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## Original Research

# Factors Affecting Breastfeeding and Complementary Feeding Choices for Children Aged 24 to 48 Months

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### Abstract

**Objectives:** The aim of this study was to evaluate factors that affected decisions regarding breastfeeding and complementary feeding practices in children aged 24 to 48 months.

**Methods:** Children aged 24 to 48 months who were presented at the outpatient clinic of a single hospital over a 6-month period were included in the study. Children who were born prematurely, hospitalized in the neonatal intensive care unit, and those with a chronic disease were excluded. A questionnaire was administered to parents who provided consent. Data related to demographic characteristics, socioeconomic status, and infant nutrition practices were collected and analyzed.

**Results:** A total of 100 cases were included. The distribution of the gender of the children was 49% female and 51% male, and the mean age was  $36.2 \pm 7.8$  months. The mean duration of exclusive breastfeeding was  $4.83 \pm 1.23$  months, the mean length of total breastfeeding was  $17.65 \pm 8.44$  months, and the mean initiation of complementary feeding was  $5.71 \pm 1.23$  months of age. The most frequent reason provided for the cessation of breastfeeding was the mother's decision to wean. The duration of exclusive breastfeeding and the total length of breastfeeding feeding was significantly shorter among children who were born by cesarean section, and those who used a pacifier and or feeding bottle. Non-working mothers used formula for a longer period ( $p=0.043$ ) and introduced solid foods and the use of utensils later than other mothers ( $p=0.001$ ,  $p=0.03$ , respectively). Complementary food was provided to the infants of families whose monthly income level was less than TL 1000 earlier than in higher income level groups ( $p=0.04$ ). The results of this study also showed that complementary food choices were most influenced by older members of the family and members of the mother's immediate circle (42%) and healthcare professionals (36%). Mothers who received information about the addition of complementary food did not demonstrate a significantly different length of time devoted to exclusive breastfeeding; however, the duration of breastfeeding overall, alone and in combination with solid foods, increased ( $p=0.03$ ).

**Conclusion:** Before the birth, families should be informed and prepared regarding the necessity of exclusive breastfeeding for the first 6 months and the continuation of breastfeeding until 2 years of age, the potential impact of relevant factors related to the type of birth, and the potentially negative effects of the use of a pacifier or bottle. All members of the family, particularly mothers and close relatives, should be advised about proper complementary feeding techniques, including the need to increase the consistency of food gradually, introducing solid foods before the 10th month, and using natural, home-cooked items instead of prepared foods. The appropriate information and guidance should be provided to all families with consideration for their education level, social environment, and life conditions.

**Keywords:** Breastfeeding; complementary feeding; education; family influences; socioeconomic factors.

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The first 2 years after birth is a critical window for physical growth/development, behavioral development, and starting a healthy life.<sup>[1]</sup> This period is an important opportunity to introduce and maintain a healthy diet. Scientific research has established that the ideal form of nutrition for the first years of life is exclusive breastfeeding for the first 6 months followed by the continuation of breastfeeding accompanied by the appropriate complementary foods until 2 years of age or beyond. Many countries are using this guidance from the World Health Organization and others to inform health policy.<sup>[2-10]</sup> The early nutrition of children during the first 2 years is known to affect health status later in life. Therefore, as a public health service, mothers-to-be and other family members should be made aware of the most appropriate nutrition for infants and children.<sup>[11, 12]</sup>

Complementary feeding is the process of providing additional nutrition to supplement breast milk in order to fully meet the changing nutritional needs of the child. Complementary foods are classified in 2 groups: transitional foods and family foods. Transitional foods are items prepared especially for the child, and family foods are items consumed by other members of the family. The most appropriate period to implement complementary feeding is between 6 and 24 months of age, and continuation of breastfeeding during this period is very important for the health of the child.<sup>[11, 12]</sup>

Providing microbiologically and chemically safe food items with adequate nutritional value, the proper consistency, and the appropriate quantity and shape of the food items are important considerations in order to achieve the desired benefit. The age at which these foods are introduced to the diet is also consequential. Feeding an infant complementary foods prematurely increases the risk of infection and provides little extra nutritional value. Delayed administration, however, may lead to malnutrition, since breast milk can no longer provide all of the needed nutrients, and may also consequently result in a negative response to infection. Both conditions can adversely affect the growth and development of the child.<sup>[13]</sup>

This study was a review of breast milk intake and the complementary feeding practices used for children aged between 24 and 48 months who were brought to a pediatric outpatient clinic. The objective was to evaluate and improve current feeding practices.

## Methods

This prospective study consisted of children aged between 24 and 48 months who were presented at a single pediatric outpatient clinic within a 6-month period (June 2013-December 2013). Children born prematurely or with a low birthweight (<2500 g), those admitted to the neonatal

intensive care unit, and those with chronic disease were excluded. Ethics committee approval was received for this study from the ethics committee of our hospital. Study data were obtained from mothers who agreed to participate in face-to-face interviews. The questions were grouped under 4 main headings:

1. Concerning the baby (age, sex, type of birth)
2. Concerning the mother (age, hometown, work and educational status)
3. Concerning the socioeconomic status of the family (number of siblings, economic status of the family)
4. Concerning feeding (duration of exclusive and total breastfeeding time; introduction of complementary foods and cow's milk; use of formula, feeding bottle, and pacifier; first complementary food preferences; start of consumption of solid foods; preferred complementary food profile at 1 year of age; information provided by healthcare personnel about nutrition; persons and materials that were influential in choosing complementary foods).

## Statistical Analysis

IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA) was used to perform the statistical analysis. The Kruskal-Wallis test, Mann-Whitney U test, and Student's t-test were used to compare quantitative data, as well as complementary statistical methods (mean, SD). A chi-square test, Fisher's exact test, and the Yates continuity correction were used to compare the qualitative data. Pearson correlation analysis was used to investigate relationships between normally distributed parameters. Significance was evaluated at  $p < 0.05$ .

## Results

A questionnaire was administered to 259 individuals who presented at the polyclinic during the study period and fulfilled the study criteria. A total of 159 patients were excluded from the study: 98 patients who declined to participate in the study after the survey, 57 who did not respond to all of the survey questions, and 4 patients who were hospitalized during the neonatal period. The study was completed with responses regarding 100 children. The mean age of the children included in the study was  $36.2 \pm 7.8$  months; 49% were female and 51% were male. Of these, 39% were born via vaginal delivery and 61% by cesarean section. The mean age of the mother was  $30.9 \pm 5$  years and 78% of the mothers did not work outside the home. The mean length of exclusive breastfeeding was  $4.8 \pm 2.1$  months, while the mean total breastfeeding time was  $17.7 \pm 8.4$  months (female infants:  $17.97 \pm 8.46$  months, male infants:  $17.33 \pm 8.49$  months). The

mean period for the introduction of complementary foods was 5.7±1.2 months. All of the infants were breastfed; 4% were breastfed for only 1 month and 5% for 2 months. Table 1 illustrates survey responses related to some early feeding practices. The most common responses regarding termination of breastfeeding were that the mother thought that she had breastfed for a sufficient length of time, the infant had stopped breastfeeding, and the infant's reluctance to consume complementary foods (Table 2).

In this study group, 39% of the infants were fed with formula in addition to breastfeeding, 60% were bottle-fed, and 36% were given a pacifier. The initial complementary foods most preferred were yogurt (38%), fruit puree (28%), soup (19%),

**Table 1.** Responses related to early feeding practices

Characteristics	n (%)
Use of baby formula	
Yes	39
No	61
Use of bottle-feeding	
Yes	60
No	40
Use of pacifier	
Yes	36
No	64
Initial complementary foods	
Yogurt	38
Pudding	10
Fruit puree	28
Soup	19
Baby biscuit	5
Manner of feeding	
Meal with the family	99
Separate crushed foods	1
Manner of feeding	
Meal with the family	94
At separate times	6
Information about complementary foods	
None	21
Booklet	36
Verbal information provided by healthcare personnel	39
Booklet + verbal information	4
Factors affecting selection of complementary foods	
Family	42
Healthcare personnel	36
Neighbors + friends	4
TV-media-Internet	5
Family + healthcare personnel	7
Family + neighbors and friends	1
Family + TV-media-Internet	2
Healthcare personnel + neighbors and friends	1
Health personnel + TV-media-Internet	1
5 parameters	1

pudding (10%), and baby biscuits (5%). Responses regarding the introduction of new foods are provided in Table 3. A comparison of the demographic characteristics determined that the type of birth and the working status of the mother had a significant effect on the duration of breastfeeding (Table 4). The initiation of complementary foods was earlier in cases of a cesarean delivery (Table 4). It was also determined that as maternal age at birth increased,

**Table 2.** Reasons for weaning infants from breastfeeding

	n (%)
Mother decided that she breastfed for a sufficient amount of time	37
Infant stops breastfeeding	21
Infant reluctance to eat complementary foods	12
Decreased production of breast milk	11
Pregnancy/maternal disease	10
Baby is still suckling	2
Infant has not gained weight	2
Mother's return to work	2
Infant has continuing desire to be breastfed/frequent waking at night	2
Decreased production of breast milk+baby's disinclination to be breastfed	1

**Table 3.** Feeding variables

Time interval of variables (months)	Lower and upper limits	Mean±SD
Duration of exclusive breastfeeding	0-10	4.8±2.1
Total duration of breastfeeding	1-46	17.7±8.4
Introduction of water	0-10	4.2±2.2
Introduction of complementary foods	2-10	5.7±1.2
Formula use	0-15	3.8±3.6
Introduction of cow's milk	1-24	13.7±4.8
First use of pacifier	0-5	1.1±1.4
Duration of feeding with pureed food	6-24	11.3±4.1
Introduction of fork and spoon	8-48	17.7±6.7
Introduction of solid foods	7-30	13.6±4.8

**Table 4.** Comparison of demographic data

	Duration of exclusive breastfeeding (months)	p	Introduction of complementary foods (months)	p
Mode of delivery				
Normal birth	5.6±1.5	0.003	6.1±1.3	0.007
Cesarean section	4.3±2.2		5.4±1	
Mother's profession				
Non-working	4.6±2.1	0.04	5.6±1.2	0.978
Employed	5.6±2		5.8±1.3	

the total breastfeeding time was longer, and a weakly significant relationship was observed ( $p=0.019$ ). The exclusive and total breastfeeding periods were significantly longer in the group that was not bottle-fed and among those who did not use a pacifier (Table 5).

In the group of non-working mothers, 89.7% of the babies were fed with formula, and soft, lumpy, solid food was introduced at a mean of  $14.4\pm 4.9$  months. Use of a fork and spoon was initiated at a mean of  $18.2\pm 6.1$  months. These results were significantly greater than those observed in the group of working mothers ( $p=0.043$ ,  $p=0.001$ , and  $p=0.03$ , respectively) (Tables 6, 7). Mothers who graduated from high school provided chopped food for a mean period of  $13.2\pm 5.2$  months, which was longer than the mean response among mothers with less formal education ( $p=0.048$ ). University graduate mothers introduced cow's milk into the diet after a mean of  $16.7\pm 4.7$  months. The addition of cow's milk was significantly delayed as the education level of the mother increased ( $p=0.035$ ). As the number of siblings increased and income level decreased, the time to introduce solid food was longer ( $p=0.001$ ,  $p=0.011$ ) (Table 6).

In all, 79% of the mothers in this study had received information about the use of supplementary foods, and it was found that this had no effect on the duration of purely breastfeeding ( $p=0.947$ ), but was associated with a significantly increased total duration of breastfeeding ( $p=0.031$ ) and delayed introduction to cow's milk ( $p=0.032$ ). In our study, the most frequently seen factors influencing the selection of supplementary foods were older family members and other members of the immediate circle (42%) and healthcare personnel (36%). At the age of 1 year, 99% of the children were consuming the same meal as the family, and 94% sat at the table with the family. During the first year, 96% reported using homemade food and 4% commercially prepared foods.

### Discussion

Ideally, it has been recommended that children should be exclusively breastfed for the first 6 months of life, followed by an introduction to complementary foods accompanied by continued breastfeeding until 2 years of age or beyond.<sup>[10]</sup> Ünsal et al.<sup>[15]</sup> reported a mean exclusive and total length of breastfeeding of  $4.3\pm 2.1$  and  $8.5\pm 5.9$  months, respectively, in their study. Telatar et al.<sup>[16]</sup> found a mean of  $4.7\pm 1.6$  and  $12\pm 5.7$  months, respectively, and feeding with complementary foods initiated at a mean of  $5.4\pm 0.8$  months of age. In our study, the mean length of exclusive breastfeeding was similar, while the total breastfeeding time was significantly longer. This result may be related to the socioeconomic status of the population served by our hospital. According to

**Table 5.** Bottle-feeding and the use of pacifier

	Duration of exclusive breastfeeding (months)	p	Total breastfeeding time (months)	p
Use of pacifier				
Yes	$3.7\pm 2.4$	0.003	$12.9\pm 8.8$	0.001
No	$5.4\pm 7.1$		$20.3\pm 7.1$	
Bottle-feeding				
Yes	$4.4\pm 2.3$	0.04	$14.2\pm 7.8$	0.001
No	$5.5\pm 6.5$		$22.9\pm 6.5$	

**Table 6.** Transition to solid foods

	Introduction to solid foods (months) Mean±SD	p
Mother's profession		
Non-working	$14.39\pm 4.83$	0.001
Employed	$10.91\pm 3.56$	
Number of siblings		
0	$11.0\pm 2.749$	0.001
1	$13.78\pm 5.26$	
2	$15.55\pm 4.63$	
≥3	$13.13\pm 4.52$	
Mother's education		
Primary school or lower	$13.73\pm 3.96$	0.089
Middle school	$13.75\pm 4.14$	
High school	$15.18\pm 6.50$	
University	$11.05\pm 2.59$	
Monthly family income		
<1000 TL	$13.94\pm 4.73$	0.011
1000-2000 TL	$14.77\pm 5.13$	
>2000 TL	$11.55\pm 3.51$	

**Table 7.** Utensil use

	Age at use of fork and spoon (months) Mean±SD	p
Mother's profession		
Non-working	$18.23\pm 6.07$	0.030
Employed	$15.77\pm 8.29$	
Number of siblings		
0	$17.50\pm 9.43$	0.231
1	$17.27\pm 5.98$	
2	$19.10\pm 5.47$	
≥3	$15.25\pm 4.49$	
Mother's education		
Primary school or lower	$17.07\pm 5.75$	0.562
Middle school	$18.5\pm 7.13$	
High school	$18.61\pm 6.07$	
University	$17.16\pm 9.01$	

the 2013 Turkey Demographic and Health Survey (TNSA), the median duration of breastfeeding for infants in Turkey was 16.7 months, specifically 18.0 months for male and 16.3 months for female infants.<sup>[17]</sup> The mean duration of breastfeeding and the length of time by gender reported in our study are similar to the TNSA data. In the 2013 TNSA report, a mean of 12% of infants were introduced to complementary food before 6 months of age, while in our study, the mean was 31%. Complementary food was added at a mean of 5 months.

The TNSA report indicates that breastfeeding is performed for some period of time for 96% of infants in the country.<sup>[17]</sup> In our study, although 100% of the infants were reported to have been breastfed for some length of time, 4% were breastfed for only 1 month and 5% for 2 months. Breast milk is the main source of essential fatty acids and energy, as it contains a greater percentage of fat than typical complementary foods. Breast milk continues to be an important source of vitamins and minerals after 1 year of age.<sup>[1]</sup> Extended breastfeeding has been shown to have a positive effect on growth and cognitive function, as well as reducing the risk of chronic disease and obesity.<sup>[18–21]</sup> Maintenance of breastfeeding has been recommended for 24 months. The total duration of breastfeeding in our study was close to this target.

Ünsal et al.<sup>[15]</sup> found no significant difference in the length of exclusive breastfeeding based on employment status of the mother; however, the total breastfeeding time of working mothers was found to be significantly shorter. In the 2013 TNSA report, no significant difference was seen between the baby's gender, mother's education level, or household income.<sup>[17]</sup> In our study, the duration of breastfeeding was significantly longer in the group of mothers who did not work outside the home, and it was observed that formulas were used significantly more often by non-working mothers. This finding was thought to be related to the level of education among the employed mothers.

National and international studies have reported a delayed start to breastfeeding in mothers who have delivered by cesarean section in order to allow them time to recover and rest after the birth. The prelacteal introduction of complementary foods among cesarean birth mothers was also associated with the presentation of complementary food during the first 6 months.<sup>[18, 19, 22]</sup> In our study, the exclusive breastfeeding time was found to be significantly shorter in babies born by cesarean section and the introduction of complementary foods to the diet was significantly earlier. Considering the fact that the rate of cesarean section has increased in recent years, the potentially negative consequences for breastfeeding, in addition to other effects, should be monitored very closely.

Our results revealed that among families with a monthly income of less than TL 1000, infants were given complementary foods significantly earlier compared with families of a higher income level. This may have been related to decreased breast milk due to insufficient nutrition or a lower level of education. In their study, Tappin et al.<sup>[23]</sup> drew attention to the importance of maternal age with respect to breastfeeding and observed that older mothers demonstrated a greater preference for breastfeeding. Our results also indicated that the total length of breastfeeding increased as maternal age increased.

Evaluation of the use of formula revealed that it was significantly more frequent in non-working and older mothers. Among the parameters regarding the introduction of complementary foods, only the time of initiation was significantly different and was found to be shorter in direct proportion with the number of siblings. It has been reported that primiparous mothers breastfed their newborns less frequently and for a shorter period of time.<sup>[24–31]</sup>

Howard et al.<sup>[32]</sup> found that the use of pacifiers and bottles adversely affected breast milk intake and it was emphasized that these items were not advised for infants receiving breast milk. In the 2013 TNSA report, bottle feeding is not recommended for any age group, unless necessary.<sup>[17]</sup> It was determined bottles were used for 40% of children under 6 months of age and 64% of children aged 8–9 months.<sup>[17]</sup> In our study, 60% of the respondents reported using a bottle. The exclusive and total breastfeeding times were significantly longer in those who did not use a pacifier or bottle. When cow's milk is consumed before 6 months of age, it can cause blood loss in the feces and iron deficiency. It is therefore preferable to use milk powders and milk products, such as cheese and yogurt (adding them to other foods) during the first year.<sup>[11, 12, 33–35]</sup> The timing of the addition of cow's milk to the diet observed in our study was consistent with the recommended timeframe.

In studies performed by Gupta et al.<sup>[28]</sup> and Essex et al.,<sup>[36]</sup> the authors reported that the most common reason for the discontinuation of breastfeeding was the mothers' decision that she had an insufficient amount of breast milk.<sup>[28, 36]</sup> In our study, it was observed that the most common reasons were the mother's determination that she had breastfed for a sufficient amount of time, the child voluntarily withdrew from breastfeeding, and that the infant was refusing complementary foods due to the preference for suckling. Ünsal et al.<sup>[15]</sup> found that the infant withdrawing from breastfeeding, insufficient production of breast milk, and the mother's return to work were the foremost reasons for the cessation of breastfeeding.

Neuromuscular development guides the age at which a

child is ready to receive food of a certain consistency. Initially, foods should be presented in a pureed form. The use of pureed foods should be continued until the child gains the ability to chew.<sup>[13]</sup> The data from the present study suggest that the start of some food with larger pieces was delayed. A transition to solid foods that is delayed until the 10th month can contribute to lasting nutritional disorders. Therefore, it is recommended that the consistency of foods be increased gradually according to age and development.<sup>[11, 12, 37]</sup>

Appropriate nutrition is determined by what is consumed, as well as how, when, where, and with whom. Ideally, infants should be fed directly by the mother or caregiver, and older children should be helped and encouraged with early efforts at feeding.<sup>[1]</sup> According to the results of our study, children were allowed to feed themselves later than is recommended.

When the modes of feeding were examined in this study, it was found that the length of time using purees was statistically significantly longer among mothers with a high school education compared with those who had less formal education. The initiation of feeding with solid foods took place earlier among working mothers, families with few siblings, and families with a higher income. These results suggest that the socioeconomic level of the family can have an effect on the nutritional development of the child.

For healthy nutrition, children should be ready to eat family meals at the age of one and to take their place at the family table.<sup>[1, 10, 13]</sup> The appropriate transition to complementary will ensure readiness to consume meals at the family table at this age.<sup>[11, 12]</sup> Most of the children in our study were found to have this level of ability. In order to ensure sustained consumption of the appropriate foods, items prepared at home are preferred to ready-made baby food.<sup>[10]</sup> Most of the children in our study were fed according to these recommendations.

Due to their easily digestible properties and nutritional value, the first foods offered are typically vegetable puree, yogurt, rice pudding, and fruit puree. Small initial amounts should be gradually increased according to the child's needs.<sup>[10]</sup> Our data revealed that, in order, the most common first complementary foods introduced were yogurt, fruit puree, vegetable puree, pudding, and baby biscuits.

It was also determined that when the mother had received information about feeding it did not affect the duration of breastfeeding, but significantly increased the total breastfeeding time and delayed the addition of cow's milk. These results suggest that the notion that only breast milk should be provided for the first 6 months has been adopted, as well as recognition that it should be continued for the first 2 years and that the introduction of cow's milk should be deferred.

In our study, it was reported that the most influential regarding the selection of foods were older members of the family and the mother's immediate circle. The information provided by healthcare personnel was also seen to be effective. Therefore, it is important that healthcare personnel be informed and aware in order to advise mothers and family members about healthy eating practices.<sup>[1, 10]</sup>

## Conclusion

In conclusion, although breastfeeding is widely practiced in our country for the first 6 months, the maintenance is insufficient. Delayed onset of breastfeeding following a cesarean section can have harmful effects. Families should be informed about the appropriate methods to use and the harmful effects of pacifiers and bottle-feeding before the delivery. Information about gradually increasing the consistency of complementary foods with age, starting solid foods before the 10th month, and the preference for natural foods prepared at home instead of commercially prepared foods should be given to all family members, especially mothers, their immediate relatives, and their close circle. The message indicating that sustaining breastfeeding until the age of 2 or more will help to ensure strong and healthy growth and development should be emphasized to families of newborns. The appropriate information and training should be provided to all and should include consideration of educational status, social environment, and living conditions.

## Disclosures

**Ethics Committee Approval:** The study was approved by Bakırköy Dr. Sadi Konuk Training and Research Hospital Ethics Committee (13.07.2015, report number: 2015/12/05).

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