The Effects of Training Emotional Intelligence Skills Training on Stress Among the Mothers of Premature Newborns in Neonatal Intensive Care Unit

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Abstract

Background

The mothers of premature newborns experience high levels of stress which can affect their relationships with their newborns, cause them ineffective parental role performance, and impair their newborns' growth and development. Emotional intelligence (EI) has potential positive effects on stress.

Objectives

This study evaluated the effects of training EI skills on stress among the mothers of premature newborns in neonatal intensive care unit (NICU).

Methods

This quasi-experimental study was conducted in 2016 with a pretest-posttest design and a control group. Ninety mothers of premature newborns were selected from the NICUs of Zeinabieh and Hafez hospitals, Shiraz, Iran, and randomly allocated to an intervention and a control group. Participants in the control group received EI skills training in six sessions held twice weekly. The Parental Stress Scale was used for stress assessment before and one week after the intervention. The SPSS software (v. 16.0) was used for data analysis.

Results

Thirty seven participants in each group completed the study. While there was no significant difference between the intervention and the control groups respecting the pretest mean score of stress (48.89 ± 19.02 vs. 44.92 ± 18.55 ; $P = 0.37$), the posttest mean score of stress in the intervention group was significantly less than the control group (13.29 ± 13.15 vs. 47.84 ± 22.56 ; $P < 0.001$). The mean score of participants' stress had significant relationship with their income level and their premature newborns' birth weight.

Conclusion

Training EI skills is effective in significantly reducing stress among the mothers of premature newborns in NICU.

Introduction

Premature birth is a major health problem of the present era. New reproductive technologies, increased rate of pregnancy after age 35, increased rate of multiple pregnancies, and improvements in pregnancy

and perinatal care services have increased the rate of premature births and the prevalence of severe congenital anomalies, particularly in industrialized countries[1]. Statistics show that 5–15% of newborns in the world are premature[2].

Premature newborns may need hospitalization in neonatal intensive care unit (NICU), where advanced care services are provided to reduce the complications of prematurity and improve the survival of premature newborns[3]. However, improved survival rate of premature newborns is associated with different problems and increases newborns' caring needs[4]. Moreover, most parents are physically, mentally, and emotionally unprepared for the unexpected birth of a premature newborn and hence, experience severe stress after a premature birth. The hospitalization of a premature newborn in NICU is also a severe emotional crisis for parents and causes them severe stress[5]. A study showed that 77% of the mothers of premature newborns had clear symptoms of psychiatric trauma for one month after birth and 49% of them had the symptoms for even one year[6].

Stress is a set of events which begin with a stimulus, are perceived and interpreted in the brain, and lead to a physiological and biological response to allow the organism to encounter and cope. The stimulus can be an opportunity or a threat[2]. Unmanaged stress can lead to depression, reduce quality of life[6], and thereby, negatively affect both maternal and neonatal health[7].

Emotional intelligence (EI) skills are potentially effective in coping with stress[1]. A study showed that high EI was associated with low perceived stress among medical students, while low EI was associated with the use of ineffective coping strategies[8]. Another study showed that individuals with high EI had great ability to manage their stress and use problem-focused coping strategies[9]. However, there are limited data about the effects of training EI skills on stress among the mother of premature newborns. Therefore, this study was conducted to address this gap.

Objectives

This study aimed to evaluate the effects of training EI skills on stress among the mothers of premature newborns in NICU.

Methods

Study design and participants

This quasi-experimental study was conducted with a pretest-posttest design and a control group. Participants were ninety mothers of premature newborns selected from the NICUs of Zeinabieh and Hafez hospitals affiliated to Shiraz University of Medical Sciences, Shiraz, Iran. Inclusion criteria were ability to speak, read, and write in Persian, no history of newborn's hospitalization in NICU, agreement for participation, and a premature newborn with a gestational age of 26–36 weeks, a birth weight less than 2500 grams, and no life-threatening problem. Exclusion criteria were newborn's death, discharge from

NICU, or transfer to another healthcare center during the study, voluntary withdrawal from the study, and any absence from the intervention sessions. Participants were randomly allocated to a control and an intervention group using a computer-generated randomization list. Accordingly, ninety sealed envelopes each containing a paper with a number from 1 to 90 were prepared. Numbers had randomly been generated using a computer program. Each participant randomly selected an envelope and reported its number to a statistician who knew the group of each number. As the intervention of the study was a training program, blinding was not possible.

Sample size was calculated using the results of a former study which reported that the mean score of anxiety in mothers was 91.4 ± 3.16 in the control group and 61.2 ± 4.4 in the intervention group[10]. Accordingly, with a confidence level of 0.95, a power of 0.80, a minimum mean difference of 2.83, and a probable attrition rate of 10%, the sample size calculation formula (Figure 1) showed that 45 participants per group were needed.

Measurement

Data were collected using a demographic questionnaire and the Parental Stress Scale. The items of the demographic questionnaire were on participants' age, occupation, educational level, marital status, number of children, type of delivery, and their newborn's gestational age, gender, and weight. Demographic data were retrieved from participants and the medical records of their newborns. The Parental Stress Scale has 26 items in three subscales, namely NICU environment (five items), the appearance and behaviors of the newborn (fourteen items), and parent-newborn relationships (seven items). Items are scored on a five-point Likert scale as follows: 0: "Not at all stressful"; 1: "A little stressful"; 2: "Moderately stressful"; 3: "Very stressful"; and 4: "Extremely stressful". Therefore, the possible total score of the scale is 0–104, with higher scores showing greater stress. Scores 0–20, 21–40, 41–60, 61–80, and 81–104 respectively show very low, low, moderate, high, and extremely high stress. This scale has acceptable validity and reliability with a Cronbach's alpha of 0.86[11]. Study participants completed this scale before and one week after the study intervention.

Intervention

Participants in the control group did not receive any EI-related intervention, while their counterparts in the intervention group participated in six 1.5-hour EI skills training sessions held twice weekly. A psychologist provided EI skills training to participants in a room next to NICU in the study setting while the first author supervised the sessions. The training program was developed based on Mayer and Salvi's EI model [12] and its content was as follows:

Session 1: After an introduction, participants were informed about the intervention and the number and duration of the sessions, and then, their questions were answered. Finally, diaphragmatic breathing and mental imagery were trained and exercised.

Session 2: EI and its difference with intelligent quotient were discussed.

Session 3: Participants were provided with explanations about self-awareness, discovery of emotions, different simple and complex emotions and their differences, and how to understand the emotions of self and others.

Session 4: Explanations were provided about understanding of emotions, empathy, social skills, and establishment of effective communication.

Session 5: This session was on the regulation and management of emotions.

Session 6: Verbal and written summaries of all trainings in previous sessions were provided and participants' questions were answered.

A panel of experts consisted of two psychologists and four psychiatric nurses approved the protocol and the content of the training program. No change was made to the approved program during the study.

Data analysis

Data were analyzed using the SPSS software (v. 16.0, SPSS Inc., Chicago). Frequency, mean, and standard deviation were calculated to describe the data. The Kolmogorov-Smirnov and the Shapiro-Wilk tests were performed for normality testing. The independent-sample t , the Chi-square, and the Fisher's exact tests were used for between-group comparisons, while the paired-sample t and the repeated measures analysis of variance were used for within-group comparisons. The analysis of covariance was also used for between-group comparison respecting the posttest mean score of stress adjusted for the effects of potential confounders. The level of significance was set at less than 0.05.

Findings

In total, ninety mothers of premature newborns in NICU were recruited to the study (Figure 2). Eight participants from each group were excluded due to their lost to follow-up and the study was completed with 37 participants in each group. Study groups did not significantly differ from each other respecting participants' and their newborns' characteristics ($P > 0.05$), except for newborns' birth weight and the existence of premature newborns in the family ($P > 0.05$) (Table 1).

There was no significant difference between the study groups in terms of the pretest mean score of stress ($P > 0.37$), while the posttest mean score of stress in the intervention group was significantly less than the control group ($P < 0.001$). The results of the repeated measures analysis of variance also showed the significant effects of time, group, and time-group interaction ($P < 0.001$; Table 2).

The analysis of covariance was used for between-group comparison in terms of the posttest mean score of stress adjusted for the confounding effects of newborns' birth weight and the existence of premature newborns in the family. Its results showed that after removing the effects of these potential confounders, the posttest mean score of stress in the intervention group was significantly less than the control group ($P < 0.001$) (Table 3).

Discussion

This study evaluated the effects of training EI skills on stress among the mothers of premature newborns in NICU. Findings showed that the mean score of stress in the intervention group significantly decreased after the study intervention, denoting the significant positive effects of training EI skills on maternal stress. EI skills training programs, like the intervention of the present study, usually include training about self-awareness and identification of the type and intensity of emotions[13]. A former study reported that these components helped mothers with premature newborns easily identify their emotions, more quickly respond to problems, and better manage their anger[14]. Another study confirmed that training EI skills, anxiety and depression management skills, relaxation exercises, and life skills improved general health among the mothers of premature newborns[15].

In line with our findings, different studies have shown the effectiveness of EI in reducing stress and anxiety. For example, a study concluded that EI was essential for reducing the level of anxiety and frustration and improving the level of trust and courage[16]. Another study showed that higher EI was associated with lower prevalence of anxiety disorders[17]. Moreover, a study reported that EI training significantly reduced stress syndrome among the mothers of mentally retarded children [18] and another study showed that EI training had significant positive effects on stress and anxiety among physicians and nurses[19].

Study findings showed that the mean score of stress among the mothers of newborns with lower birth weight was greater. This finding may be due to the severer conditions of newborns with lower birth weight and the necessity of performing more invasive procedures for them. A former study highlighted the necessity of providing parents with explanations about the characteristics of their newborns, including weight, size, and physical problems[20]. Moreover, our findings showed the higher mean score of stress among participants with another premature newborn in family. A former study also reported the same finding[21]. A reason for this finding may be the greater awareness of the mothers of another premature newborn about the critical conditions of premature newborns.

Mothers with higher income experienced greater reduction in the mean score of stress compared with their low-income counterparts. Therefore, income and socioeconomic status can be considered as significant factors affecting stress among the mothers of premature newborns. A study in the United States also showed that mothers with high income experienced lower stress[22]. Mothers with low socioeconomic status may suffer from problems such as malnutrition, inadequate care during frequent pregnancies, and stress, which in turn may lead to intrauterine growth restriction and low birth weight[23]. Moreover, short intervals between pregnancies can reduce women's physical strength and the availability of essential nutrients for the fetus and thereby, result in prematurity and low birth weight.

Limitations

A main limitation of the present study was our inability to control the effects of probable recent stressful events in participants' lives. Moreover, the study was conducted only in two hospitals. Further studies with larger samples are recommended to evaluate the effects of training EI skills on the mothers of premature newborns. Moreover, studies with long follow-up period are recommended to evaluate the long-term effects of training EI skills.

Conclusion

This study shows that training EI skills is effective in significantly reducing stress among the mothers of premature newborns hospitalized in NICU. Therefore, routine EI skills training programs are recommended for the parents of children hospitalized in different hospital settings.

Abbreviations

EI

Emotional Intelligence

NICU

Neonatal Intensive Care Unit

Declarations

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Authors' contributions

MA: The conception, design of the study, data collection process were undertaken; FA: Was the supervisor; BP: Advisor. They contributed to the design of the study, and reporting of the result. MD, LA: Analysis, interpretation and reporting were supervised. All authors contributed to drafting the article, revising it and preparing the final version of the manuscript to be submitted to the journal. They all met the criteria of authorship.

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Availability of data and materials

Full data set and other materials on this study can be obtained from the corresponding author on reasonable request.

Ethics approval and consent to participate

In order to do ethical consideration, this study followed the guidelines set by declaration of Helsinki and received ethical approval for human subject by the Ethics Committee of Kerman University of Medical Sciences approved the study. (code:IR.KMU.REC.1395.576). Informed consent was obtained from all participants. They were ensured that their data would remain confidential, their participation would completely be voluntary, and they would be able to withdraw from the study at any time.

Consent for publication

Not applicable.

Competing interests Funding

None of the authors report any competing interest.

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Tables

Table 1
Between-group comparisons in terms of participants' characteristics

Group		Intervention	Control	Test value	P value
Characteristics		N (%) or Mean±SD	N (%) or Mean±SD		
Educational level	Secondary	7 (18.9)	11 (29.7)	5.79*	0.22
	Diploma	11 (29.7)	17 (45.9)		
	Associate degree	4 (10.8)	2 (5.4)		
	Bachelor's	10 (27.0)	5 (13.5)		
	Master's	5 (13.5)	2 (5.4)		
Delivery type	Normal vaginal	12 (32.4)	9 (24.3)	0.6*	0.44
	Cesarean section	25 (67.6)	28 (75.7)		
Pregnancy type	Singleton	28 (75.7)	34 (91.9)	3.58*	0.06
	Twin	9 (24.3)	3 (8.1)		
Newborns' gender	Female	27 (72.9)	22 (59.5)	1.51*	0.219
	Male	10 (27.1)	15 (40.5)		
Mother's occupation	Housewife	32 (86.5)	33 (89.2)	0.13*	0.72
	Employed	5 (13.5)	4 (10.8)		
Income	Low	13 (35.1)	20 (54.1)	5.52**	0.059
	Moderate	17 (45.9)	16 (43.2)		
	High	7 (18.9)	1 (2.7)		
Another premature child in family	Yes	21 (56.8)	27 (73.0)	6.17**	0.041
	No	14 (37.8)	5 (13.5)		
	No answer	2 (5.4)	5 (13.5)		
Birth weight (Grams)		1513.24±330.59	1758.92±567.22	2.28***	0.03
Gestational age)Weeks(		32.08±4.04	32.11±5.82	0.02***	0.98
*: The results of the Chi-square test; **: The results of the Fisher's exact test; ***: The results of the independent-sample <i>t</i> test					

Table 2
Between- and within-group comparisons in terms of the mean score of stress

Time Group	Before	After	P value		
			Time	Time*group	Group
Intervention	48.89±19.02	13.29±13.15	< 0.001	< 0.001	< 0.001
Control	44.92±18.55	47.84±22.56			
Test results	t = 0.91	t = 8.04			
	P value = 0.37	P value < 0.001			

Table 3
Between-group comparisons in terms of the mean difference of participants' stress adjusted for the effects of potential confounders

Mother's stress	Experimental	Control	(control-experimental) Mean ± SD	Confidence interval (95%)	Significance level
	14.02 ± 3.08	47.10 ± 3.11	33.08 ± 4.47	(0.4, 0.87)	P < 0.001

Figures

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2} = \frac{(1.96 + 0.84)^2 (5.4^2 + 3.16^2)}{(2.83)^2} \cong 41$$

Figure 1

Sample size calculation formula

Figure 2

The flow diagram of the study