Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(4B):1712-1720 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2015.v03i04.021

Research Article

The effect of breastfeeding training based on BASNEF model on infants' growth and development in the women with and without postpartum blues

Akbarzadeh M[2], Kiani Rad S[2], Moattari M[3], Mokhtaryan T[2]
[1]Maternal –fetal medicine research center, Department of Midwifery, School of Nursing and Midwifery, Shiraz University of medical sciences. Shiraz. Iran,
[2]Department of midwifery, Research center for health sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
[3]Department of nursing, Shiraz University of Medical Sciences, Shiraz, Iran.

***Corresponding author**
Akbarzadeh M,
Email: akbarzadm@sums.ac.ir

Abstract: Considering the importance of infant's physical indicators and developmental functions in the first year of life, the present study aimed to investigate the effect of breastfeeding training based on BASNEF model on infants' growth and development in the women with and without postpartum blues. This semi-experimental study was conducted on 100 subjects in 2012. The intervention group took part in four educational sessions and was provided with pamphlets and CDs. Besides, three sessions were held for their husbands, mothers, and mothers-in-law. The control group only received the hospital's routine care. Growth and development indicators were assessed using Denver II questionnaire at birth and after 1 and 3 months. Zung depression scale was also completed by the two groups in the first week after delivery. The mean score of postpartum blues was 31.36±7.98 in the intervention group and 37.61±12.15 in the control group, and the difference was statistically significant (P=0.004). However, no significant relationship was observed between the mean score of postpartum blues and parameters of BASNEF model in the two groups immediately, 1 month, and 3 months after birth (P>0.05). In the intervention group, a significant association was found between the mean score of postpartum blues and mid-upper arm circumference at the age of 3 months (P=0.024) and one item of personal-social domain (P=0.019).The educational intervention was effective in reduction of postpartum blues. However, no significant difference was observed between the two groups regarding the growth and development indicators. Long-term investigations are recommended to be conducted in order to evaluate growth and development indexes.
Keywords: breast feed, model, postpartum blue, physical, development

INTRODUCTION

Breastfeeding is associated with mother's and child's health. The physical and mental advantages of breastfeeding include reduction of the risk of infectious diseases, obesity, hypotension, reduction of cholesterol level, nausea, vomiting, respiratory diseases, sudden infant death syndrome, necrotizing enterocolitis, and hypertension and increase of cognitive and motor functions. Al-Zubairi et al. conducted a study on 621 mothers in Yemen in 2007 to assess the relationship between exclusive breastfeeding and infant's weight and mother's education level, occupation status, and number of deliveries[1]. The study results demonstrated that the infants that had been breastfed were heavier compared to those that were fed inefficiently [1]. Moreover, length of exclusive breastfeeding had a reverse relationship with the risk of high weight gain. The infants that had been breastfed for a month showed a two-fold higher weight gain compared to those exclusively breastfed for 6 months. Thus, it was concluded that exclusive breastfeeding decreased the risk of high weight gain in infancy [2].

The positive effects of breastfeeding on mother's physical health and improvement of maternal outcomes include reduction of the risk of breast cancer, ovarian cancer, type 2 diabetes, and hypertension. In addition, its mental effects are attenuated response to stress, improvement of sleep, and reduction of postpartum depression. Nevertheless, mental advantages of breastfeeding require further experimental evidence [3,4].

Breastfeeding has indirect effects, as well. For instance, breastfeeding women have higher levels of prolactin and oxytocin compared to non-breastfeeding ones. These hormones lead to a feeling of tranquility, health, and care behaviors [5]; however, some studies have not confirmed the role of prolactin [6].

Evidence has indicated that breastfeeding creates a mental and hormonal condition in the mother which has a reverse relationship with postpartum depression. Studies have also suggested that the women suffering from postpartum depression and consuming anti-depressants should not disrupt breastfeeding. Oxytocin and prolactin have anti-depression and anti-anxiety effects. Furthermore, breastfeeding mothers showed reduction of cortisol response to stress. These revealed that breastfeeding decreased the endocrine glands' response to stress [3].

Research has demonstrated that disruption of breastfeeding not only has physical and mental effects on infants, but it also exposes mothers at risk of different psychological disorders [7]. For instance, postpartum blues is a transient phenomenon of mood changes which can occur in the first days after delivery and continue up to 5 days. This phenomenon is accompanied by some symptoms, such as unstable mood between happiness and sadness, excessive sensitivity, unreasoned crying, restlessness, weakness in concentration, anxiety, irritability, and anger [8]. Almost 30-85% of women experience postpartum blues which normally begins between the 1st and 4th day after delivery. This disorder is mostly detected in primiparous women and most mothers experience the symptoms of depression through the last months of pregnancy. The prevalence of emotional changes and the time they begin indicates the relationship between this disorder and regulation of hormones after delivery [9].

Lack of exclusive breastfeeding, particularly in the first 6 months of life, leads to more than one million preventable deaths annually. Evidence has shown that programs supporting breastfeeding are effective in lengthening breastfeeding, but the impact of these programs on duration of exclusive breastfeeding is not known yet [10].

Despite the recommendation of American Academy of Pediatrics (AAP) regarding exclusive breastfeeding within 6 months after birth, the rate of breastfeeding is still low. Although the rate of primary breastfeeding is high up to several weeks after birth, the rate of continuation of breastfeeding is quite low.

In Portugal, in spite of the high rate of breastfeeding at discharge (91-98.5%), this rate decreased to 54.7-55% three months after delivery and 34.1-36% six months after that [3].

In general, hospital measures, mothers' and families' knowledge, attitude, and beliefs, and supporting breastfeeding can affect exclusive breastfeeding as well as infants' growth and development which are the main bases of health achievement in future generations. The results of the study by Tarrant and Dodgson revealed that in order to promote breastfeeding, plans should be made to encourage couples, create positive attitude, and improve their knowledge level. Regular planning should also be made in all social levels [11]. Raven carried out a research on families, health staff, and traditional medicine specialists in China regarding the effect of the common traditional methods after delivery on infants' nutrition. The findings of that study proved the necessity to inform and train the health personnel and educate the families to prevent the probable incorrect thoughts. Moreover, Stewart et al. conducted a study in Northern Ireland in 2003 and emphasized that inappropriate norms made successful breastfeeding difficult. Therefore, educational programs must follow a social approach [13]. In general, type of education is among the bases and main indexes in health education planning [14].

BASNEF model is one of the models used for identification of behavior and creation of novel behaviors in the society. The constructs of the model are beliefs, attitude, subjective norms, and enabling factors. Various studies have confirmed the efficiency of this model [15,16].

Subjective norms refer to beliefs about other individuals' behaviors regarding breastfeeding. Besides, enabling factors, including income, house, food, water, resources, and skills, allow the individuals to convert their intention or interest to action and behavior (Table 1) [17]. In this regard, AAP recommended screening of development tests for various age ranges and emphasized utilization of screening tests at 9th, 18th, and 30th month visits [18].

According to what was mentioned above, breastfeeding has significant effects on infant's growth and development which are determining factors in future of individuals and societies [19,20]. However, only few studies have investigated the difference between mothers with and without postpartum blues regarding infants' growth and development. Moreover, most of the studies performed in Iran have assessed infants' motor growth at pre-school and school ages and physical and motor development in infancy has been less taken into account. Therefore, the present study aims to evaluate the effect of breastfeeding training based on BASNEF model on infants' growth and development in the primiparous women with and without postpartum blues referring to the selected hospitals of Shiraz University of Medical Sciences, Shiraz, Iran.

MATERIALS AND METHODS

This semi-experimental study was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran. The aimed to assess the effect of breastfeeding training based on BASNEF model on infants' growth and development in the women with and without postpartum blues in 2012. The research

community included the pregnant women referring to prenatal clinics at Shoushtari and Hafez hospitals, Shiraz, Iran. Considering the sample size formula, a 100-subject sample size was determined for the study (50 subjects in each group). Then, the subjects were divided into two groups using the table of random numbers.

The inclusion criteria of the study were being primiparous, having no complications, gestational age of 36-41 weeks, being 18-35 years old, having at least middle-school degrees, not having serious physical or mental disorders during the study, living in Shiraz, intending to breastfeed their infants, being willing to take part in the study, and signing written informed consents.

After selection of the mothers and completion of the questionnaires, four 90-minute educational sessions based on BASNEF model were held for the intervention group once a week. The content of these sessions included the advantages of breastfeeding, correct method of breastfeeding, role of breastfeeding in mother's health, role of breastfeeding in improving children's physical and mental health, signs of sufficiency of milk, milking and storing methods, consultation with mothers and their acquaintances regarding breastfeeding, advantages of continuous breastfeeding, and infants' growth-development indicators. These sessions were conducted by the researchers through lecturing, group discussion, role play, practice, educational images, question and answer, pamphlet, and in the last session video CD. Besides, three educational sessions were separately held for 20 mothers, 15 mothers-in-law, and 19 husbands.

The reliability and validity of BASNEF questionnaire have been determined by Sharifi Raad. In order to assess the reliability of the questionnaire, a pilot study was conducted on 20 individuals. Accordingly, Cronbach's alpha coefficient was obtained as 0.81, 0.9, 0.78, 0.82, and 0.91 for knowledge, attitude, performance, enabling factors, and subjective norms, respectively. That study was the basis of the present research [22].

After the end of the intervention, Zung depression scale was completed by the two groups within the first week after delivery. Zung self-rating depression scale was published by Zung in 1965 for quantitative evaluation of depression. Various studies in the U.S. and other countries around the world have confirmed the reliability and validity of this scale [21,22]. This instrument consists of 20 items measuring various aspects of depression which can be scored from 1 to 4. The scores of the items increase from right to left for positive feelings and from left to right for negative ones. The subjects were required to mark the statements which best described their feelings in the recent two weeks. Accordingly, scores <50, 50-59, 60-69, and >70 represented normal mood without psychopathology, mild to average depression, average to state depression, and severe depression, respectively [23]. The reliability of this scale was assessed by Khanjani et al. in Iran by test-retest method with a 15-day interval and was obtained as 0.92. That study was the basis of the current research [24].

In the third stage, infants' physical growth (weight, height, and head circumference) and development indexes (based in Denver Development Screening Test-II) were recorded. This questionnaire evaluates development indicators separately in gross motor, fine motor, adaptive, and personal-social dimensions. Denver Development Screening Test-II was first used by Denver for evaluation of development indexes in 1026 children (543 males and 593 females) from 2 weeks to 6.4 years of age. This instrument was localized by Shahshahani et al. and its content validity was confirmed. Besides, Cronbach's alpha coefficient and Kappa measure of agreement were respectively 92% and 87% for test-retest method and for 90% and 76% for inter-rater method. These values provided the basis of the present study [25].
After all, the data were entered into the SPSS statistical software and analyzed using paired t-test.

RESULTS

The mean age of the participants was 23.86±4.30 years in the intervention group and 24.4±4.18 years in the control group (P=0.78). In the intervention group, 16 (32%), 27 (54%), and 7 (14%) mothers had below diploma, diploma, and academic degrees, respectively (P=0.80). The mean score of postpartum blues was 31.36±7.98 in the intervention group and 37.61±12.15 in the control group, and the results of t-test showed that the difference was statistically significant (P=0.004). However, no significant relationship was observed between the intervention group's mean score of postpartum blues and knowledge score before the intervention (P=0.63) and immediately (P=0.67), 1 month (P=0.44), and 3 months (P=0.20) after that. Also, no significant association was found between the two groups' mean scores of postpartum blues and the mean scores of attitude and enabling factors before the intervention and immediately, 1 month, and 3 months after that (P>0.05) (Table 2-3). Among the physical growth indexes (weight, height, head circumference, and Mid-Upper Arm Circumference (MUAC)), a significant positive relationship was observed between the mean score of postpartum blues and MUAC at three months of age (P=0.024). In the control group, on the other hand, a significant positive association was observed between the mean score of postpartum blues and weight at three months of age (P=0.039) (Table 4).

However, the results revealed no significant relationship between the mean score of postpartum blues and mean duration (days) of achievement of

development indicators in gross motor, fine motor, adaptive, and personal-social domains, except for only one item in personal-social domain (P=0.019) (Table 5-6).

Table-1: Behaviour change model [23]

Aspects	Influences	Actions needed	Questions to ask
Knowledge	Programme planning, books, educators	Health and classes about benefits of exclusive breastfeeding, human lactation& Positions , indicators of adequate intake,	Questionnair& in a role play situation, discuss breastfeeding with a pregnant or postpartum woman,
Beliefs, attitudes	Culture, values, traditions, education, experiences	Building on positive and neutral aspects in communication to modify beliefs and values	Questionnair & discuss breastfeeding with a pregnant or postpartum woman,
Subjective norms (community)	First relative Family, community, influential people,	Communication directed at persons of influence in family and community (husband, mother of husband, mother of pregnant women), Communication about Breastfeeding is conceptions	Provide breastfeeding support throughout individualized contacts, talking misconnect , fear of being "tied down,
Enabling factors	Breastfeeding Recommendations, Pumping & Storing Breast Milk, Breastfeeding Problems & Solutions	Capacity building activities in skill training, gaining support from influential people, gaining help from other health provider	What do you need to have good health and exclusive breastfeeding?

Table-2: Correlation of the mean scores of postpartum blues after intervention and the mean scores of knowledge, evaluation of behavioral outcomes, attitude towards the behavior, enabling factors at before, after, one and three months after educational intervention in the intervention group

			Before intervention	After intervention	One month later	Three months later
Postpartum Blues score in the intervention group	Knowledge	Pearson Correlation	-0.076	-0.061	-0.112	-0.186
		p- value	0.625	0.676	0.448	0.206
	Evaluation of behavioral outcomes	Pearson Correlation	0.119	0.157	0.109	-0.205
		p- value	0.414	0.282	0.459	0.162
	Attitude Towards the behavior	Pearson Correlation	0.112	0.069	-0.074	0.061
		p- value	0.442	0.637	0.617	0.682
	Enabling Factors	Pearson Correlation	0.218	-0.040	-0.134	-0.153
		p- value	0.137	0.783	0.363	0.298

Table-3: Correlation of the mean scores of postpartum blues after intervention and the mean scores of knowledge, evaluation of behavioral outcomes, attitude towards the behavior, enabling factors at before, after, one and three months after educational intervention in the control group

			Before intervention	After intervention	one month later	Three months later
Postpartum Blues score in the intervention group	Knowledge	Pearson Correlation	-0.008	-0.107	0.009	-0.007
		p- value	0.957	0.484	0.952	0.965
	Evaluation of behavioral outcomes	Pearson Correlation	-0.163	-0.134	-0.056	0.132
		p- value	0.264	0.358	0.709	0.378
	Attitude Towards the behavior	Pearson Correlation	0.028	-0.025	-0.120	-0.068
		p- value	0.847	0.867	0.420	0.647
	Enabling Factors	Pearson Correlation	0.024	0.006	0.073	0.063
		p- value	0.868	0.965	0.624	0.672

Table-4:Correlation of the mean scores of postpartum blues after intervention and the weight, height, head circumference and arm circumference of infants in the intervention and control groups between the birth and 3 months

		Weight			Height			Head circumference			Arm circumference		
		Birth	One month	3months	Birth	One month	3 months	Birth	One month	3months	Birth	One month	3months
Intervention group	Pearson Correlation	-0.047	-0.129	-0.167	0.032	0.112	0.037	-0.091	0.012	-0.183	-0.150	-0.029	0.333(*)
	p- value	0.753	0.380	0.258	0.828	0.447	0.804	0.536	0.936	0.213	0.307	0.843	0.021
Control group	Pearson Correlation	0.134	0.263	0.302(*)	0.113	0.172	-0.076	0.184	0.173	0.120	0.046	-0.173	0.126
	p- value	0.370	0.074	0.039	0.450	0.249	0.613	0.215	0.245	0.423	0.758	0.246	0.398

Table-5: Correlation of the mean scores of postpartum blues and the mean and SD of the time of achieving the developmental skills (gross motor skills dimension)

	Postpartum Blues score	
Developmental indicators	**Pearson Correlation**	**P-value**
Moving the two hands	0.112	0.186
Symmetric movement of the hands	0.139	0.100
Moving both legs	Similar data	
Lifting the head up to 45˚	0.030	0.725
Lifting the head up to 90˚	-0.079	0.355
Stability of the head while sitting	-0.050	0.554
Breast lift by relying on the arm	0.000	0.998
Standing weight on feet	-0.050	0.572
Keeping the head fixed	-0.115	0.367
Showing reaction to the sound of the bell	Similar data	
Phonation	0.114	0.178
Making sounds	-0.091	0.284
Laughing	0.069	0.415
Screaming	0.105	0.214
Tracking the sound of the rattle	-0.011	0.913

Table-6: Coloration of the mean scores of postpartum blues and the mean and SD of the time of achieving the developmental skills (fine motor skills dimension and individual-social dimension)

		Postpartum Blues score	
Developmental indicators		**Pearson Correlation**	**P-value**
Fine motor skills dimension	Following an object to the midline	-0.046	0.587
	Following an object after the midline	0.069	0.414
	Taking the rattle	-0.013	0.881
	Bringing the hands together	0.111	0.216
	Rotating the head	0.096	0.285
Individual-social dimension	Paying attention to others' faces	-0.198*	0.019
	Smiling	-0.019	0.820
	Smiling at others	0.063	0.458
	Paying attention to one's hands	0.031	0.720

DISCUSSION

The findings of the present study showed that the mean score of postpartum blues decreased in the intervention group after the intervention. Therefore, breastfeeding training was probably effective in the intensity of postpartum blues and the intervention group participants felt lower postpartum depression compared to the control group.

The results of the previous studies demonstrated that the women's acquaintances' social support during pregnancy and after delivery was of great importance for women. In fact, the values the acquaintances, particularly husbands, give the pregnant women enlightens hope in their hearts and provides them with more chances for feeling calm, comparing their experiences to those of other women, and enjoy this experience. Besides, these supports attract mother's attention to positive aspects of her infant's birth and reduce the probable effects of hormonal and biological changes on their mental status. Moreover, the mothers receiving emotional and social support after delivery were more confident in playing their maternal roles and expressed higher satisfaction with their motherhood [29].

In the current study based on BASNEF model, involving the husbands and families was effective in improvement of mothers' knowledge and attitude and reduction of their anxiety. Thus, the prevalence of psychological changes was lower in the intervention group.

Among the physical growth indexes, a significant positive relationship was observed between the mean score of postpartum blues and MUAC at three months of age (P=0.024). In the control group, on the other hand, a significant positive association was observed between the mean score of postpartum blues and weight at three months of age (P=0.039).

A study was conducted on 242 women after delivery (120 depressed on 122 non-depressed) in Nigeria in 2007 in order to investigate the effect of postpartum depression on infants' physical growth within the first 9 months of life. Infants' weight and height were measured 6 weeks, 6 months, and 9 months after birth. According to the results, the infants of the depressed mothers had grown less at 3 months of age compared to those of the non-depressed mothers (weight: CI: 95% OR: 3.41 (1.30-8.52), weight: CI: 95%, OR: 3.28 (1.03-10.47)). In addition, the probability of early disruption of breastfeeding was higher in depressed mothers and the incidence of diarrhea and other infectious diseases was higher among their infants. Similarly, studies in Asian developing countries have demonstrated that mothers' postpartum depression predicts lower physical growth and mental development in infants [30]. In contrast, the findings of the current study indicated no significant difference between the mothers with and without postpartum blues regarding the infants' physical growth, except for MUAC. This can be justified by the fact that fetal and infantile growth is supplied by complex genetic and environmental interactions [31,32]. One of the main environmental factors is the socioeconomic status which can be presented through education level, income, or occupation. In the current study, no significant relationship was observed between the mean score of postpartum blues and occupation (P=0.78). Education level is yet another dimension of socioeconomic status. Some researches have demonstrated that mother's low education level was accompanied by her infant's slower growth and that this effect was stronger for head compared to other parts of the body (P=0.23) [33]. Nevertheless, the present study revealed no significant association between the couples' education levels and mean scores of postpartum depression in the two groups. Hence, in spite of involvement of the families in this study, breastfeeding was not improved and no significant difference was observed between the women with and without postpartum blues regarding infants' growth indexes. This might be due to the fact that these indexes are affected by other variables, such as delivery mode and infant's sex, which have not been investigated in our study. Method of execution of the educational protocol might also require reviewing.

In the current study, a significant relationship was found between the mean score of postpartum blues and mean duration (days) of achievement of development indicators in only one item of personal-social dimension (P=0.019).

A previous study evaluated the correlation between mother's depression 6 months after delivery and home environment and infant's cognitive, motor, and language development at 18 months of age. After controlling the confounding factors (premature infants, breastfeeding, and socioeconomic status), no significant relationship was observed between mother's depression 6 months after delivery and infant's cognitive, motor, and language development. Hence, more studies have to be conducted on depressed mothers [34].

Childhood is a period of quick cognitive development and children's psychosocial environment plays a critical role in their mental and emotional health. Thus, mother's anxiety and depression are the main concerns of children's development. Various studies have indicated a relationship between the symptoms of chronic depression and postpartum depression and weak cognitive and behavioral function [35].

A previous study was conducted on 40 depressed patients and 48 non-depressed controls in 2004 in order to assess the effect of postpartum depression on infant's development. The study results

showed that disorder in mother's primary interactions with her infant led to disorder in development of depressed mothers' children [36].

Some studies have also examined development dimensions (cognitive, motor, or language development) and risk factors and protective factors (mother's education level and socioeconomic status and infant's sex) as the mediating factors of the effects of mother's depression on infantile outcomes. Some studies reported undesirable developmental outcomes due to early postpartum depression, while some others only showed undesirable outcomes due to chronic depression [37].

A systematic study was conducted in 2013 to assess the effect of breastfeeding for above and below 2 years on infants' growth and development. Investigation of six studies on the effect of breastfeeding for 2 years on infants' growth resulted in contradictory findings. Therefore, further studies are recommended to be conducted on this issue [38].

Another study performed on 2857 children indicated that only 13% of the children who had not been breastfed were different from others in growth diagram (Bernardi). This implies that some factors other than mother's mental status and education might have a role in infant's development [39].

It seems that infants' growth and development not only result from proper breastfeeding, but also from application of care packages for improvement of infant's motor skills. Appropriate interactions between the infant and the caregiver are also essential for motor development [40]. Besides, attention should be paid to infants' motor skills based on spontaneous discovering on the surrounding objects [41]. In the present study, however, the aforementioned factors were not investigated and emphasis was put on breastfeeding based on BASNEF model and mothers' psychological dimensions.

One of the limitations of the present study was mothers' lack of cooperation in regularly completing Denver's questionnaire, which was eliminated by continuous follow-up. Besides, despite different growth and development in girl and boy infants, separate reporting was not possible in this study due to the small sample size.

CONCLUSION

Educational intervention based on BASNEF model was effective in reduction of postpartum blues. However, no significant difference was observed between the mothers with and without postpartum depression regarding physical growth (weight, height, and MUAC) and development indicators (gross motor, fine motor, adaptive, and personal-social dimensions). Thus, long-term investigation of growth and development indexes is recommended to clarify the difference between the two groups.

ACKNOWLEDGEMENTS

The present article was extracted from research project(91-4605). The study was financially supported by the Research center for health sciences. Shiraz university of medical sciences. The authors would like to thank Dr. Nasrin Shokrpour at Center for Development of Clinical Research of Nemazee Hospital for editorial assistance.

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