

Knowledge Levels of Mothers Regarding Baby Feeding: A Single-Center Experience*

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ABSTRACT

Objective: The acquaintance period with complementary foods is an essential period for infants in terms of the determination of both their development and short- and long-term health conditions. The method of introduction of complementary foods to the infant, the order in which they are introduced, and the repetitive introduction of foods to the infant are vital for determining the eating behavior and food preferences.

Methods: We designed as a single-center, cross sectional, descriptive study. Written and verbal consent was obtained from the mothers, and face-to-face interviews were conducted with the family by the doctors involved in the study. The survey comprised 33 open-ended and closed-ended questions that evaluated the experiences of mothers regarding breastfeeding and complementary feeding.

Results: The mothers of 100 infants presenting to the pediatric emergency department participated in the questionnaire survey. The mean age of the infants was 10.48 ± 6.37 months, and 52% of them were boys. Mothers with an educational level higher than elementary school started breastfeeding after waiting for a longer time ($p = 0.03$). Mothers with elementary school and secondary school graduate education levels exclusively breastfed their infants for a period over 10 months significantly higher than mothers with undergraduate and postgraduate education level ($p = 0.0072$, $RR = 0.44$). Among the participants, 53.1% responded that they used formula milk in baby nutrition.

Conclusions: Mothers' knowledge levels regarding the duration of exclusive breastfeeding and the timing of transitioning to complementary feeding were insufficient and inversely proportional to their education level. Moreover, the lack of education on the initiation of formula milk, except for medical indications, in our country was striking. Therefore, all physicians, especially pediatricians, should allocate time for explaining the importance of breastfeeding, timing, and diversity of complementary feeding and seek support from the media.

Keywords: Breastfeeding, complementary feeding, feeding knowledge

INTRODUCTION

The acquaintance period with complementary foods is a vital period for infants in terms of the determination of both their development and short- and long-term health conditions. Healthy eating behaviors during infancy exert a positive effect on brain development and cognitive functions as well as enable reducing the morbidity and mortality caused by infections (1, 2). The method of introduction of complementary foods to the infant, the order in which they are introduced, and the repetitive introduction of foods to the infant are important for determining the eating behavior and food preferences (3–6).

The World Health Organization (WHO) recommends that infants should be exclusively breastfed in the first 6 months

of life, and complementary foods should be introduced to them after this period (7, 8). The European Food Safety Authority (EFSA) and the European Society for Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) support the WHO's recommendation of exclusive breastfeeding for the first 6 months as well as suggest that introducing complementary foods to infants from 4 to 6 months of age is a suitable approach (9–11). Recommendations for the timing of introducing complementary foods to infants vary between countries and also depending on the frequency of their breastfeeding with breast milk or formula milk. Studies have shown that parents introduced complementary feeding to their children earlier than the recommended time in some countries, such as Germany and the United Kingdom (12–14). Because of these different practices, information regarding the

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timing of introducing complementary foods varies substantially. Defining the feeding habits of infants considering the local characteristics provides an advantage in the followup of a healthy child. We conducted this study to investigate the experiences and knowledge levels of mothers regarding the nutrition of infants aged 1–24 months who were presented to our pediatric emergency department using survey questions prepared for this study.

MATERIALS AND METHODS

This single-center, cross sectional, descriptive study included mothers who had infants aged 1–24 months presenting to the pediatric emergency department of Şişli Hamidiye Etfal Training and Research Hospital between March 15, 2019, and March 15, 2020, and accepted to answer the questions. Written and verbal consent was obtained from the mothers, and face-to-face interviews were conducted with the family by the doctors involved in this study. The survey consisted of 33 open-ended and closed-ended questions that evaluated the experiences of mothers regarding breastfeeding and complementary feeding. Demographic data, including the age of the infant; mode of delivery; the reason for cesarean section, in case the baby was delivered through cesarean section; the age, education level, and occupation of the mother; the economic status of the family according to monthly income; number of children; and birth order of the infant in the family, were recorded. Based on the recommendations of the WHO and the United Nations International Children’s Emergency Fund (UNICEF), the timing of introducing breast milk, formula milk, and complementary foods to infants; the reasons for introducing formula milk; and the methods of administration and introduction times of food as complementary nutrients were evaluated (15). We also analyzed the relationship between the education levels of mothers and feeding habits (duration of exclusive breastfeeding, timing of introducing complementary foods, and variety of foods provided during the introduction of complementary foods) and whether their infants’ nutrition was sufficient.

Statistical analysis of the data was conducted using the IBM SPSS for Windows Version 21.0 package program. Descriptive statistics for the data were expressed as mean, standard deviation, and frequency. The distribution of data was evaluated using the Kolmogorov–Smirnov test. Independent samples t-test and Mann–Whitney U test were used for analyzing quantitative data. The ratios in the groups were compared using the chi-square test. When the conditions of the chi-square test were not met, Fisher’s exact test was used. A p value of <0.05 was considered statistically significant. The study was approved by the University of Health Sciences, Şişli Hamidiye Etfal Training and Research Hospital Ethics Committee (Decision Date/Number: 20.08.2019-2466).

RESULTS

The mothers of 100 infants presenting to the pediatric emergency department participated in the questionnaire survey. Of the infants, 48 (48%) were girls, and 52 (52%) were boys; the mean age was 10.48 ± 6.37 months. Table 1 shows the

Table 1: Sociodemographic characteristics of the families

Sociodemographic characteristics	n (%)
Maternal age	
<20 years	6 (6)
20-24	16 (16)
25-30	31 (31)
30-35	28 (28)
35-40	15 (15)
>40 years	4 (4)
Maternal age at the first delivery	
<20 years	12 (12)
20-24	42 (42)
25-30	32 (32)
30-35	11 (11)
35-40	3 (3)
The number of children at home	
1	42 (42)
2	27 (27)
3	22 (22)
>3	9 (9)
Maternal education level	
Illiterate	5 (5)
Elementary school	32 (32)
High school	28 (28)
University	33 (33)
Postgraduate or doctorate	2 (2)
Family monthly income	
Low	23 (24.2)
Middle	63 (66.3)
High	9 (9.5)
Does mother work?	
Yes	32 (32.7)
No	66 (67.3)

sociodemographic characteristics of the families. Regarding the method of delivery, 36 infants (36%) were born through normal vaginal delivery, and 64 infants (64%) were born via cesarean section due to a medical indication.

The question regarding the timing of breastfeeding of the infants was answered by 63 mothers (63%), of whom 40 (63.5%) and 23 (36.5%) mothers mentioned that they started breastfeeding their babies within the first hour after birth and at least 1 h after birth, respectively. Furthermore, regarding the relationship between breastfeeding and mothers’ educational level, mothers with an educational level higher than elementary school started breastfeeding after waiting for a longer time ($n = 19$, $p = 0.03$). Water was also provided to 26 infants (26%) during exclusive breastfeeding. The question regarding the duration of exclusive breastfeeding of the infants was answered by 84 mothers (84%), and the question regarding the total duration of breastfeeding was answered by 87 mothers (87%). Breastfeeding charts prepared according to the answers to these two questions are depicted in Figure 1. Mothers with undergraduate and postgraduate education level exclusively breastfed their babies at most for 4–6 months significantly higher than mothers with lower education level and then started complementary feeding appropriately ($n = 14$, $p = 0.0072$, $RR = 3.5$). Mothers with elementary school and secondary school graduate education levels ($n = 21$) exclusively

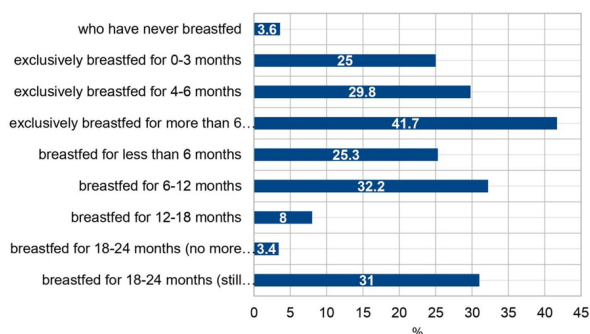


Figure 1: Feeding charts of infants regarding breastfeeding.

breastfed their infants for a period over 10 months significantly higher than mothers with undergraduate and postgraduate education levels ($n = 4$, $p = 0.0072$, $RR = 0.44$). We also found that 70 mothers (70%) breastfed exclusively, 15 mothers (15%) used bottle-feeding, and the remaining 15 mothers (15%) used a combination of both methods.

Regarding the distribution of the total duration of breastfeeding according to mothers' education levels, no significant difference was observed between the breastfeeding duration and mothers' education levels ($p > 0.05$).

The question "Do you give formula milk?" was answered with "yes" by 52 mothers (53.1%). Formula milk was introduced at the very most within the first month ($n = 31/62$, 49.9%). Formula milk was administered to 53 of 58 infants (91.4%) through a bottle. Formula milk was recommended in 30 of 61 infants (49.2%) by a doctor due to a medical indication. This answer was followed by answers related to the decision of the mother herself to start formula milk considering that her milk was insufficient based on a deduction from social media and written and visual press ($n = 17/61$, 27.9%) and to start formula milk upon the comment of people around her that her milk was inadequate ($n = 3/61$, 4.9%).

Answers to questions related to complementary feeding are presented in Table 2, and information regarding the most common months when complementary foods were started is illustrated in Figure 2.

We investigated the relationship between the educational levels of mothers and the diversity of foods introduced when starting complementary feeding. Results showed that mothers with high school or higher education level ($n = 32$) started complementary feeding with a higher proportion of a single variety of foods than mothers with elementary school education level or only literate ($n = 18$); however, this difference was not statistically significant ($p > 0.05$). Mothers with high school or lower education level ($n = 30$) introduced complementary feeding before the completion of the 6th month, and mothers with university or higher education level ($n = 16$) primarily started complementary feeding from the 6th month onward. This difference showed a borderline statistical significance ($p = 0.085$, $RR = 1.6$). Finally, for the question "whether their babies were adequately fed or not," 66 mothers (71.7%) answered "adequately fed."

Table 2: The answers given to the questions related to complementary feeding

Question	n (%)
When did you start complementary feeding?	
4-6 month	39 (47.6)
6-9 month	36 (43.9)
0-3 month	5 (6.1)
≥ 10 month	2 (2.4)
Which food did you start complementary feeding with?	
With multiple types of food	26 (34.2)
Fruit or vegetable puree	19 (25)
Yogurt	15 (19.7)
Soup	8 (10.5)
Fruit or fruit juice	5 (6.6)
Pudding	3 (3.9)
Whose recommendation did you start complementary feeding with?	
Doctor	44 (56.4)
I decided after research	29 (37.2)
People around me (relative, spouse, mother, mother-in-law)	5 (6.4)

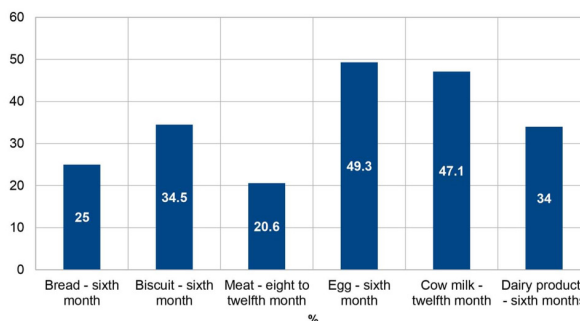


Figure 2: The most common months when complementary foods were started.

DISCUSSION

The rate of cesarean section due to a medical indication among deliveries was 64% in our study, which was consistent with the national rate of cesarean section deliveries in our country (52%) but considerably higher than the global cesarean rate (21%) (16, 17). The mode of delivery through cesarean section exerts a negative effect on breastfeeding and an indirect effect on the use of formula milk and the timing of transitioning to complementary feeding (18).

According to the "Global Strategy for Infant and Young Child Feeding" approved by the WHO and UNICEF in 2002, breastfeeding should be started within the first hour after birth, exclusive breastfeeding should be performed for the first 6 months, transitioning to complementary feeding should be done from the age of 6 months, and breastfeeding must be continued together with complementary feeding for up to 2 years or more (19, 20).

The educational levels of mothers exert a positive effect on acquiring correct feeding behaviors and accessing information and utilizing it properly. Sisko et al. reported that with an increase in educational level, there was an increase in the rates of exclusive proper breastfeeding to the timing also recommended by the WHO and UNICEF (21). In our study also, as the educational levels of mothers increased, the timing of exclusive breastfeeding and transitioning to complementary feeding was more compatible with the recommendations of guidelines.

The income level, breastfeeding duration, and the timing of transitioning to complementary foods also have an association. The rates of breastfeeding in high-income countries are higher than those in middle- and low-income countries (22). Economic difficulties also impact the quality and diversity of food entering the household, and this condition indirectly determines children's eating behaviors. According to our survey results, approximately 25% of the families answering the questions had a low-income level.

The UNICEF's 2019 report on global children has stated that the rate of babies breastfed within the first hour after delivery was 44%; in our study, this rate was 63.5%. The responses regarding early breastfeeding were consistent with the findings of the 2018 Turkey Demographic and Health Survey (TNSA). However, according to the TNSA data, although the timing of the initiation of breastfeeding among uneducated mothers or mothers not graduated from elementary school was longer than that of mothers with higher education levels, our study showed that mothers with lower education levels started breastfeeding earlier after birth (16).

According to the UNICEF data, 20% of babies in high-income countries and 4% of babies in middle- and low-income countries are not breastfed at all (23). Our study revealed an even lower percentage of babies who were not breastfed (3.4%). According to the National Nutrition and Health Survey conducted by Duan et al. in China in 2013, the rate of exclusive breastfeeding of infants aged <6 months and the rate of implementation of complementary feeding with a minimally acceptable diet among children aged 6–23 months were 18.6% and 25.1%, respectively (24). Our study also showed a rate of 29.8% for exclusive breastfeeding for the first 6 months. This result shows that exclusive breastfeeding for the first 6 months is appropriately supported in our country. Nevertheless, according to our survey, exclusive breastfeeding of 41.7% of babies for more than 6 months still indicates the presence of deficiency in complementary feeding. Furthermore, the delay in transitioning to complementary feeding may be associated with our country's middle-to-low-income level. As income levels decrease, access to food becomes more challenging, and mothers believe that they can compensate for this deficiency by breastfeeding for longer periods. Because exclusive breastfeeding for more than 6 months increases the risk of the incidence of micronutrient deficiencies, institutions performing healthy child monitoring should focus on educating families regarding complementary feeding (25).

According to data from Turkey, the rate of bottle-feeding for infants aged <2 months was 31%, which increased to 60% for infants aged 9–11 months (16). When we examined babies fed with breast milk or formula milk separately with respect to bottle-feeding in our study, we observed that formula milk was administered by bottle-feeding at much higher rates. Bottle-feeding with formula milk exerts negative effects such as rapid weight gain in infants and a tendency to develop obesity in later years of life, making them more susceptible to infections such as diarrhea (26). In our study, 53.1% of mothers mentioned that they used formula milk in infant feeding. Although it was observed that the majority of them started formula milk with the recommendation of a doctor due to a medical indication, approximately one-third of mothers were influenced by written and visual press and social media about deciding to start formula milk, and this rate indicates the considerable impact of media on feeding. Because formula milk advertisements are continued to be published widely even in countries adopting the International Code of Marketing Breastmilk Substitutes (The Code of Formula Milk), stricter measures should be implemented worldwide to prevent the publishing of advertisements affecting the usage of formula milk (21, 27).

Complementary feeding is defined as nutrition provided with liquid or solid foods together with breast milk or formula milk when breastfeeding or formula milk alone cannot meet the nutritional requirements of infants (28). Although there are internationally accepted standard approaches, behaviors during the transitioning to complementary feeding vary based on personal factors similar to that in breastfeeding; moreover, these behaviors are influenced by sociocultural factors such as beliefs and general habits of the community. Furthermore, because early childhood feeding behaviors exert an impact on food choices in later years of life, establishing positive eating habits during this period results in long-term effects (29, 30). There are some differences between guidelines concerning the timing of introducing complementary feeding. In our study, we observed that the majority of mothers (47.6%) introduced complementary foods to their infants between 4 and 6 months of age. This timing was consistent with the recommendations of the American Academy of Pediatrics, ESPGHAN, and EFSA (31, 32). According to the TNSA 2018 data, the most common foods provided to infants aged 6–23 months were dairy products and fruit–vegetable purees. Consistent with these data, we also observed in our study that mothers initiating complementary feeding with a single type of food started this transition by providing their babies fruit puree, vegetable puree, and yogurt. However, in fact, one-third of the participating mothers started complementary feeding with more than one type of food during the transition process.

As the aim of our study was to investigate mothers' experiences regarding complementary feeding, the absence of questions evaluating their general knowledge level regarding nutrition can be considered a limitation of our study. Moreover, because our hospital was declared as a pandemic hospital after the first COVID-19 cases in our country on March 11, 2020, and most cases presented to our pediatric emergency department were

suspected COVID-19 cases, the present survey was conducted on a limited number of mothers and terminated with 100 mothers. Therefore, extrapolating the experiences of these 100 mothers regarding complementary feeding to the general population might not be correct. More comprehensive and multicentric survey studies are required to ensure more reliable results.

CONCLUSIONS

Mothers' knowledge levels regarding the duration of exclusive breastfeeding and the timing of transitioning to complementary feeding were insufficient and inversely proportional to their education level. Moreover, the lack of education on the initiation of formula milk, except for medical indications, as well as the still-continuing impact of written and visual press and social media on this subject in our country, was striking. Therefore, all physicians, especially pediatricians, dealing with children and mothers planning to have children should allocate time for explaining the importance of breastfeeding, timing, and diversity of complementary feeding and seek support from the media.

Ethics Committee Approval: This study was approved by the ethics committee of the University of Health Sciences, Şişli Hamidiye Etfal Training and Research Hospital (Decision Date/Number: 20.08.2019-2466).

Informed Consent: Written and verbal consent was obtained from the participants.

Peer Review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study- N.U., E.E.A.; Data Acquisition- E.E.A., H.Y.; Data Analysis/Interpretation- E.E.A., N.U.; Drafting Manuscript- E.E.A., H.Y., N.U.; Critical Revision of Manuscript- N.U.; Final Approval and Accountability- E.E.A., N.U., H.Y.

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