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How to achieve long-term breast-feeding: factors associated with early discontinuation

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Abstract

Objectives: To evaluate the factors associated with discontinuation of breast-feeding before 12 months in order to make suggestions for achieving long-term breast-feeding.

Design: A descriptive cross-sectional study.

Setting: Gazi University Medical School, Ankara, Turkey.

Subjects: Mothers of 1230 children who discontinued breast-feeding at least 15 d before the last visit were asked to fill out a questionnaire about the discontinuation process. Logistic regression analysis was performed to assess the independent effects of factors that might influence breast-feeding discontinuation.

Results: Mean breast-feeding duration of the study group was 11·04 (SD 7·45) months. Introduction of bottle-feeding correlated with discontinuation of breast-feeding ($r = 0{\cdot}507$, $P = 0{\cdot}001$). Important risk factors for discontinuation of breast-feeding before the first 12 months were not exclusively breast-feeding at 3 and 6 months, prematurity, not having a plan about breast-feeding duration and maternity leave duration of ≤91 d for working mothers. The common reasons for abandoning breast-feeding in the first and second 6 months were similar, namely the mother's concerns about the sufficiency of breast milk. After 12 months and 18 months the reasons for discontinuation were the baby's unwillingness to eat solid foods while breast-feeding and the mother's perception that 'the baby is old enough', respectively.

Conclusion: The factors that improve long-term breast-feeding are successful exclusive breast-feeding in the first few months, intention of the mother to breast-feed and sufficient duration of maternity leave. This study emphasizes the importance of successful breast-feeding counselling during the first few months to achieve the desired long-term breast-feeding.

Keywords
Breast-feeding
Discontinuation
Discontinuation process
Exclusive breast-feeding
Breast-feeding counselling
Intention to breast-feed

Research documents numerous advantages for infants, mothers, families and society from breast-feeding and the use of human milk for infant feeding[1]. The WHO recommends that breast-feeding should preferably continue beyond the first year of life, and in populations with high rates of infection continued breast-feeding throughout the second year and longer is likely to benefit the infant[2]. Breast-feeding benefits are not only limited to the early months of the infant's life; breast-feeding beyond 12 months of age has been shown to have long-term protective effects from chronic diseases such as type 1 diabetes mellitus, coeliac disease, inflammatory bowel diseases and childhood cancers[3].

It may be necessary for the breast-feeding pattern and its determinants to be recognized in each culture. Most of the studies on this subject have been performed in economically developed countries[4–9] or very poor countries of Africa and Asia[10–14]. There is a limited number of studies from most of the developing world[15–18] and only a few of them have originated from countries in the Eastern Mediterranean and Middle East region[19–21]. In Turkey, which is a developing Eastern Mediterranean country, there are only limited studies[22–24]. In one, the factors that affect the duration of breast-feeding were investigated in a sample of 301 working mothers[22]. The other two studies had smaller sample sizes and shorter duration of follow-up[23,24]. In the present study we aimed to determine mean breast-feeding duration and evaluate the factors associated with discontinuation of breast-feeding before 12 months in a relatively larger sample

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of mothers of medium–high socio-economic status in a population where, culturally and religiously[25], long-term breast-feeding beyond 12 months is accepted[26] and women actively participate in occupational life. The reasons for and methods of discontinuation, and the effects of discontinuation on mothers and infants, were also investigated in detail as the mothers were followed until the end of their breast-feeding period in our clinic.

Subject and methods

Subjects

A descriptive cross-sectional study was performed at Gazi University Hospital, which was certified as a Baby-Friendly Hospital in 2002. The well-child clinic in this hospital usually serves a population of medium–high socio-economic status and about 1400 newborns start follow-up visits each year. Infants are seen six times (at 15 d, then 2, 4, 6, 9 and 12 months) in the first year of life; three times (at 15, 18 and 24 months) in the second year; and once annually thereafter until they are 5 years old. At each visit, their growth, development and feeding patterns are noted. The recommendation in this clinic about infant feeding includes exclusive breast-feeding in the first 6 months and continuing breast-feeding until 2 years of age with appropriate complementary foods. Exclusive breast-feeding (EBF) is defined as no other food or drink, including water or herbal teas, for 6 months of life[1].

The infants and children between birth and 5 years of age who attended our well-child clinic between 1 January and 31 December 2004, and discontinued breast-feeding permanently at least 15 d before this visit, were included in the present study. They were not enrolled if they were continuing with breast-feeding or had not permanently discontinued in the last 15 d. In other words, included infants were the ones who were breast-feeding in the previous visit and had discontinued breast-feeding thereafter; therefore they were enrolled if the visit was the first visit in the year that the infant had discontinued breast-feeding. This helped to avoid recurrent enrolment of the mother/child dyads who attended several times during the year of the study and also, as the time between two subsequent visits was usually not long, mothers could remember the details of discontinuation easily. Infants who were hospitalized in the neonatal intensive care unit or had congenital malformations, abnormalities or underlying diseases that could possibly alter the pattern of feeding in infancy were excluded. The mothers of 1230 children who fulfilled the inclusion criteria filled out a questionnaire about their discontinuation process. None of the mothers who fulfilled the inclusion criteria refused to participate.

Statistical methods

The data were analysed using the Statistical Package for the Social Sciences (SPSS for Windows) statistical software package version 10.0 (SPSS Inc., Chicago, IL, USA). Continuous variables are presented as means with their standard deviation, categorical variables as percentages. In statistical analysis, the *t* test, ANOVA, the χ^2 test and logistic regression analysis were performed to assess the independent effects of these predictors on breast-feeding discontinuation. Statistical significance was considered at $P < 0{\cdot}05$. For the binary logistic regression model, gestational age ≤37 weeks, maternity leave less than the official time (≤91 d; housewives were modelled as having maternity leave >91 d), Caesarean section as type of birth, pacifier use in the first month of life, no plans about breast-feeding intention of the mother and not exclusively breast-feeding at 3 and 6 months were defined as risk factors.

Results

Demographic characteristics

Mean birth weight of the infants was 3101 (SD 37) g. Mean age of the mothers was 30·56 (SD 5·03) years and mean maternity leave of working mothers was 169·50 (SD 117·40) d, with a median of 135 d. Of the infants, 572 (46·5 %) were the first child in the family while 658 (53·5 %) were second or more in birth order. Mean duration of breast-feeding was 11·09 (SD 7·63) months for the first children and 10·58 (SD 7·18) months for the second or later children of the family. This difference was not statistically significant ($P = 0{\cdot}735$).

Duration of breast-feeding

Mean duration of breast-feeding of the infants included in this study was 11·04 (SD 7·45) months (minimum 1 d; maximum 36 months) with a median of 10 months. At 1, 3, 6, 12, 18 and 24 months, 95·3 %, 86·0 %, 65·7 %, 39·0 % 14·3 % and 4·0 % of the infants, respectively, were continuing breast-feeding. In the study period there were no mothers who breast-fed their children beyond 36 months. EBF rates at 1, 3 and 6 months were 92·9 %, 81·1 % and 41·7 %, respectively. The factors associated with the duration of breast-feeding are given in Table 1.

Although the mean duration of breast-feeding was shorter among the mothers who were employed ($P = 0{\cdot}017$), these mothers had a longer EBF period than the non-working mothers (3·50 (SD 1·22) months *v.* 2·90 (SD 1·59) months, respectively, $P = 0{\cdot}008$). Mean maternity leave was correlated with both overall duration of breast-feeding and EBF duration ($r = 0{\cdot}196$ and 0·160, respectively, $P = 0{\cdot}001$).

More than half of the babies (51·5 %) used pacifiers; the mean time to start a pacifier was 59·45 (SD 88·26) d with a median of 30 d. The early use of a pacifier was common, 57·4 % starting in the first month. The starting time of pacifier use and discontinuation of breast-feeding were weakly correlated ($r = 0{\cdot}096$, $P = 0{\cdot}019$).

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Table 1 Factors associated with the overall duration of breast-feeding: mothers of medium–high socio-economic status, Ankara, Turkey, 2004 (*n* 1230)

	Frequency		Overall duration of breast-feeding (months)		
Factor	*n*	%	Mean	SD	*P*
Infant's gender					
Female	624	50·7	10·95	7·17	NS
Male	606	49·3	11·16	7·74	
Birth weight (g)					
2499	188	15·3	6·18	5·04	0·001‡
2500–3499	712	57·9	10·98	7·26	
≥3500	330	26·8	12·87	7·69	
Gestational age (weeks)					
≤37	420	34·1	6·66	5·31	0·001
>37	810	65·9	12·22	7·43	
Type of birth					
Normal vaginal delivery	382	31·1	12·99	7·88	0·001
Caesarean section	848	68·9	9·77	6·96	
Pacifier use					
Yes	634	51·5	8·57	6·11	0·001
No	596	48·5	13·86	7·80	
Bottle-feeding					
Yes	952	77·3	9·25	6·38	0·001
No	277	22·7	17·53	7·44	
EBF in 3rd month					
EBF in first 3 months	1006	81·1	12·31	6·95	0·001
No EBF in first 3 months	224	18·9	5·03	6·99	
EBF in 6th month					
EBF in first 6 months	513	41·7	14·66	6·66	0·001
No EBF in first 6 months	717	58·3	8·42	6·88	
Mother's age (years)					
≤29	524	42·6	10·69	6·76	NS
30–34	428	34·8	11·19	7·75	
≥35	278	22·6	11·51	8·25	
Maternal education (years)					
Primary school (0–8)	318	25·9	11·39	8·17	NS
High school (9–11)	205	16·7	11·14	7·58	
University (>11)	707	57·4	10·99	7·47	
Maternal occupational status					
Employed	704	57·2	10·61	7·01	0·017
Housewife	526	42·8	11·65	7·99	
Duration of maternity leave (d) (*n* 704)†					
≤91	256	36·6	9·03	6·45	0·001‡
91–180	232	32·8	10·56	7·13	
>181	217	30·6	12·40	6·83	
Maternal plans about breast-feeding intention					
Planned to breast-feed	852	69·2	11·58	7·62	0·001
Not planned to breast-feed	378	30·8	9·97	6·93	

EBF, exclusive breast-feeding.
†Official maternity leave with salary in Turkey is maximum 91 d; unpaid leave until 6 months is optional.
‡All three groups are different.

The mean time for starting bottle-feeding was 134·85 (SD 151·20) d with a median of 90 d, and 77·3 % of the babies had used a bottle for feeding at some time during the first year. Introduction of bottle-feeding correlated with the discontinuation of breast-feeding ($r = 0·507$, $P = 0·001$).

The mothers who had an intention about the duration of breast-feeding comprised 69·2 % of the total. The planned duration and actual duration were not exactly the same (16·21 (SD 7·63) months *v.* 11·58 (SD 7·62) months, respectively, $P = 0·001$), but they were correlated ($r = 0·476$, $P = 0·001$).

Table 2 demonstrates the results of logistic regression analyses of the factors that affected discontinuation of breast-feeding before 12 months. Significant risk factors in the discontinuation of breast-feeding before 12 months were: not exclusively breast-feeding at 3 and 6 months, no intention about the duration of breast-feeding, gestational age ≤37 weeks and maternity leave ≤91 d.

Mothers' perception about discontinuation of breast-feeding

The mothers' answers about the reasons for abandoning breast-feeding before 6 months, at 6–12 and 13–18 months and after 18 months are given in Table 3. The common reasons for abandoning breast-feeding in the first and second 6 months were similar, namely the

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Table 2 Significant risk factors in the discontinuation of breast-feeding before 12 months: mothers of medium–high socio-economic status, Ankara, Turkey, 2004 (*n* 1230)

	Relative risk (95 % CI) for discontinuation of breast-feeding before 12 months	
Risk factor	EBF in 3rd month	EBF in 6th month
EBF		
Yes	1·00 (referent)	1·00 (referent)
No	6·10 (2·36, 15·80)*	4·14 (2·55, 6·70)*
Maternal intention to breast-feed		
Yes	1·00 (referent)	1·00 (referent)
No	2·27 (1·34, 3·83)*	2·14 (1·26, 3·63)*
Gestational age (weeks)		
>37	1·00 (referent)	1·00 (referent)
≤37	3·03 (1·72, 5·34)*	2·30 (1·32, 4·01)*
Duration of maternity leave (d)		
>91	1·00 (referent)	1·00 (referent)
≤91	2·19 (1·11, 4·30)*	1·78 (1·15, 3·41)*
Type of birth		
Vaginal delivery	1·00 (referent)	1·00 (referent)
Caesarean section	1·47 (0·87, 2·47)	1·39 (0·83, 2·35)
Pacifier in 1st month		
No	1·00 (referent)	1·00 (referent)
Yes	0·97 (0·60, 1·56)	1·08 (0·67, 1·75)

EBF, exclusive breast-feeding.
Factor was significantly associated with breast-feeding discontinuation: *$P < 0·05$.

Table 3 Mothers' perception/motives to discontinue breast-feeding according to termination time: mothers of medium–high socio-economic status, Ankara, Turkey, 2004 (*n* 1230)

	Termination time							
	<6 months		6–12 months		13–18 months		>18 months	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Discontinuation time of breast-feeding (months)	3·02	1·58	8·71	2·21	16·01	1·88	24·43	5·74
	n	%	*n*	%	*n*	%	*n*	%
Reasons given by mothers for breast-feeding discontinuation								
Insufficient breast milk	180	54·4	227	52·3	56	18·3	10	6·5
Introduction of bottle	53	15·9	37	8·5	5	1·7	1	0·7
'Baby is old enough'	–	0	17	3·8	58	19·0	86	54·3
Subjective reasons related to mother†	25	7·4	54	12·7	46	14·7	18	11·2
Mother's illness‡	37	11·2	47	10·7	44	14·4	12	7·5
Baby's refusal of other solid foods	3	1·1	17	3·8	78	25·7	23	14·5
New pregnancy of the mother	6	1·8	20	4·5	17	5·3	8	5·3
Acute health problem of the child	27	8·0	16	3·7	2	0·6	–	0
Total (*n* 1230)	331	27·0	435	35·3	306	24·6	158	12·9

†Frequent awakening at night, the thought of 'It will be harder if I discontinue later', willingness to fast during Ramadan, to be tired of breast-feeding, willingness to diet to lose weight.
‡Physical or mental illness of the mother that necessitates drug use (postpartum depression, rheumatoid arthritis, migraine), nipple problems (sore or retracted), breast problems (engorgement, mastitis).

mother's concerns about the sufficiency of breast milk. The mothers who discontinued breast-feeding due to perceived milk insufficiency started complementary foods earlier (4·26 (SD 1·91) months *v.* 4·59 (SD 2·12) months, respectively, $P = 0·010$) and used a pacifier and bottle more frequently than others (pacifier 72·0 % *v.* 43·4 %, respectively; bottle 85·9 % *v.* 74·2 %, respectively, $P = 0·001$). The most common reason for discontinuation was the baby's unwillingness to eat solid foods in 12-month-old infants, while for 18-month-old infants it was the mother's perception that 'the baby is old enough'.

Less than half of the mothers (*n* 577, 46·9 %) stated that although they wanted to continue breast-feeding they could not succeed, while the other half (*n* 653, 53·1 %) said that they themselves decided to stop breast-feeding. Of the mothers who decided to discontinue, 65·6 % (*n* 428) reported that they used a method. Methods that were used for discontinuation were as follows:

- Saying 'There is no milk anymore', 'The breast is ill', etc. (*n* 176, 41·1 %).
- Using something that changes the appearance and odour of the breast (*n* 110, 25·7 %).

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- Gradual discontinuation (first discontinuation in the day time, then at night time) (*n* 88, 20·5 %).
- Not being home for a few days due to work-related journeys (*n* 54, 12·6 %).

In the cases where breast-feeding was discontinued after 18 months (*n* 158), the method of putting on something that changed the appearance and odour of the breast was the most popular (46·2 %). Of the seventy-three mothers who used such a method with the aim of making the baby disgusted with the breast, nineteen used tomato sauce, twelve used molasses, nine used cosmetics such as nail polish and lipstick, eight covered the nipple with tape and six with dye, while five attached black hair or wool to the nipple. Some mothers also tried putting salty lemon juice or merely salt (*n* 4), red pepper (*n* 3), cocoa or coffee (*n* 3), cosmetic cream (*n* 2), charcoal (*n* 1) or garlic (*n* 1) on the nipple to change the taste and odour.

Discussion

Duration of breast-feeding

There are only a few studies that specifically evaluate long-term breast-feeding patterns and associated factors[7,10,19]. In the current study, breast-feeding patterns and associated factors of a relatively large sample (1230 subjects) who continued breast-feeding for as long as 36 months were evaluated.

Although the ideal EBF duration is defined as 6 months[1], studies performed in both developed and developing countries demonstrate that this goal is currently not achieved[4,5,15,16,27]. In Norway, where breast-feeding rates are high, a recent study revealed that the EBF rate in the first month was 90 %, falling rapidly to 7 % at 6 months[5]. In the present study these figures were 92·9 % and 41·7 %, respectively. We tried to determine EBF duration that affects overall breast-feeding duration, and we saw that mothers who breast-fed exclusively in the first 3 months were six times more likely to continue breast-feeding until 12 months. Some other studies also report that early introduction of formula or milk is associated with shorter breast-feeding duration[4,7,15–17], but the critical importance of EBF duration for overall breast-feeding of at least 12 months is emphasized in the present study.

In our study group none of the infants had stayed in the neonatal intensive care unit. All of the premature infants were healthy and were discharged directly from the maternity ward, but still their duration of breast-feeding was shorter than that of term infants. The infants whose gestational age was ≤37 weeks were two or three times more likely to discontinue breast-feeding before 12 months. Low birth weight of premature infants might have contributed to this result as well. Although there are studies that report no significant association between birth weight and breast-feeding duration[28,29], the present study together with some others reveal that low birth weight has a negative impact on duration of breast-feeding[5,8,20,30].

In recent years, in addition to demographic factors, maternal intention about the infant's feeding has been shown to be a very strong indicator of breast-feeding duration[7,16,19,23,31,32]. Asking women about their plans for the duration of breast-feeding is a useful way to predict the risk of short breast-feeding duration. In the present study, mothers who had a plan about breast-feeding duration continued longer than other mothers. These results confirm the findings of previous studies in which breast-feeding duration goal is found to be an important predictor of longer breast-feeding.

It is reported that mothers who return to full-time work in the first year have a shorter duration of breast-feeding[19]. In Turkey paid leave is 91 d maximally and mothers can get unpaid leave up to 6 months. The mothers in the present study had an average maternity leave duration of 169 d and mean breast-feeding duration was approximately 1 month shorter for employed mothers compared with housewives, but EBF period was longer. EBF was correlated with the length of maternity leave. This may not be interpreted as the negative effect of employment on breast-feeding, but it may rather be due to the mother's decision to postpone working until the baby stops breast-feeding or starts complementary foods. As our study demonstrates that successful EBF in the first 3 months increases the likelihood of continuing breast-feeding until 12 months, if breast-feeding is supported in the workplace by breast pumps and appropriate storage conditions for breast milk, mothers can start working after 3 months to minimize economic loss.

Multiparous women have been shown to continue breast-feeding longer than first-time mothers[19,33]. This is thought to be due to breast-feeding experience of the mother after the first child, but there are also other studies which report no difference[7,10,16]. The present study did not demonstrate any difference between duration of breast-feeding of first and second children of the family.

In the present study mean duration of breast-feeding was shorter in Caesarean deliveries, but multivariate analysis did not reveal a significant effect of type of birth. Other studies report that type of birth may be associated[33–35], may not be associated[6,7,23] or may be weakly associated[36] with breast-feeding duration.

There is controversy about the effects of pacifiers on breast-feeding duration. Many studies report a strong negative association between pacifier use in the first month and breast-feeding duration[7,8,16,37,38] while others find a weaker association[39,40] and one study reports that pacifier use does not increase the risk of early weaning per se[41]. In the present study mean breast-feeding duration was shorter in pacifier users and there was a weak correlation between pacifier use and termination of breast-feeding.

In many studies it is demonstrated that breast-feeding duration is shorter if the infant becomes used to

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bottle-feeding[7,20,37–40]. The present study supports this finding. The reason to start bottle-feeding is usually the mother's inappropriate belief about her insufficient milk supply, which ends up with the baby's confusion about the sucking technique and diminution of the mother's milk[37]. It is not clear whether bottle-feeding is a reason or a result of insufficient milk supply[42,43].

Reasons for and processes of discontinuation of breast-feeding

In the present study the most common reason stated by mothers for discontinuation of breast-feeding in the first 12 months was perception of 'insufficient breast milk'. Concerns about insufficient breast milk are universal and studies performed in different countries demonstrate that this concern has a negative effect on breast-feeding duration because of early supplementation[10,15,19]. In the present study the mothers who discontinued breast-feeding due to milk insufficiency had started complementary foods earlier, and had used a pacifier and bottle more frequently than the others. These findings suggest that the feeling of insufficient milk is a strong concern among mothers and results in them trying an alternative feeding method. This results in involuntary early discontinuation of breast-feeding.

After 12 months, the most common reason for discontinuation according to mothers was refusal of the infant to eat solid foods[44]. Most of the mothers in the present study believed 'the baby is old enough to terminate breast-feeding' when the baby was 12 months old. In some African countries discontinuation before 15–18 months is considered 'early'[10,13]. However, in Germany and New Zealand, breast-feeding for 4–6 months is considered as a 'long enough' duration by most families[4,7]. This emphasizes that discontinuation time due to the same reason may be very different in different societies.

When mothers decide to terminate because the infant is old enough, they choose a method according to their customs, traditions and beliefs. In Senegal 'abrupt' cessation is the method of choice and a healer performs a ritual on the day of weaning[13]. In the present study the most common methods were abrupt cessation and, especially after 18 months, use of something that changes the appearance and odour of the breast. In this period, babies have difficulty relinquishing the breast and mothers choose to act as if there is something wrong with it.

A limitation of the present study is that our report on duration of breast-feeding refers only to mother/child dyads who attended our clinic and had discontinued breast-feeding permanently at least 15 d before the visit. For this reason the reported duration does not refer to the general population. Also, some other factors that had been investigated in previous studies, such as family size and structure, maternal smoking status and BMI, were not investigated in the present study as its scope was already too wide.

Conclusion

The factors that affect long-term breast-feeding and the reasons why mothers choose to terminate breast-feeding are important items of information for a health-care worker. The present study emphasizes the importance of successful breast-feeding counselling during the first few months to achieve the desired long-term breast-feeding.

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