of life, loss of ability to make decisions and communicate with other family members. Also it can leads to the physical, social, cognitive, emotional and behavioral disorders of infants.¹⁵ Previous studies have focused on prenatal high risk mother's education about the NICU¹¹ or identifying sources of maternal stress in the NICU.^{4,5,6} There was fewer study on assessing the postnatal NICU orientation programs and its effects on maternal anxiety. The purpose of this study, therefore, was to investigate the effect of NICU orientation program through watching a film and reading a booklet after preterm delivery and before entering to the NICU and its effect on the anxiety levels of mothers with preterm infants hospitalized in NICU.

Materials and methods

This study is a randomized clinical trial with three parallel group design. The study population consisted of the mothers with infant who born premature and hospitalized in NICU. The study was conducted in Tabriz Al-Zahra teaching hospital affiliated to Tabriz University of Medical Sciences (Iran) during the January to May 2015. The pilot study conducted with 45 mothers who had inclusion criteria for entering the study. By considering the changes to 25% in response to state anxiety, sample size was estimated to 90 mothers (30 mothers for each group) with 95% confidence level and 0.9 power of the test. By considering the possible attrition rate, the sample size were increased to 33 mothers for each group. Thus, a total of 99 mothers were selected through convenient sampling method within 5 month period. The participants were randomly assigned to the control or experimental groups.

Inclusion criteria were the mother's willingness to participate in the study, mothers

with newborns who born premature and hospitalized in NICU (gestational age 30-36 weeks, without abnormality), mothers who had not any experience of preterm infant hospitalization in NICU, have at least reading and literacy, having no anxiety disorders, the being not blind and deaf, and mothers who have not never seen NICU. Exclusion criteria were as the mothers who died their baby in the first 24 hours after birth, the mothers who have severe obstetric complications leading to hospitalization in other hospitals after delivery, refusing to participate in orientation sessions, and the mothers whom their infant have been sent to another hospital.

Research tools included three questionnaires:

1) Demographic mother- infant questionnaire: for mother data included age, education level, job, number delivery, type of delivery, number of births, planned or unplanned pregnancy, etc. (21 items). Infants data included the gestational age, gender, birth weight, APGAR score at first and five minutes, etc. (7 items).

2) Spielberger State- Trait Anxiety Inventory: the Spielberger State- Trait Anxiety Inventory (STAI) consists of two parts measuring the state and trait anxieties separately. Each section comprised of 20 questions and each question has been scored 1 to 4. For the state items, respondents are asked to indicate "how you feel right now, that is, at this moment". Responses indicate intensity of feeling on a 1 to 4 scale, from "not at all" through "somewhat", "moderately so" to "very much so". For the trait items the question concerns "how you generally feel" and the response scale indicates frequency as "almost never", "sometimes", "often" and "almost always". The total score for each individual will be between 20 and 80.

Based on this questionnaire, people were classified into three groups of mild (20-40 score), moderate (41-60), and severe (61-80) anxiety.¹⁶ Reliability ($r = 0.97$) and validity of Persian version of this questionnaire by using test- retest has been adopted in 2007.¹⁷ Kvaal et al., reported the sensitivity and specificity of state-trait anxiety questionnaires to 0.82 and

0.88, respectively.¹⁸ Nasiri Amiri et al., reported the reliability of state and trait anxiety questionnaire for each of the subscales of trait anxiety and state anxiety as 0.90.¹⁹ In this study, the face and content validity of study tool was approved by 10 academic staff (nursing and psychiatrics) from Tabriz University of Medical Sciences. The reliability based on coefficient Cronbach's alpha in a sample of 33 mothers for the whole scale was estimated 0.80.

3) Cattell's Anxiety Questionnaire: during the 1960s, Cattell used multi variate analyses to examine the structure of questionnaire items deemed to measure anxiety, and empirically distinguished between state and trait components. It is originally developed as a research instrument to study anxiety in normal adult populations. This is a 40 items self-reports scale that measures state- trait anxiety. Witch item 1-20 measure trait anxiety (STAI-T), and items 21-40 measure state anxiety (STAI-S). These cores can range from 0 to 80. Classification of anxiety scores involves 0-27 (without anxiety), 28-40 (mild anxiety), 41-49 (moderate anxiety) and 50-80 (severe anxiety).

STAI is suitable for all ages above 14-15 years. Iranian version of Cattle's Inventory has been validated in a previous study.²⁰ In this study, the reliability of the instrument based on coefficient Cronbach's alpha in a sample of 33 mothers for the whole scale was estimated 0.71.

Sampling started after receiving all the permission and approvals. Mothers with preterm newborns hospitalized in NICU (gestational age 30-36 weeks) identified from the NICU and delivery ward by a main researcher. Researcher attended the mother's bedside and checked inclusion criteria.

Mothers who met the inclusion criteria and had willingness to participate in the study completed the mother and babies demographic characteristics with the help of researcher (infant's characteristics completed by using infant's medical file via researcher). After informing and explaining to the study objectives and obtain their written informed consent, the mothers were randomly allocated

to three groups (control, film, and booklet). Random allocation to each group was done by a statistician using RAS software. Mothers usually one day after delivery, were stable in terms of physiological conditions and were ready to meet their baby.

One hour before entering to the NICU and meeting their baby, researcher took away mother to a separate room in the unit which mother has been hospitalized there. State-Trait Anxiety Inventory (STAI) was completed by mothers. When filling the questionnaire, the mother was alone in the room. Mothers in the film group watched a film and mothers in the booklet group read a colored picture booklet for about 15 minutes to become familiar with the NICU environment and equipment used for baby, in which familiarization was done

individually. The content of film and booklet was prepared the same. The intervention was done during 15 minutes. The mothers in the control group did not receive any intervention and behaved as routine. After the intervention, mother, went to the NICU by training nurse. The mothers in each three groups completed the State-Trait Anxiety Inventory (STAI) and Cattell's Anxiety Questionnaire in a room at the NICU after the first meeting. Data were analyzed using SPSS version 13 by using descriptive statistics such as indicators of frequency distribution, mean and standard deviation, and statistical tests such as one-way ANOVA and independent t-test. P-values less than 0.05 were considered to be significant. Flowchart of the study showed as figure 1.

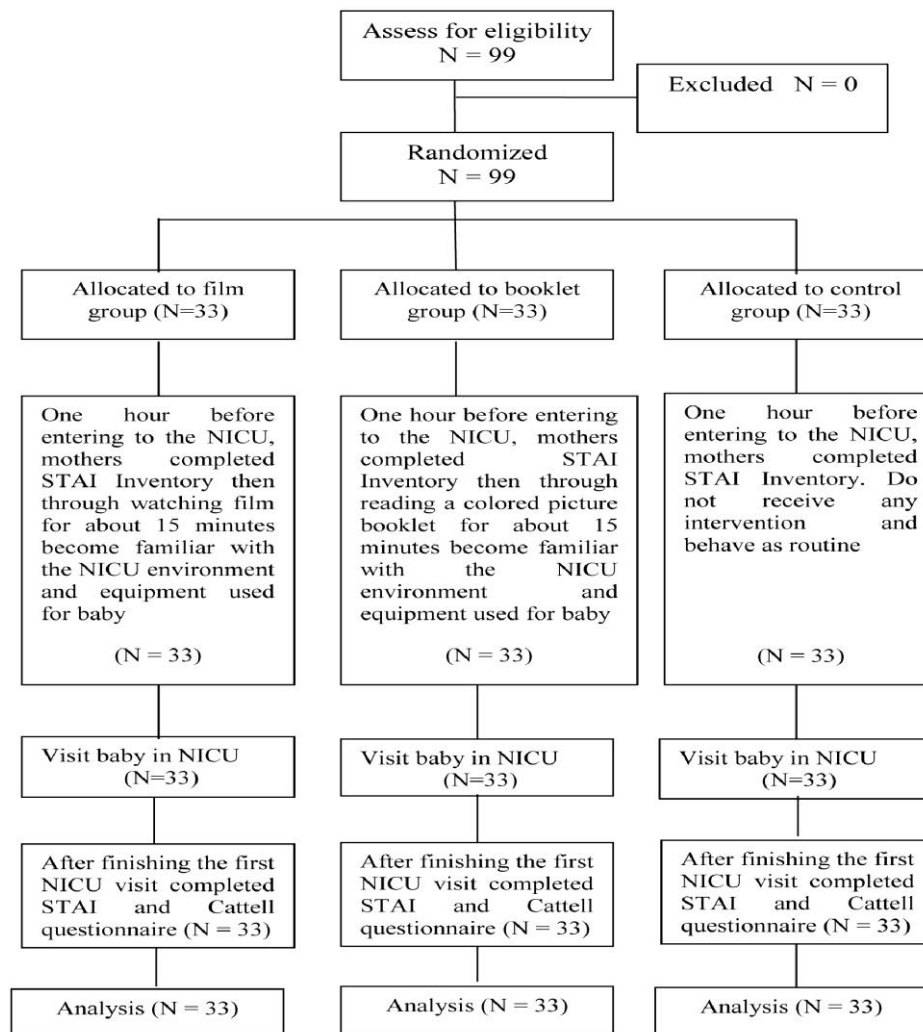


Figure 1. Flowchart of the study

Ethical considerations of this study included the participants' consent for participating in the study, respecting the principle of personal confidentiality and confidentiality of the data.

For protecting participants' privacy, the researcher used codes for each patient. They were also guaranteed confidentiality and anonymity in the presentation of the results. The researcher, after obtaining the permission of ethics committee of Iran- Tabriz University of Medical Sciences (code number: 93108), submitting in IRCT registration system (IRCT registration number: 201405208315N6), and receiving the letter of introduction from the relevant authorities, referred to Al- Zahra hospital affiliated to Tabriz University of Medical Sciences.

Results

This clinical trial completed with participation of 99 mothers in three groups (33 persons in each group of control, film and booklet). There were no statistical significant differences among the groups regarding mother- infant demographic characteristics. About seventy eight subjects (78.6%) had cesarean delivery and 49.0% were primiparous. Most of them (82.7%) had a high school diploma or less and 87.8% were housewife. Most of the newborns (57.1%) were males and their mean (SD) birth weight was 1979.18 (538.72) grams. About thirty seven (37.1%) had over 34 weeks of gestational age at birth and most of them (70.4%) were admitted level I in the NICU (Table1).

Most cause of preterm delivery (33.7%) was premature rupture of membranes. About ninety two mothers (92.9%) were had single born infants. About ninety eight of the mothers (98%) claimed that had a positive experience with current pregnancy. The most common reasons for preterm infant to be admitted to the NICU were respiratory distress.

There were no statistically significant difference between groups before the intervention {mean (SD) related to state anxiety in groups were as film: 49.12 (6.25), booklet: 47.96 (5.86) and control: 47.93 (6.38),

($P= 0.67$) and trait anxiety were as film: 32.75 (3.05), booklet: 32.28 (4.39) and control: 32.48 (3.80), ($P= 0.87$)}. Adjustment for the baseline values and the confounding factors (level of mother's education, mother's job, number of delivery), there was statistically significant difference between groups after the intervention in term of state anxiety {film: 35.30 (3.53), booklet: 36.53 (5.79) and control: 50.30 (6.95), ($P< 0.001$)}. While there was no statistically significant difference regarding trait anxiety after the intervention between groups {film: 32.24 (3.05), booklet: 32.25 (4.50) and control: 32.09 (4.14), ($P=0.87$)}.

The results showed that there was statistically significant difference within groups (pre- post paired t- test) regard state anxiety ($P<0.05$). After NICU first visit the mean of state anxiety score increased in control group 2.36 (2.79) and decreased in intervention groups {film: -13.81 (5.28), booklet: -11.43 (5.33)}. Whereas there was no significant difference within groups (pre- post paired t- test) regarding trait anxiety {film: -0.51 (1.34), booklet: -0.03 (1.69) and Control: -0.39 (1.61), ($P>0.05$)} (Table 2).

The findings showed that in pairwise comparison groups together related to mean difference of state anxiety score after the intervention, there was no significant difference between film and booklet groups ($P= 0.13$); Whereas there was a statistically significant difference between control group with film and booklet groups ($P< 0.05$) (Table 3).

To increase the accuracy and validity of results, the Cattell questionnaire as other tool used for measuring the state and trait anxiety after intervention. There was a statistically significant difference in the state anxiety {film: 5.87 (1.40), booklet: 8.37 (2.35) and control: 13.42 (2.38), ($P< 0.001$)}. While there was no significant difference regarding trait anxiety {film: 6.93 (1.95), booklet: 8.25 (1.98) and Control: 7.84 (2.48), ($P=0.47$)}.

The findings showed that in pairwise comparison groups together related to mean difference of state- trait anxiety score after the intervention by using Cattell questionnaire,

there was no significant difference between film and booklet groups regarding state anxiety ($P>0.05$); whereas there was a statistically significant difference between control group with film and booklet groups regarding state anxiety ($P< 0.05$). While there was no significant difference between groups regarding trait anxiety ($P> 0.05$) (Table 4).

Discussion

Neonatal intensive care unit induces anxiety

for mothers. This study aimed to determine the effect of NICU orientation through watching film and booklet after preterm delivery and before entering to the NICU on decreasing the anxiety of mothers with preterm newborns hospitalized in NICU. The results indicated that providing film and booklet orientation program for mothers with premature infant hospitalized in NICU is beneficent for reducing mother's anxiety level after the first NICU visit.

Table 1. Demographic characteristics of the mother- infant by study groups (N=33)

Characteristics	Film N (%)	Booklet N (%)	Control N (%)	Total N (%)	P
Type of delivery					
Normal	8 (24.2)	5 (15.6)	8 (24.2)	21 (21.4)	0.70 [§]
Cesarean	25 (75.8)	28 (84.4)	25 (75.8)	78 (78.6)	
Number of delivery					
First	16 (48.5)	18 (53.1)	15 (45.5)	49 (49)	0.71 [§]
Second	10 (30.3)	10 (31.3)	8 (24.2)	28 (28.6)	
Third and over	7 (21.2)	5 (15.6)	10 (30.3)	22 (22.4)	
Education level					
University education	4 (12.1)	11 (34.4)	2 (6.1)	17 (17.3)	0.62 [§]
Diploma or less	29 (87.9)	22 (65.6)	31 (93.9)	82 (82.7)	
Mother's job					
Employee	6 (18.2)	6 (18.8)	0 (0)	12 (12.2)	0.39 [§]
Housewife	27 (81.8)	27 (81.2)	33 (100)	87 (87.7)	
Infant's gender					
Boy	18 (54.5)	20 (62.5)	18 (54.5)	56 (57.1)	0.78 [§]
Girl	15 (45.5)	13 (37.5)	15 (45.5)	43 (42.9)	
Gestational age at birth (weeks)					
≤30	12 (36.4)	11 (34.4)	9 (27.3)	32 (32.7)	0.38 [§]
31-34	13 (39.4)	7 (21.8)	10 (30.3)	30 (30.2)	
>34	8 (24.2)	15 (43.8)	14 (42.4)	37 (37.1)	
Level of hospitalization					
Level I	26 (78.7)	21 (64.3)	23 (69.7)	70 (70.4)	0.40 [§]
Level II	5 (15.2)	11 (34.4)	7 (21.2)	23 (23.5)	
Level III	2 (6.1)	1 (1.3)	3 (9.1)	6 (6.1)	
Mother's age[¥] (years)	29.78 (5.18)	30.62 (4.66)	29.42 (8.02)		0.72 [£]
	27.95, 31.62	28.94, 32.30	26.57, 32.26		
Birth weight[¥] (g)	1671 (538)	1979 (538)	1936 (607)		0.06 [£]
	1480, 1862	1782, 2171	1721, 2152		

[¥] Mean (SD) and 95% Confidence Interval were reported. [§]Linear-by-Linear and [§]Pearson Chi-Square were used. [£]ANOVA test was used.

Table 2. Comparison the mean (SD) of state- trait anxiety score (STAI) before and after intervention within group

Variable (After- Before)	Mean differences (SD)	95% CI for difference		P [£]
		Lower bound	Upper bound	
Film				
State anxiety	-13.81 (5.28)	-15.69	-11.94	<0.001*
Trait anxiety	-0.51 (1.34)	-0.99	-0.03	0.30
Booklet				
State anxiety	-11.43 (5.33)	-13.36	-9.51	<0.001*
Trait anxiety	-0.03 (1.69)	-0.64	0.57	0.91
Control				
State anxiety	2.36 (2.79)	1.37	3.35	<0.001*
Trait anxiety	-0.39 (1.61)	-0.96	0.18	0.17

£Pair t-test was used. *Statistically significant

Table3. Comparison of mean differences related to state anxiety score (STAI) pair wise groups after intervention

Group (I)	Group (J)	Mean difference (I-J)	95% CI for difference		P [£]
			Lower bound	Upper bound	
Film	Booklet	-2.13	-4.70	0.424	0.13
	Control	-16.18	-18.76	-13.60	<0.001*
Booklet	Film	2.13	-0.42	4.70	0.13
	Control	-14.05*	-16.70	-11.39	<0.001*
Control	Film	16.18	13.60	18.76	<0.001*
	Booklet	14.05	11.39	16.70	<0.001*

£Analysis of covariance and Sidak post hoc test was used. Adjusted for confounding factors. *Statistically significant

Table4. Comparison of mean difference related to anxiety score by using Cattell questionnaire of pair wise groups after intervention

Variable	Group (I)	Group (J)	Mean difference (I-J)	95% CI		P [£]
				Lower bound	Upper bound	
State- cattell	Film	Booklet	-2.49	-3.73	-1.25	0.30
		Control	-7.54	-8.77	-6.31	<0.001*
	Booklet	Film	2.49	1.25	3.73	0.30
		Control	-5.04	-6.28	-3.81	<0.001*
	Control	Film	7.54	6.31	8.77	<0.001*
		Booklet	5.04	3.81	6.28	<0.001*
Trait- cattell	Film	Booklet	-1.31	-2.58	-0.03	0.52
		Control	-0.90	-2.17	0.35	0.20
	Booklet	Film	1.31	0.03	2.58	0.42
		Control	0.40	-0.87	1.67	0.73
	Control	Film	0.090	-0.35	2.17	0.20
		Booklet	-0.40	-1.67	0.87	0.73

£Analysis of covariance and Tukey post hoc test was used. Adjusted for confounding factors. *Statistically significant

There was significant reduction in maternal state anxiety in both intervention groups (film and booklet).

The results of this study are consistent with other studies that orientation program was the main part of the intervention. In a study of Hanifi *et al.*, results showed that orientation program had positive effects on reducing anxiety of patients undergoing coronary angiography.²¹

Ruffinengo *et al.*, also confirmed the effectiveness of an informative video on reducing anxiety levels in patients undergoing elective coronarography.¹³ The results of the present study is also in line with the findings of Delaram & Karimi Dehkordi study. They found that orientation of nulliparous women with delivery room, personnel and equipments on period reduced the anxiety of women.²² Moreover, Majzooobi *et al.*, showed that psychological preparation leads to the significant reduction of surgery anxiety in the children. They concluded that it can be applied as an effective way to reduce anxiety in children.²³

In this regard, Saisto & Halmesmaki, indicated that psychological preparation methods have a positive impact on decreasing anxiety level of patients.²⁴ In line with the findings of this study, Varaei *et al.*, and Chan & Cheung, studies concluded that the orientation program for patients undergoing coronary angiography reduce their anxiety.^{25,26}

Turkan *et al.*, and Ahn & Kim study found similar reports that NICU education, professional support and personal communication in the post NICU has been associated with parent satisfaction and reduced stress and anxiety levels of parents who had a premature infant in the NICU.^{27,28}

Mettling *et al.*, indicated that NICU education based on website was helpful for high risk pregnant women on bed rest prior to delivery. Providing antenatal education about the neonatal intensive care unit (NICU) may decrease maternal stress levels

and improve outcomes of premature infants. Tour of the NICU prior to delivery and NICU education may be beneficial interventions to all high risk pregnant women.¹¹ All parents should be encouraged to visit NICU prior to birth if possible. If this is not possible then providing parents with a photograph of the infant before they visit the NICU may lessen the negative impact of seeing their baby in NICU for the first time and improve bonding.²⁹ All of these findings support the result of current study.

However, Talaei *et al.*, investigated the effect of familiarizing the patient with the personnel and operating room on the day before tubectomy surgery for decreasing of preoperative anxiety. The results showed that familiarizing program is not effective on pre operating anxiety of tubectomy.³⁰ This result is not consistent with the results of current study. Perhaps the reason for the difference between two studies is that may be due to the previous familiarity of women with tubectomy surgery that conducted by health care systems, thus their familiarization program was ineffective on patient's anxiety.

Current study focused on mothers with infants 30-36 week's gestation, without anomaly. Therefore, results are not generalizable to infants less than 30 weeks and mothers with abnormal infant and anxiety of other family members. These limitations point to the need for further studies. It is suggested further studies of this strategies for mothers and fathers with premature infants without age limitation with anomalies and could be implemented to all family members.

Conclusion

Based on the findings, using orientation program through watching a film or reading a booklet for mothers who had preterm delivery, before entering to NICU; is an effective strategy for reducing the maternal anxiety. The development and

orientation program as a routine way in all hospitals with NICU is seems necessary.

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Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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