

Impact of Maternal Fasting During Ramadan on Growth Parameters of Exclusively Breastfed Infants in Shahroud, 2012

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ABSTRACT

Introduction: There are many advantages in breastfeeding of infants. The impact of fasting of breastfeeding mothers during Ramadan, on their exclusively breastfed infants' growth, is still unclear. The objective of this study is to determine the impact of maternal Ramadan fasting on growth parameters of exclusively breastfed infants.

Method: This cohort study was conducted on 55 healthy, exclusively breastfed infants, aged 1 to 6 months, during Ramadan and three months after it. 20 infants, whose mothers fasted throughout Ramadan (case group) and 35 infants, whose mothers did not fast (control group), were enrolled in the study. All infants underwent periodic physical examinations, twice in Ramadan and 3 times in the first, second and the third months after Ramadan. The data analyses were done using a repeated measure analysis of variance. Statistical significance was defined as $P<0.05$. Analyses were performed using SPSS statistical package and repeated measures ANOVA.

Results: The average age was 3.43 ± 1.38 months in the case group and 2.31 ± 1.45 months in the control group that presence no significant difference between. From the total number of infants, 23 cases (41.8%) were males and the rest were females. All growth parameters increased during the study period ($P<0.05$), with the same rate of increase for both groups ($P=0.125$).

Conclusion: Ramadan fasting by breastfeeding mothers did not adversely affect the growth parameters of exclusively breastfed infants in short-term.

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Introduction

Despite the importance of breast milk for infants, especially in the first six months of life, many mothers who fast during Ramadan, due to their concern that fasting may reduce milk amount or cause nutrient insufficiency in the milk, reduce the frequency of breastfeeding or use complementary foods for their infants while fasting (1). In the first six months of infant's life, due to the dependency of the child on mother's

milk, mothers should avoid fasting. Long-term starvation decreases mother's milk and can interfere with a child's growth (2).

After six months of breastfeeding, when a child uses supplementary food, breastfeeding women can fast with proper diets. The diets of breastfeeding mothers should consist of proteins, calcium, iron and vitamins, otherwise, child's growth and mother's health will be compromi-

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sed. It should be noted that reduced meals during fasting can cause a reduction in the amount of milk, which consequently, will affect the infant's milk supply. Mothers should take milk and plenty of fluids before fasting (Sahar). Milk amount will be reduced because of the lack of fluids (3-2). Exclusive breastfeeding in the first 6 months of life will lead to better biological, psychological and intellectual developments of the infant. The concentration and amount of breast milk usually remain constant. For example, dehydration has no effect on the volume of milk in lactating mothers (4).

Despite the importance of breast milk for infants, especially during the first 6 months of life, many mothers who have infants and fast during Ramadan, due to their concern that fasting may reduce milk volume or cause nutrient insufficiency, reduce the frequency of breastfeeding and use complementary foods for their infants (5, 6). In different studies, the effect of Ramadan fasting on mothers' dietary patterns and compounds in breast milk have been studied.

However, no study has been carried out on the relationship between mothers' fasting and the growth indices of their infants. The aim of this study was to investigate the effect of fasting lactating mothers on the growth indices of infants who were only breastfed.

Materials and Method

This cohort study was performed in health centers of Shahroud in 2012. In the beginning of the project, goals of the study, its methodology and our expectations were fully explained for the subjects and they were completely informed, and voluntarily participated in this study. In the first week of Ramadan, from healthy infants who aged one to six months and were admitted for routine checkups and growth monitoring in the pediatric clinic of Imam Hossein Hospital, 55 infants were selected by using simple sampling, and were divided into two groups based on their mothers' fasting. The case group was the one in which the infants' mothers fasted during Ramadan (25 infants), and the control group was the one in which infants' mothers did not fast during this month (30 infants). These infants were exclusively breastfed, and received supplement drops, only according to their age.

There was no history of disease in the prenatal period and the infants were born after an uncomplicated pregnancy. Twin infants, of early delivery, with low birth weight, and infants who suffered from congenital diseases were excluded from the study. Also, infants who were suffering from diseases which had negative effects on their growth (such as acute gastroenteritis, respiratory tract infection) were excluded.

All mothers were healthy non-smokers and did not use any medication or dietary supplements. Infant growth parameters including height, weight and head circumference were measured at the beginning of Ramadan and then every 2 weeks after it (a total of five times). Infant and mother demographic data were recorded on the forms provided.

Infants with minimal wear were weighed by scale (Seca). Before weighing them, the scale was set on zero and we used the counterweight of 500 g to make sure it was safe. Infant's height was measured using plastic meter which was attached to a flat surface of a bed in infant clinic for the two groups. Infant's head circumference was measured by a plastic meter. Recorded values were evaluated based on the NCHS (National Center of Health Statistics) standards. Weight charts were used to determine the growth status of children. Chi-square test was used for comparison of sex between two groups. Independent t-test was used for comparison of the age and weight of infants. To investigate the growth parameters during the study, repeated measures ANOVA test was used.

Table 1. Age distribution of infant groups

Age groups	Cases group Number (%)	Control group Number (%)	P-value
Under 2 months	(20) 4	(17.1) 6	
2-4 months	(50) 10	(40) 14	
4-6 months	(30) 6	(42.9) 15	
Total	(100) 20	(100) 35	NS*

* Non significant

Results

The mean age of infants in the case group was 3.43 ± 1.38 months, and 2.31 ± 1.45 months in the control group. In total, 23 infants were males (41.8%) and the rest were females. Distribution of infants by age is presented in Table 1. The mean of infant's weight, height and head circumference was measured five times and is shown in Table 2. Repeated measures ANOVA

Table 2. Distribution of infants' average weight, height and head circumference

Variation	Groups	Step 0 (Beginning of Ramadan)	Step 1 (End of Ramadan)	Step 2 (1 month after Ramadan)	Step 3 (2 months after Ramadan)	Step 4 (3 months after Ramadan)	P
Mean weight (kg)	Case group	4.45± 2.15	4.95± 2.84	6.27± 3.24	7.43± 5.14	8.23± 5.28	NS*
	Control group	4.27± 2.11	5.12± 3.01	6.05± 3.27	7.65 ± 5.38	8.24± 5.35	
Mean height (cm)	Case group	56.13± 8.15	63.28± 12.36	67.27± 15.28	75.44± 17.32	80.25± 21.21	NS
	Control group	57.25±10.14	62.52± 14.51	68.35± 17.29	73.19 ± 18.84	79.74± 22.64	
Mean head circumference (cm)	Case group	36.17± 2.19	39.25± 3.23	42.28± 4.74	44.48± 5.86	47.61± 6.81	NS
	Control group	36.57± 2.62	38.57± 3.42	41.37± 5.01	44.21 ± 6.21	47.94± 6.39	

* Non significant

test indicated that growth parameters (weight, height and head circumference) have increased in two months in both groups ($P<0.05$), but there was no difference between groups in three parameters. The meaning of these findings is that changes in all parameters were similar in both groups during the study.

Discussion

The results of this study showed that growth parameters (weight, height, and head circumference) increased in both groups, and fasting of breastfeeding mothers did not affect growth parameters of infants who were exclusively breastfed (7). Many Muslim breastfeeding mothers fast in Ramadan and the length of their fasting may reach up to 12-14 hours a day (8). The results of this study are coordinated with other studies which show that fasting of breastfeeding mothers has no effect on the quality and quantity of breast milk. Therefore, changes in the type or frequency of feeding and nutrition have no effect on milk volume, and the compounds and synthesis of breast milk remain unchanged during Ramadan (9-11).

Strode *et al* examined the effect of calorie restriction on milk volume and its compounds, and concluded that the energy constraints have no significant effect on the volume of milk in the week in which the diet was followed (12). High prolactin levels during calorie restriction causes release of fatty acids from adipose tissue or intake food and causes no change in milk production and synthesis pattern. Many nursing mothers who fast during Ramadan and are concerned for the think that fasting causes reduction in milk for their infants, use complementary foods for their infants Instead of exclusive breastfeeding (13). On the other hand, the most appropriate infant-feeding pattern is breastfeeding, especially in the first 6 months of life. For this reason, some pundits have suggested that the barriers which interfere with

breastfeeding need to be removed, and facilities and confidence should be provided for breastfeeding mothers (14).

This is especially important in developing countries, because the possibility of providing complementary food or formula with contaminated water is very high. Considering the fact that this study was a short-term study, a long-term follow-up is recommended to evaluate the long-term effect of fasting on infant's growth parameters. Also the effect of fasting on Iranian mothers' milk amount and its composition should be considered in future studies. The smallest problem for breastfeeding mothers can make feeding the baby difficult during fasting. The first priority for breastfeeding mothers should be their infant's feeding. Breastfeeding mothers should note that if fasting reduces their milk volume, their infant may need a formula (13, 14).

Breastfeeding mothers who fast in Ramadan should avoid hot environments. They should eat foods which are rich in calories between Iftar (sunset) and Sahar (sunrise). Also, drinking adequate amount of fluids to prevent mother dehydration is highly emphasized between Iftar and Sahar (15).

Conclusion

According to the results, it seems that fasting of breastfeeding mothers does not have any influence on growth indices of the infants.

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