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Original Article

The Effects of Training Based on BASNEF Model and Acupressure at GB21 Point on the Infants' Physical Growth Indicators

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ABSTRACT

Background: Educational models are used to study the behavior and plan for changing and determining the factors that affect the individuals' decision making for conducting a behavior. This study aimed to compare the effects of the educational program based on BASNEF model and acupressure at GB21 point on the infants' physical growth indicators.

Methods: This clinical trial was conducted on 150 (50 per group) pregnant women in 2011-2012. The interventions included educational program based on the BASNEF model and application of acupressure at GB21 point. The infants' physical indicators were compared to the control group one and three months after birth. The study data were analyzed using repeated measurement test, paired sample T-Test, one-way ANOVA, and Tukey's test.

Results: The results showed a significant difference between the intervention and the control group regarding the infants' weight and height one and three months after birth ($P<0.05$). However, no significant difference was found between the training and the acupressure group in this regard ($P>0.05$). Also, no significant difference was observed among the three groups concerning the infants' head and arm circumferences ($P>0.05$).

Conclusion: BASNEF model improved the infants' height and weight. Application of acupressure also improved the infants' height, weight, and head and arm circumferences compared to the control group. Hence, learning and application of techniques and models by the medical team are highly essential.

Keywords: Acupressure, BASNEF model, GB21 acupoint, Physical growth indicator

Introduction

Exclusive breastfeeding supports the infants' growth and development in the first 6 months of life. Breastfeeding has been recommended to be continued for at least one year (1). In comparison to formula feeding, breastfeeding is more advantageous for both the mother and her infant and most responsible organizations have recommended breastfeeding for at least 6 months (2). Raven (2007) conducted a study on the households, health staff, and physicians in China regarding the effects of the common traditional methods after the delivery on the infants' nutrition. The study results emphasized the importance of informing and training the households as well as the health personnel for avoiding the probably wrong beliefs (3). Moreover, Papinczak and Turner (2000) performed a study on 159 breastfeeding mothers in Iceland and showed that the mothers who had not been prepared for exclusive breastfeeding had considerably lower levels of confidence and self-efficacy in breastfeeding (4). Furthermore, Bartlett (1981) stated that improving the knowledge and attitude through training changed the health behaviors and continuation of the training courses helped the stability of these behaviors (5).

Mothers gain information about exclusive breastfeeding since pregnancy. Therefore, development of theory- and model-based training programs can be effective in improving the mothers' attitude and behavior regarding exclusive breastfeeding (6). The study Stewart et al. (2003) conducted in Northern Ireland indicated that inappropriate norms made successful breastfeeding more difficult for the mothers. Thus, training programs should include a social approach, as well (7).

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Up to now, various studies have been carried out regarding the factors related to successful breastfeeding. The results of these studies have revealed that the mothers who feel that the society values the maternal role are better matched with the role of breastfeeding (8, 9). In addition, Hizel et al. (2006) stressed the importance of local traditions and beliefs as well as the effectiveness of family in health programs (10). Besides, Ertem et al. (2001) came to the conclusion that lack of the necessary facilities and consultation-educational interventions led to lack of efficiency and success in exclusive breastfeeding (11).

Health education is the basis of all health activities. Education plays a critical role in changing the individuals' viewpoints, behaviors, and habits. It is also considered as a process which affects the behavior and changes the knowledge, attitude, and skills for maintaining health (12). Health education is an appropriate strategy for creating motivation and improving inappropriate performances because health education is nothing but the science and art of paying attention to a learning process for creating an appropriate behavior in order to achieve health (13). BASNEF model was proposed by John Hubly (1988). He believed that BASNEF model should be considered as a checklist for planning a program rather than explaining the complex processes involved in an individual's behavior (14). This model focuses on the effect of knowledge and attitude on performance, but considers other factors, such as enabling factors and subjective norms, to be also effective in behavior (15).

Acupuncture and acupressure are among the most common non-pharmacological medications and World Health Organization (WHO) has confirmed the application of these two methods in 100 cases. Acupressure involves pressing the key points on the skin by the fingers for stimulating and inducing the self-treatment capabilities of the body (16). In spite of the large number of studies on using alternative medicine for increasing breast milk, a few studies have been conducted on using herbal medicine, acupuncture, acupressure, massage, etc. for increasing breastfeeding. Up to now, acupressure has been employed in the active phase of delivery and for reducing the discomforts after surgery, decreasing the intensity of menstrual pain, and increasing the secretion of prolactin (17). Moreover, acupuncture and acupressure at GB21 point can be greatly helpful for increasing the rate of breastfeeding. Acupressure at this point has been reported to promote breastfeeding and stimulate milk ejection reflex. GB21 point has been located where most women feel muscle tension. Therefore, massage at this point can be an enjoyable way for relaxation while breastfeeding (18).

Considering what was mentioned above, the current study aims to compare the effects of training based on the BASNEF model and acupressure at GB21 point on the infants' physical growth indicators in the women referring to the selected hospitals of Shiraz University of Medical Sciences in 2011-2012.

Material and methods

The present clinical trial compared the physical growth indicators of three groups of infants that had been breastfed up to three months of age. The research community included the pregnant women referring to Shoushtari and Hafez hospitals, Shiraz, Iran in 2011-2012 and the sample size included 150 subjects (50 in each group). The inclusion criteria of the study were being primiparous, gestational age of 36-41 weeks, being 18-35 years old, having at least middle school degree, not suffering from serious physical or mental disorders during the study period, living in Shiraz, being willing to breastfeed the infants, being willing to take part in the study, and signing written informed consents. In addition, the inclusion criteria of the infants were being exclusively breastfed, not suffering from any special disorders, having been healthy at birth, not having congenital disorders, singleton, not suffering from diseases such as severe diarrhea, respiratory infection, and severe jaundice leading to hospitalization during the study period, and being in the standard status regarding the growth and developmental skills indicators at the beginning of the study. The study data were gathered using a questionnaire including the parents' demographic characteristics as well as the infants' features (sex, weight, height, head circumference, and type of delivery), pan balance, tape measure, stadiometer, and blood pressure control machine.

The first, second, and third individuals who referred to the study hospitals and met the inclusion criteria of the study were entered into the training, acupressure, and control groups, respectively. The training group underwent 4 training sessions based on the BASNEF model held once a week each for 90 minutes. These sessions aimed to improve the mothers' knowledge and attitude towards breastfeeding. In the second session, the factors affecting the mothers as well

Table 1. Comparison of the mothers' and husbands' intention for pregnancy in the three groups

Intention for pregnancy	Educational group				Acupressure group				Control group			
	yes		no		yes		no		yes		no	
	N	%	N	%	N	%	N	%	N	%	N	%
Mothers' intention	48	98	2	4	47	94	3	6	49	98	1	2
Husbands' intention	46	92	4	8	47	94	3	6	48	96	4	8

Table 2. Comparison of the infants' weight, height, and head circumference at birth, one month of age, and three months of age in the three groups

Physical indicator	Educational group		Acupressure group		Control group		PV
	Mean	SD	Mean	SD	Mean	SD	
Birth weight	3120.6	309.6	3042.17	298.6	3090.6	348.7	0.48
Weight at one month of age	4311.5	390.6	4148.3	382.0	4089.1	400.7	0.019
Weight at three months of age	5918.8	442.8	5759.8	398.1	5671.7	482.3	0.025
Birth height	49.2	1.4	49.20	1.4	49.0	1.3	0.079
Height at one month of age	53.6	1.8	53.8	1.7	52.5	1.90.012	0.012
Height at three months of age	58.2	2.4	57.6	2.4	56.5	2.4	0.002

Table 3. Comparison of the infants' head circumference and arm circumference at birth, one month of age, and three months of age in the three groups

Physical indicator	Educational group		Acupressure group		Control group		PV
	Mean	SD	Mean	SD	Mean	SD	
Birth HC*	34.6	1.1	34.5	0.92	34.3	0.907	0.513
HC at one month of age	37	1.3	36.8	1.1	36.7	1.2	0.398
HC at three months of age	39.9	1.3	39.5	1.2	39.5	1.3	0.22
AC** at birth	10.3	0.18	10.3	0.16	1.3	0.16	0.845
AC at one month of age	11.4	0.23	11.4	0.24	11.4	0.22	0.927
AC at three months of age	13.4	0.17	13.4	0.15	13.4	0.23	0.728

*HC: head circumference **AC: arm circumference

as the families were identified through group discussions (identification of subjective norms). Also, three training sessions regarding the subjective norms were separately held for 20 mothers, 15 mother in laws, and 19 husbands. The mothers were also provided with a pamphlet on breast milk, a pamphlet on the physical growth skills, and a CD. Considering the enabling factors in the research community, the mothers were given the researcher's phone number to call in case they had any problems in breastfeeding. An introduction letter was also given to the mothers in order to refer to the health personnel in case they had any questions regarding the educational content. In order to monitor the educational intervention, the mothers were contacted through telephone from the first to the third month after birth and a "remembrance training course" was held, as well. After the training when the mothers gave birth to their children and referred to the study centers, the infants' physical growth indicators were measured one and three months after birth.

The participants of the second study group were required to perform acupressure at GB21 point at home before or at the time of breastfeeding for 1 minute. Pressure had to be applied until the women felt burning, tingling, or itching at the acupoint. The subjects were also provided with a form on which they were required to mark the number of times they performed acupressure each day. Finally, the control group only received the routine trainings of the hospitals.

In the first and third months after birth, the infants of the study women were assessed regarding anthropometric indicators (weight, height, and head circumference) by the researcher. After all, the data were entered into the SPSS statistical software and analyzed using Chi-square, paired sample t-test, repeated measurement test, one-way ANOVA, and two-way ANOVA.

Result

In this study, the mean age of the mothers in the training, acupressure, and control groups was 23.86±4.30, 23.98±3.75, and 24.4±4.18 years, respectively. In addition, the maximum and minimum age in the three groups was 18 and 34 years, respectively. Before the intervention, no significant difference was observed among the three groups regarding the educational status (P=0.852), age (P=0.786), and husbands' age and occupation (P=0.617). The research community was also homogeneous regarding the intention for pregnancy and correct breastfeeding (P=0.741) (Table 1). Also, no significant difference was observed among the three groups regarding the infants' birth weight (P=0.489). However, the

Table 4. Two-by-two comparison of the groups regarding the infants' weight

Groups	Weight at one month of age			Weight at three months of age		
	Educational group	Acupressure group	Control group	Educational group	Acupressure group	Control group
Educational group		0.111	0.018		0.19	0.02
Acupressure group	0.111		0.749	0.19		0.607
Control group	0.018	0.749		0.02	0.607	

Table 5. Two-by-two comparison of the groups regarding the infants' height

Groups	Educational group	Acupressure group	Control group	Educational group	Acupressure group	Control group
Educational group		0.113	0.01		0.388	0.001
Acupressure group	0.113		0.625	0.388		0.071
Control group	0.01	0.625		0.001	0.071	

results revealed a significant difference between the intervention groups and the control group regarding the infants' weight at one month (P=0.019) and three months of age (P=0.025) (Table 2-3). According to the results of Tukey's post-hoc test at the age of one month, a significant difference was found between the training and the control group regarding the infants' weight (P=0.018), while no significant difference was observed between the acupressure and the training group in this regard (P=0.111) (Table 4).

The findings of the present study showed that the three groups were homogeneous regarding the infants' birth height (P=0.79). However, a significant difference was observed among the three groups regarding the infants' height at one month (P=0.012) and three months of age (P=0.002). Based on the results of Tukey's post-hoc test at the age of one month, a significant difference was found between the training and the control group regarding the infants' height (P=0.01), while no significant difference was observed between the training and the acupressure group in this regard (P=0.113)

The results of the current study revealed no significant difference among the three groups regarding the infants' head circumference at birth (P=0.513), one month of age (P=0.398), and three months of age (P=0.217). Also, no significant difference was observed among the three groups regarding the infants' arm circumference at birth (P=0.845), one month of age (P=0.927), and three months of age (P=0.728) (Table 5).

Discussion

The importance of the infants' growth and development and their undeniable effects on the future generations' health have led the researchers to search for strategies to improve the infants' growth and development without any side effects (19).

The findings of the present study revealed no significant difference among the training, acupressure, and control groups regarding the mothers' as well as the husbands' mean age, occupation, and educational status. One study which was conducted in New Zealand showed that the risk of non-exclusive breastfeeding was higher in the below-30-year-old mothers (20). One other study in Kuala Lampur also indicated the above-27-year ages as a factor in increasing the probability of breastfeeding (21). However, the results of the study by Hartley et al. showed working as one of the reasons for failure in breastfeeding (22). In this study, all the groups were similar concerning the above-mentioned factors as well as the mothers' and the husbands' intention for pregnancy. Studies conducted by Leventhal et al. (23) and Schwartz (24) revealed that the mothers who had breastfed their infants for a longer period of time had more tendency towards breastfeeding compared to those who had breastfed for a short period of time. Furthermore, Fairbank et al. (25) and Oliveira et al. (26) mentioned knowledge and attitude regarding breastfeeding as the main factors leading to selection of this method for feeding the infants.

The findings of the present study showed a significant difference among the three groups regarding the infants' weight at birth, one month of age, and three months of age. Nutrition is the main factor which affects the infants' physical growth (27). Besides, weight is the most sensitive indicator of growth and the changes in weight reflect the growth status (28). The studies conducted in Chile and India have shown that breastfeeding has been significantly effective in improving the infants' weight gain (29, 30). Moreover, one study in South Africa investigated the effect of nutrition education in 2-5 year old children and indicated that the educational program together with complementary food improved the children's weight (31). These results were in agreement with those of the present study and showed nutrition education to have a positive effect on the infants' weight. However, one clinical trial which was performed on 6-18 month old

children in India showed that nutrition education had no effects on the children's weight (32). Yet, Santoro Junior's study reported that the rate of breastfeeding was higher in the educational intervention group (33). The type of intervention in Santoro Junior's study was different from that of the present study. In that study, they introduced one of the researchers to the mother before the delivery and she was close to the mother and the infant during and in the first hours after the delivery. In the present study, on the other hand, the mother and the infant were visited by the researcher in the first 24-48 hours after the delivery and the second visit was performed after one month. Golden et al. conducted a study to determine the improvement of infants' growth through nutrition and showed that the intervention group gained more weight in comparison to the control group (1). Overall, some studies have indicated that training is appropriate for beginning of breastfeeding, while its continuation requires other services (34).

In spite of the fact that acupuncture and acupressure have been used for increasing breast milk for more than two thousand years, these methods are not so common in western countries and, consequently, the findings cannot be compared to those of other studies (35-37). One study showed acupuncture to be effective in increasing breast milk (38). The present study, as the first study in Iran, indicated that acupressure at GB21 point affected the infants' weight by influencing the quality of mothers' breastfeeding. Although the acupressure group's weight at one and three months of age was higher compared to the control group, the difference was not statistically significant (P=0.342). This might be due to the fact that acupressure needs more time and supervision. Hence, further studies are required to be conducted on this issue.

The findings of the present study revealed a significant difference among the three groups regarding the infants' height at the ages of one month (P=0.012) and three months (P=0.002).

The results of the study by Aarts et al. showed no significant difference between the two study groups regarding the infants' head circumference (39). However, Donma et al. reported that the head circumference of the breastfed infants was higher compared to that of the infants that were fed with other types of milk (40). In the present study, no significant difference was observed among the three groups regarding the infants' head circumference at one (P=0.398) and three months of age (P=0.217). Bhandari et al. reported no significant difference between the two groups (preterm infants) regarding height at 3 and 6 months of age (41), which is on the contrary to the findings of the current study. It should be noted that the studies conducted in the U.S. in 1990-1994 (42) and Sri Lanka in 1997 (43) confirmed that weight and height were dependent on the environmental factors, while head circumference was less affected by such factors.

In a study in Poland, Bielicki and Szklarska reported the increasing trend of weight and height, which is similar to the findings of the studies conducted in other European countries. These increasing trends might result from the improvement of the health and nutrition status (44).

Some studies have brought the effect of race on growth indicators into question. These studies have confirmed the potential of growth in the children living in different societies and have proven that by improving the health and welfare status, all infants can grow appropriately (45, 46). A study showed training based on BASNEF model rather than traditional methods, plays an important role in promoting the awareness of the subject and improving families' attitudes about breastfeeding (47).

In the present study, weight and height of the acupressure group were higher compared to those of the control group; nonetheless, the difference was not statistically significant. Thus, further studies are recommended to be conducted in a longer period of time.

European researchers have reported the positive effects of acupuncture on prolactin secretion which in turn increases milk production (48-49). They have also shown its positive effects on milk flow from engorged or inflamed breasts (50). Nevertheless, the researchers of the present study found no studies on the effect of acupressure on the infants' physical growth indicators in the recent 30 years to compare the findings.

Conclusion

This study showed that face-to-face training based on BASNEF model was effective in creating a positive attitude towards breastfeeding and, consequently, increasing the success rate of breastfeeding. This in turn improved the infants' growth indicators, such as weight and height, at one and three months of age. Hence, the training programs are required to be started since the beginning of pregnancy and be continued up to the sixth month after delivery. They should also be generalized to other women in the reproductive

ages. Moreover, the breastfeeding culture should be improved and incorrect beliefs and habits should be modified to make women believe that they are capable of breastfeeding.

Acupressure was also effective in improvement of the indicators compared to the control group; however, the difference was not statistically significant. It seems that practical and effective application of this method needs more frequent training for both the pregnant women and the medical team.

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