

Determinants of continued breastfeeding beyond 12 months in Turkey: secondary data analysis of the Demographic and Health Survey

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Continued breastfeeding at year 1 is one of the core indicators for assessing global infant and young child feeding practices. The study aims to determine the frequency of breastfeeding after 12 months (long-term breastfeeding) according to a number of infant and maternal characteristics and to investigate the effects of long-term breastfeeding on the nutritional habits and growth status of children as seen in the national data. The sample included 1666 children aged 12 to 35 months from the 2003 Turkey Demographic and Health Survey. Only 55.9% of children were breastfed beyond 12 months. The rates of long-term breastfeeding were higher in the presence of the following characteristics: high birth order, long preceding birth interval, religious marriage ceremony, usage of traditional contraceptive methods, mothers aged 30-34 years and overweight mothers. Rates were lower for mothers with tobacco exposure and for bottle-fed infants. Long-term breastfeeding did not affect the consumption of plain yogurt, solid foods and semi-solid foods; however, it was associated with a decreased intake of bottled milk and fruit juice. The rates of long-term breastfeeding were similar in the case of undernourished children and of those with normal growth status. Long-term breastfeeding was related to certain maternal and infant characteristics; however, it did not affect the consumption of complementary food. Breastfeeding promotion programs should include targeted interventions for younger, primiparous and smoking mothers.

Key words: breastfeeding, nutritional habits, growth, smoking, contraceptive methods.

The World Health Organization (WHO) recommends breastfeeding for up to 2 years of age or beyond¹, and there is no age limit for cessation of breastfeeding, according to the American Academy of Pediatrics policy statement^{2,3}. Breastfeeding decreases the risk of developing allergies, respiratory tract infections, gastrointestinal infections, inflammatory bowel disease and crib death. In addition, breastfed infants have a lower risk of developing obesity, cardiovascular disease, diabetes and hematologic malignancies in future life^{2,4}. These beneficial effects are related to breastfeeding duration^{2,4}. The rate of continued breastfeeding at 1 year is one of the core indicators for assessing

infant and young child feeding practices⁵. Long-term breastfeeding rates vary by country and infant age^{5,6}. The percentage of children aged 12–15 months who are breastfed (continued breastfeeding at 1 year) is 98.1% in Burkina Faso, 55.2% in Turkey and 33.2 % in Azerbaijan. The percentage of children 20-23 months of age who are fed breast milk (continued breastfeeding at 2 years) is 95.0% in Nepal, 24.3% in Turkey and 2.4% in the Republic of Moldova^{5,6}. Despite these differences in rate by country and a sharp decline with age, there is very little published research concerning the factors that influence the prevalence of long-term breastfeeding⁷⁻¹³. Healthcare practices,

family support and breastfeeding technique are the main factors influencing the initiation of breastfeeding. After breastfeeding is established, sociodemographic factors may become more important⁷⁻¹³. The factors influencing the duration of breastfeeding require more in-depth study.

The objectives of this study are to determine the frequency of continued breastfeeding after 12 months according to sociodemographics, cultural habits, hospital practices and infant characteristics, and to investigate the effect of long-term breastfeeding on the nutritional habits and growth status of infants as seen in the national data from the Turkey Demographic and Health Survey (TDHS)-2003.

Material and Methods

Data were taken from the TDHS-2003, conducted by the Hacettepe University Institute of Population Studies in collaboration with the

General Directorate of Mother and Child Health and Family Planning, Ministry of Health⁶. That Directorate reviewed and approved the protocol. The details of the sample design and survey methodology are available in the TDHS report. The present study included the set of individual-, household-, and community-level variables of all last-born children aged 12 to 35 months who were living with their mothers⁶.

The sample design and size of the TDHS-2003 make possible to perform analyses for the country as a whole, for urban and rural areas and for the five geographic regions (West, South, Central, North and East) in Turkey⁶. Maternal parameters included age, highest education level attained, occupation, language (main language spoken in the home, i.e., Turkish vs. other), smoking status, contraceptive methods, health insurance, type of marriage ceremony (religious or civil), payment of a bride price, parity, anthropometric data (height, weight), paternal

Table I. Breastfeeding Status at 12 Months of Age According to Maternal and Paternal Characteristics

Variables		% ^a	Breastfeeding status, % ^b			
			BFS	BF12	OR	95% CI
Overall			44.1	55.9		
Maternal age at birth of this child, in years	<19	8.6	51.5	48.5	1	
	19-24	40.7	47.8	52.2	1.17	0.81-1.70
	25-29	28.7	42.6	57.4	1.44	0.98-2.13
	30-34	13.4	31.6	68.4	2.31	1.48-3.61
	≥35	8.6	44.0	56.0	1.36	0.84-2.20
Paternal age at birth of this child, in years	<25	17.8	50.0	50.0	1	
	25-29	35.3	46.3	53.7	1.16	0.87-1.55
	30-34	24.7	39.3	60.7	1.54	1.13-2.11
	≥35	21.3	40.7	59.3	1.45	1.05-2.00
Maternal education, years	<5	24.3	35.4	64.6	1	
	5-7	53.7	45.2	54.8	0.66	0.52-0.85
	≥8	22.0	51.2	48.8	0.52	0.39-0.70
Paternal education, years	<5	9.0	37.1	62.9	1	
	5-7	50.4	45.2	54.8	0.72	0.50-1.05
	≥8	40.3	44.5	55.5	0.74	0.51-1.08
Mother's language	Turkish	72.1	47.7	52.3	1	
	Other	27.9	34.9	65.1	1.70	1.35-2.14
Mother's work for wages	Absent	92.0	43.1	56.9	1	
	Present	8.0	55.6	44.4	0.60	0.41-0.86
Bride price	Absent	78.0	46.1	53.9	1	
	Present	21.9	37.4	62.6	1.43	1.12-1.84

^a% of column in the same variable, ^b% of row

BFS: Breastfed <12 months, BF12: Breastfed ≥12 months

Missing data were present in some variables [0.8 % in paternal age, 0.1% in bride price].

Table II. Breastfeeding Status at 12 Months of Age According to Family Characteristics

Variables		% ^a	Breastfeeding status, % ^b			
			BFS	BF12	OR	95% CI
Type of marriage ceremony	Civil only	2.0	58.1	41.9	1	
	Religious only	8.8	35.3	64.7	2.45	1.11-5.41
	Both	88.9	44.8	55.2	1.63	0.80-3.35
Family type	Nuclear	66.6	44.3	55.7	1	
	Extended	31.5	44.6	55.4	0.99	0.80-1.23
Household size	<6 persons	55.1	46.4	53.6	1	
	≥6 persons	44.9	41.3	58.7	1.23	1.01-1.51
Wealth index	Richest	16.5	52.9	47.1	1	
	Rich	21.2	44.5	55.5	1.40	1.01-1.94
	Middle	18.5	47.6	52.4	1.24	0.88-1.73
	Poor	20.4	39.3	60.7	1.73	1.24-2.41
	Poorest	23.4	39.5	60.5	1.72	1.25-2.38
Place of residence	Urban	67.1	44.0	56.0	1	
	Rural	32.9	44.5	55.5	0.98	0.79-1.21
Region	East	27.0	39.0	61.0	1	
	South	12.5	41.2	58.8	0.91	0.65-1.29
	Central	19.6	43.0	57.0	0.85	0.63-1.14
	West	34.6	48.9	51.1	0.67	0.51-0.86
	North	6.4	50.0	50.0	0.64	0.41-0.99

^a% of column in the same variable, ^b% of row

BFS: Breastfed <12 months, BF12: Breastfed ≥12 months

Missing data were present in some variables [0.3 % in type of marriage ceremony, 0.1% in bride price, 1.8 % in family type (divorced and co-spouse)].

occupation, family type (simple or extended), family size (household members <6 vs. ≥6), family wealth index (poorest, poor, middle, rich, richest), residence and region. Children's parameters included age, gender, preceding birth interval, presence of antenatal care, birth setting, birth weight, birth order, duration of breastfeeding, infant feeding practices, use of a bottle with a nipple and anthropometric data (height, weight).

Maternal employment status was given as the presence or absence of "work for wages outside the home at the time the child was enrolled in the study." A marriage with a bride price is a traditional practice in Turkey, in which the family of the boy gives an amount of a certain value that may consist of money/gold/animals to the girl's family for giving her in marriage. Contraceptive methods were classified as "none", "traditional" (including withdrawal, lactational amenorrhea, periodic

abstinence), "hormonal" (pills, injections) or "modern excluding hormonal." Maternal tobacco exposure was classified as "absence," "presence of environmental tobacco smoke (ETS) without maternal smoking" or "maternal smoking with/without ETS."

The WHO Multicentre Growth Reference Study (MGRS) was used to compare Z scores of weight for age (WAZ), weight for height (WHZ), height for age (HAZ) and body mass index for age (BAZ). Body mass index (BMI) was calculated (weight/height^2 [kg/m^2])¹⁴.

Infants breastfed more than 12 months (long-term breastfeeding) were placed in the "BF12" group. Breastfeeding was here defined to include the practice of feeding breast milk (including expressed breast milk) in addition to food or liquids including non-human milk and formula after one year of age. Infants breastfed fewer than 12 months were placed in the "BFS" group.

Statistical Analysis

Statistical analyses were done for weighted data considered proportionally in each of the 40 strata and response rates that were given in the main report⁶. Statistics were computed using the Statistical Package for the Social Sciences (SPSS Inc, Chicago, Illinois). Data were presented using numerical descriptive statistics, including means with standard deviations (SD) and percentages, as appropriate. Comparisons between groups were performed using Student's *t*-test for continuous variables. The differences in rates of BF12 were analyzed using univariate logistic regression and odds ratios (OR); 95% confidence intervals (CI) were given. Predictor variables that had a significant relationship with the dependent variable (BF12) at the $P < 0.10$ level in univariate logistic regression were selected for inclusion in the multivariate logistic regression model. The Hosmer-Lemeshow goodness-of-fit statistic was used to assess model fit. Backward stepwise (likelihood ratio) regressions were used to determine which factors were most strongly and independently associated with the outcomes of interest. Significance levels were set at the

$P < 0.05$ criterion.

Results

The sample included 1666 eligible children, of whom 52.1% were male. The median age was 24.0 month (SD 7.1). Among the children in the sample, only 1.3% of the children had never received breastmilk, while 55.9% had been breastfed for at least 12 months, and 20.4% were still being breastfed during the study period. Continued breastfeeding rates were found to be 56.8% at 12-15 months, 33.3% at 16-19 months, 20.7% at 20-23 months, 8.9% at 24-27 months, 6.3% at 28-31 months and 3.0% at 32-35 months.

Maternal and Family Characteristics and Breastfeeding Duration

Maternal age, paternal age, maternal education, and the presence of marriage with a bride price and of a religious marriage ceremony significantly affected the rate of BF12 (Tables I and II). Mothers having large families (≥ 6) and speaking a tongue other than Turkish breastfed their infants for at least 12 months more frequently than did their counterparts. Rates of BF12 were seen to be significantly

Table III. Breastfeeding Status at 12 Months of Age According to Health Insurance, Maternal BMI, Contraceptive Use and Smoking Status

Variables		% ^a	Breastfeeding status, % ^b			
			BFS	BF12	OR	95% CI
Health insurance	Absent	38.7	42.9	57.1	1	
	Present	60.4	44.8	55.2	0.92	0.75-1.13
Maternal body mass index, kg/m ²	<24.9	45.4	47.2	52.8	1	
	25-29	33.9	40.5	59.5	1.31	1.04-1.65
	≥ 30	18.4	44.1	55.9	1.14	0.86-1.50
Contraceptive method used	Traditional methods	29.3	35.7	64.3	1	
	None	22.9	44.9	55.1	0.68	0.51-0.90
	Non-hormonal modern	40.5	47.6	52.4	0.62	0.48-0.79
	Hormonal contraceptives	7.3	55.3	44.7	0.45	0.30-0.68
Maternal smoking	Absent	73.8	41.6	58.4	1	
	Present	26.2	51.4	48.6	0.67	0.54-0.84
Maternal ETS exposure	Absent	32.2	40.2	59.8	1	
	Present	67.8	46.0	54.0	0.79	0.64-0.98
Maternal smoking exposure	Absent	27.5	37.9	62.1	1	
	ETS only	46.1	43.8	56.2	0.78	0.61-0.99
	Maternal smoking	26.4	51.3	48.7	0.58	0.44-0.75

^a% of column in the same variable, ^b% of row

BFS: Breastfed <12 months, BF12: Breastfed ≥ 12 months, BMI: Body mass index, ETS: Environmental tobacco smoke
Missing data were present in some variables [0.9% in health insurance, 2.3% in maternal BMI].

Table IV. Breastfeeding Status at 12 Months of Age According to Prenatal Characteristics of Children

Variables		% ^a	Breastfeeding status, % ^b			
			BFS	BF12	OR	95% CI
Birth order	1	33.5	49.5	50.5	1	
	2-4	53.6	44.7	55.3	1.21	0.97-1.51
	≥5	12.9	27.9	72.1	2.56	1.80-3.64
Preceding birth interval	1 st birth	33.5	49.5	50.5	1	
	<24 months	17.0	46.8	53.2	1.12	0.83-1.50
	≥24 months	49.2	39.4	60.6	1.51	1.21-1.89
Birth order and preceding birth interval	1 st birth	33.5	49.5	50.5	1	
	2 nd -4 th birth and <24 months	13.0	51.2	48.8	0.93	0.67-1.28
	2 nd -4 th birth and ≥24 months	40.0	42.4	57.6	1.34	1.06-1.69
	≥5 th birth and <24 months	4.0	31.1	68.9	2.13	1.21-3.75
	≥5 th birth and ≥24 months	9.0	25.9	74.1	2.78	1.84-4.22
Antenatal visits, number	0	21.4	42.3	52.7	1	
	1-4	36.3	42.8	57.2	0.98	0.75-1.29
	5-8	23.0	44.4	55.6	0.92	0.68-1.24
	≥9	19.2	48.5	51.5	0.78	0.57-1.06
Birth setting	Home	20.0	39.5	60.5	1	
	Public	67.1	45.4	54.6	0.79	0.61-1.02
	Private	12.7	45.5	54.5	0.78	0.54-1.13
Mode of delivery	Non-caesarean	77.9	42.3	57.7	1	
	Caesarean section	22.1	50.6	49.4	0.72	0.57-0.92
Birth weight	<2.5 kg	7.9	55.7	44.3	1	
	2.5-4.4 kg	61.2	46.6	53.4	1.45	0.99-2.12
	≥4.5 kg	3.4	34.0	66.0	2.52	1.28-4.94

^a% of column in the same variable. ^b% of row

BFS: Breastfed <12 months, BF12: Breastfed ≥12 months

Missing data were present in some variables [0.5 % in preceding birth interval, 0.2% in birth setting, 27.5% in birth weight].

higher among mothers in the poorest and poor wealth categories than among those in the richest wealth category. BF12 rates also varied according to region; the West and North had lower rates of BF12 than the East. However, the frequency of BF12 did not vary with maternal occupation (being a wage-earning worker), paternal education, presence of health insurance or place of residence (Tables I, II and III).

A significantly higher rate of BF12 was observed for mothers using traditional contraceptive methods than for their counterparts. The rate of BF12 was seen to be higher among overweight mothers than among normal-weight mothers; however, the rate for obese mothers

was similar to that for normal-weight mothers. Overall, 58.3% of mothers had never smoked, 7.4% had smoked in the past but had since ceased to do so, and 8.1% had tried once or twice; however, 9.4% smoked occasionally and 16.8% smoked regularly during the survey period. The rate of BF12 was lower among mothers who smoked than it was among their counterparts (Table III).

Characteristics of Children and Breastfeeding Duration

The mean age of children in the BF12 group was similar to that of children in the BFS group (23.8±7.3 and 24.3 ± 6.8 months, respectively;

$p=0.167$). The mean birth order in the BF12 group was found to be significantly higher than in the BFS group (2.85 ± 2.03 and 2.43 ± 1.64 months, respectively; $p<0.001$). The birth setting and the level of antenatal care were similar in both groups (Table IV). Children whose birth order was ≥ 5 had significantly higher odds of being in the BF12 group than did those who were firstborn. Mothers having a preceding birth interval ≥ 24 months were more likely to breastfeed more than 12 months, compared to those with only one child. Overall, the rate of BF12 for children delivered by cesarean section was significantly lower than that for children born vaginally.

The birth weight was known for 72.5% of the children in this survey. The mean birth weight was found to be significantly higher in the BF12 than the BFS group (3280 ± 671 g and 3157 ± 686 g, respectively; $p=0.002$). A significantly higher rate of BF12 was seen in the case of large-for-gestational-age infants than in the case of small-for-gestational-age infants (Table IV). Early breastfeeding initiation (<1 hour) did not change the rate of BF12, while

any foods given during the first three days after delivery had a negative effect on BF12. A significantly lower rate of BF12 was seen for bottle-fed infants than for non-bottle-fed infants (Table V).

At the time the children in the study were 12 months of age, 14 mothers had become pregnant again; only one of these had continued to breastfeed her child.

Results of Multivariate Analysis

Maternal and paternal age at the birth of the child in the study (≥ 35 , 30-34, 25-29, 19-24 vs <19 years), maternal education (5-7, ≥ 8 vs. <5 years), maternal employment (presence vs. absence of work for wages), maternal body mass index (≥ 30 , 25-29 vs. <25 kg/m²), contraceptive methods, type of marriage ceremony (religious and both civil and religious vs. civil only), bride price (absence vs. presence), mother's language (other vs. Turkish), mode of delivery (caesarean section vs. non-caesarean), birth order and preceding interval (2nd-4th birth and <24 months, 2nd-4th birth + ≥ 24 months, $\geq 5^{\text{th}}$ birth

Table V. Breastfeeding Status at 12 Months of Age According to Infant Characteristics

Variables		% ^a	Breastfeeding status, % ^b			
			BFS	BF12	OR	95% CI
Age	12-23 months	46.9	42.5	57.5	1	
	24-36 months	53.1	45.6	54.4	0.88	0.72-1.08
Sex	Male	52.1	44.8	55.2	0.95	0.78-1.16
	Female	47.9	43.4	56.6	1	
Initiation of breastfeeding	<1 hour	50.5	43.6	56.4	1	
	≥ 1 hour	49.5	44.8	55.2	0.96	0.78-1.17
Feeding in the first 3 days of life	Given additional foods	42.6	47.2	52.8	1	
	Exclusively breastfed	57.2	41.9	58.1	1.24	1.01-1.52
Drank from bottle with nipple	No	55.8	33.6	66.4	1	
	Yes	44.1	57.3	42.7	0.38	0.31-0.46
Weight for age	z score ≥ -1	89.0	44.2	55.8	1	
	z score < -1	11.0	37.4	62.6	1.33	0.95-1.85
Height for age	z score ≥ -1	59.2	45.3	54.7	1	
	z score < -1	40.8	40.7	59.3	1.21	0.97-1.50
Weight for height	z score ≥ -1	96.6	43.5	56.5	1	
	z score < -1	3.4	39.6	60.4	1.18	0.65-2.12
BMI for age	z score ≥ -1	96.8	43.7	56.3	1	
	z score < -1	3.2	33.3	66.7	1.55	0.83-2.91

^a% of column in the same variable. ^b% of row

BFS: Breastfed <12 months, BF12: Breastfed ≥ 12 months, BMI: Body mass index

Missing data were present in some variables [0.2% in feeding in the first 3 days of life, 0.1% in drank from bottle with nipple, 9.1% in height for age, 4.5% in weight for age].

+ <24months, ≥5th birth + ≥24 months vs. 1st birth), drank from a bottle with a nipple (yes vs. no), feeding in the first 3 days of life, (exclusively breastfed vs. given additional foods), number of household members (≥6 vs. <6), maternal smoking (only ETS [excluding

maternal smoking] and maternal smoking vs. no exposure) were entered into the multivariate analysis. This analysis revealed that the rate of being BF12 was higher in infants who had been breastfed exclusively during the first three days of life, in infants with a high birth

Table VI. Factors Predictive of Continuing Any Breastfeeding at 12 Months of Age Using Multivariate Analysis, Backward Stepwise Method (Likelihood Ratio)*

	p	OR	95% CI	
Maternal age at birth of the enrolled child, years	0.022			
19-24 vs. <19	0.353	1.22	0.80	1.84
25-29 vs. <19	0.140	1.42	0.89	2.25
30-34 vs. <19	0.015	1.94	1.13	3.32
≥35 vs. <19	0.804	0.93	0.51	1.68
Maternal smoking	0.005			
ETS (excluding maternal smoking) vs. no exposure	0.020	0.73	0.56	0.95
Maternal smoking vs. no exposure	0.001	0.61	0.45	0.83
Contraceptive methods	<0.001			
None vs. traditional methods	<0.001	0.52	0.37	0.71
Modern (excluding hormonal) vs. traditional methods	<0.001	0.59	0.45	0.77
Hormonal contraceptives vs. traditional methods	0.001	0.47	0.30	0.75
Birth order and preceding birth interval	0.005			
2 nd -4 th birth + <24 months vs. 1 st birth	0.113	0.74	0.52	1.07
2 nd -4 th birth + ≥24 months vs. 1 st birth	0.607	1.08	0.81	1.44
≥5 th birth + <24 months vs. 1 st birth	0.469	1.27	0.67	2.39
≥5 th birth + ≥24 months vs. 1 st birth	0.003	2.20	1.30	3.72
Feeding in the first 3 days of life				
Exclusively breastfed vs. given additional foods	0.001	1.45	1.16	1.82
Drank from bottle with nipple				
Yes vs. no	<0.001	0.36	0.29	0.45
Maternal body mass index, kg/m ²	0.072			
25-29.9 vs. <24.9	0.034	1.31	1.02	1.68
≥30 vs. <24.9	0.979	1.00	0.73	1.36
Civil marriage ceremony	0.035			
Religious vs. civil ceremony only	0.036	2.54	1.06	6.07
Both civil and religious vs. civil ceremony only	0.274	1.55	0.71	3.37
Constant	0.507	1.36		

*Variables entered into model: maternal and paternal age at birth of the enrolled child (≥35, 30-34, 25-29, 19-24 vs. <19 years), maternal education (5-7, ≥8 vs. <5 years), maternal employment (presence vs. absence of work for wages), maternal body mass index (≥30, 25-29 vs. <25 kg/m²), contraceptive methods, type of marriage ceremony (religious and both civil and religious vs. civil only), bride price (absence vs. presence) and mother's language (other vs. Turkish), mode of delivery (caesarean section vs. non-caesarean), birth order with preceding interval (2nd-4th birth and <24 months, 2nd-4th birth + ≥24 months, ≥5th birth + <24 months, ≥5th birth + ≥24 months vs. 1st birth), drank from bottle with nipple (yes vs. no), feeding in the first 3 days of life, (exclusively breastfed vs. given additional foods), household size (≥6 persons vs. <6 persons), maternal smoking (ETS only [excluding maternal smoking] and maternal smoking vs. no exposure)

order and long birth interval ($\geq 5^{\text{th}}$ birth + ≥ 24 months vs 1st birth), in infants having mothers aged 30-34 years and in infants having mothers married with a religious ceremony. On the other hand, a significantly lower BF12 rate was seen among mothers with exposure to tobacco smoke (active smokers or ETS), mothers using no contraception or modern contraceptive methods, and bottle-fed infants (Table VI).

Effect of Continued Breastfeeding on Children's Nutritional Habits

When food intake in the last 24 hours for children enrolled in the study was analyzed, BF12 infants were found to consume less bottled milk (27.0% and 34.2%, respectively; $p=0.002$), soup (66.9% and 72.9%, respectively; $p=0.012$), pudding (9.2% and 13.1%, respectively; $p=0.015$), fruit juice (32.8% and 37.5%, respectively; $p=0.052$) than did BFS infants. However, no differences were detected between the BF12 and BFS groups in the consumption of plain yogurt (60.5% and 62.8%, respectively; $p=0.361$), other solid and semi-solid foods (81.1% and 83.8%, respectively; $p=0.160$), tea (76.9% and 75.0%, respectively; $p=0.401$) and formula (4.9% and 6.9%, respectively; $p=0.101$).

Effect of Continued Breastfeeding on Children's Growth Status

The rate of BF12 for children with low HAZ, WHZ, WAZ and BAZ (< -1 z score) did not differ from the rate for children with normal growth status (Table V).

Discussion

More than half of the infants in our study, aged 12-35 months, were breastfed ≥ 12 months. Univariate analysis of the data showed that the rate of long-term breastfeeding was higher among mothers who were older, had less education, had been married with a bride price, had been married with a religious ceremony only, had a large family, spoke a language other than Turkish, and had many children. The East region, where mothers had high parity, little education and large families, had the highest rate of BF12. A possible explanation could be that large families, with the immediate presence of older women and grandmothers, might assist new mothers in learning to breastfeed¹⁵. Among mothers in the "richest" category, there

appeared to be a negative attitude toward long-term breastfeeding, possibly due to loss of the transmission of the traditional breastfeeding culture and the increasing availability and promotion of formula.

Multivariate analysis of the data demonstrated the importance of maternal age, birth order and type of marriage ceremony. A review has revealed a strong and consistent association between the duration of breastfeeding and demographic factors such as maternal age and education level, and a less consistent association with factors such as marital and socioeconomic status in Western countries¹⁰. However, Thulier and Mercer¹⁶ reported that demographic factors, including age, marital status, education, socioeconomic status and Special Supplemental Nutrition Program for Women, Infants, and Children status might influence breastfeeding duration. Similarly, the Third National Health and Nutrition Examination Survey showed that the rate of breastfeeding at 12 months among US infants varied by maternal age, education, region and ethnicity in univariate analysis¹⁷.

Human lactation is a complex phenomenon. Most influencing factors are not constant within or between societies and may vary over the years. DHS data collected in 50 countries between 1990 and 2005 showed that the variation across regions was clear; the rates of exclusive breastfeeding were higher in low-income families in developing countries, but higher in families from richer groups in industrialized countries¹⁸. It should be noted that the WHO/UNICEF Baby-Friendly Hospital Initiative¹ was implemented in Turkey in 1991¹⁹; the effect of the initiative was not studied as a limitation of the survey. Nonetheless, we detected no change in the rate of BF12 among children who were born in hospital and received antenatal care, suggesting that adequate consultation regarding lactation and long-term breastfeeding was not given to mothers during healthcare visits. In the Sri Lanka DHS, it was found that those not receiving postnatal home visits (OR=2.62) were more likely to discontinue breastfeeding by 1 year¹¹.

Shawky and Abalkhail¹² reported that mothers who delivered by caesarean section had a shorter duration of lactation than those who delivered

vaginally. Also, Senarath et al.¹¹ observed that a child was at risk for not currently breastfeeding if delivered by caesarean section (OR=1.46). However, similar to the review by Scott and Binns¹⁰, our survey revealed that the method of delivery was not associated in multivariate analysis with continued breastfeeding at 12 months.

Any food given within the first three days and bottle feeding were associated in the survey with a decreased rate of breastfeeding after the first year. Similarly, previous studies have reported that prelacteal feeding is associated with poor breastfeeding outcomes, and should not be given to newborns unless medically indicated²⁰⁻²². In addition, low breastfeeding rates were reported in children who were bottle fed or used pacifiers^{7,23}.

Previous studies have looked at the role of hormonal contraceptives in reducing the length of lactation^{12,24,25}. Biologically, it seems plausible that hormonal contraceptives, especially those containing estrogen, might inhibit lactation. However, in our study, significantly lower rates of BF12 were seen among both mothers using "modern contraceptive methods" and those using no contraception than among mothers using traditional methods. This might be explained by the influence of the cultural milieu regarding both longer breastfeeding and selection of contraceptive methods in our population.

In our survey, mothers were more likely to continue breastfeeding after one year if they and other household members did not smoke. A negative association between maternal smoking and breastfeeding duration has been seen consistently in a range of countries^{16,26-28}. Nicotine may have a negative effect on breast milk supply by suppressing prolactin levels; breastfeeding duration might be increased if women reduced or quit smoking²⁷.

Results concerning maternal weight status and breastfeeding are controversial²⁹. Rates of BF12 were higher among overweight women than among women with normal BMI in our survey; however, the rates were similar among obese and normal-weight mothers. A systematic review²⁹ reported that in seven studies, obese women were observed to breastfeed their infants for a shorter duration than normal-weight women; however, in three studies (in

Russia, in Denmark and in black women in the USA) there were no differences in breastfeeding duration. In Kuwait, higher maternal weight was associated with longer breastfeeding. These variations might be influenced by cultural habits and ethnic differences³⁰.

In our survey, children in the BF12 group consumed similar amounts of plain yogurt, solid foods and semi-solid foods; however, they consumed less bottled milk and fruit juice than children in the BFS group. Lande et al.⁸ observed a lower daily intake of sweetened drinks and a 16% lower mean daily intake of added sugar in breast-fed infants. Thus, long-term breastfeeding had a positive association with good nutritional habits. Also, on the basis of growth assessment according to MGRS data, our study showed that the rate of BF12 was not higher for undernourished children than for children with normal growth status.

Our survey was a secondary data analysis of the TDHS, and thus was limited by the absence of information on social family support, duration of maternity leave, beliefs about breastfeeding, association between maternal identity and breastfeeding, personality, presence of psychological disorders, breast and nipple condition, and infant health problems in the original data. As the study relied on maternal self-reports, we could not determine the impact of response bias. However, this survey was nonetheless based on nationwide data for mothers with children aged 12-35 months, and included a number of maternal, family and children characteristics; it highlights for the first time several novel and potentially modifiable factors associated with breastfeeding after the first year of life in Turkey.

Our survey reveals that continued breastfeeding after 12 months is related to maternal age, type of marriage ceremony, type of feeding in the first three days of life, bottle feeding, maternal weight, maternal smoking or ETS, parity, preceding birth interval and contraceptive methods. Based on our findings, we make the following recommendations. No food should be given to newborns within the first three days of life unless medically indicated. Bottle feeding should be strongly discouraged to support long-term breastfeeding. Targeted interventions may be necessary to improve infant feeding practices^{7,9,18-20,31}. Lactation counseling should

be given to mothers who are young or who have low parity or a short preceding birth interval. Screening for maternal smoking and ETS in the primary care setting could be a step forward in promoting a longer duration of breastfeeding. Giving additional social support to mothers who smoke might increase the practice of breastfeeding to 12 months and longer^{7,13}. Breastfeeding promotion strategies should focus specifically on metropolitan communities by means of revitalizing the Baby-Friendly Hospital Initiative in health facilities. In future studies, circumstances related to the social milieu in which the mother lives and the availability of health promotion interventions in hospitals and health services should be taken into consideration. There is also a need to identify maternal sources of support associated with continued breastfeeding, which may better inform the design of promotional campaigns and targeted interventions aimed at improving breastfeeding rates at the national level.

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