

Breast-feeding Patterns in Central Israel

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Key words: breast-feeding, human milk, infant formula, maternal education, parity

Abstract

Background: The rate of breast-feeding in Israel has increased over the last two decades but is still lower than rates in other developed countries that have taken an active role in promoting breast-feeding.

Objective: To determine breast-feeding patterns and the association between sociodemographic characteristics and breast-feeding in the Tel Aviv district.

Methods: The mothers of infants aged 2, 4, 6 and 12 months, attending 59 well-baby clinics in the Tel Aviv district, were interviewed by telephone. Singleton infants who weighed less than 2,000 g and multiple-gestation infants were excluded from the study. The questions covered background data, sociodemographic characteristics of the family, and breast-feeding practices. Stepwise logistic regression was used to analyze the association between breast-feeding and various sociodemographic characteristics.

Results: Altogether, 78.5% of the mothers (1,307/1,665) initiated breast-feeding. The rate of breast-feeding at 2, 4, 6 and 12 months was 55.8, 36.8, 29.9 and 11.8%, respectively. Only 35.8% of the infants at 2 months and 11.2% at 6 months were exclusively breast-fed. The mean duration of breast-feeding was 5.2 ± 0.2 months. Grand multiparas (≥ 5 children) had a significantly higher rate of breast-feeding than women with one to four children ($P < 0.001$). More likely to breast-feed for 2 weeks or longer were women married to Yeshiva students (odds ratio = 5.3), women with ≥ 13 years education (OR = 2.1), and women on maternity leave (OR = 1.6). The predictors for breast-feeding for 6 months or longer were similar.

Conclusions: Although the rate of breast-feeding initiation in central Israel was 78.5%, only 29.9% of the mothers continue to breast-feed for 6 months. Already at a young age, an appreciable number of breast-fed infants receive infant formula. Breast-feeding promotion should focus on less educated women, homemakers, and families with one to four children.

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Human milk is the ideal source of nutrition for infants and has numerous health benefits for the infant and the mother. Both the World Health Organization [1] and the American Academy of Pediatrics [2] recommend exclusive breast-feeding for the first 6 months of life, and continued breast-feeding, with the addition of appropriate complementary foods, until

12 months and thereafter for as long as mother and baby desire.

The 1960s and 1970s saw a decline in breast-feeding rates in developed countries [3,4], which was attributed to improved economic conditions, changes in society and family structure, and a substantial increase in the availability of milk formulas. During the last two decades, much effort has been invested in the promotion of breast-feeding. With the implementation of global programs, such as the International Code of Marketing of Breast-Milk Substitutes [5] and the Baby Friendly Hospital Initiative [6], an increase in the rate and duration of breast-feeding has been reported in developed countries [3,7]. Similar trends have been reported in Israel. In contrast to high rates and long mean duration of breast-feeding reported in 1956 [8], surveys conducted in the late 1970s and early 1980s revealed a decrease in the rate and duration of breast-feeding [9,10]. Changing trends in breast-feeding rates were seen from the late 1980s. In a recent communication by the Israel Center for Disease Control and the Department of Nutrition of the Ministry of Health, it was reported that 83% of Jewish mothers breast-fed their infants and the mean duration of breast-feeding was 6 months [11].

The purpose of the present study was to determine the patterns of breast-feeding in the Jewish population of the Tel Aviv district and their relationship to various sociodemographic characteristics. The data presented here may help to promote breast-feeding and plan intervention programs on the individual, community, and national levels.

Patients and Methods

Study population

A telephone survey was conducted by the Israel Center for Disease Control, Gertner Institute for Policy Research, Sheba Medical Center, and the Department of Pediatrics B, Schneider Children's Medical Center of Israel. We collected the names and telephone numbers of infants attending all 59 well-baby clinics in five cities in the Tel Aviv district who at the time of the interview were 2, 4, 6 and 12 months of age. Included in the Tel Aviv district were Tel Aviv (excluding Jaffa), Ramat Gan, Holon, Bat Yam, and Bnei Brak. Approximately 95% of the infants residing in the District receive prenatal and postnatal care in these well-baby clinics [12], which are run by the Ministry of Health or local municipalities.

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OR = odds ratio

Data collection

A structured questionnaire was addressed to the infants' mothers on the assumption that they are the main care providers during early infancy. However, their answers were considered a family decision. The questions covered background data on the infant (gender, gestational age at delivery, birth weight, hospital of birth), sociodemographic characteristics of the family (maternal education, maternal employment status, parity, father being a Yeshiva student), and breast-feeding practices (mothers were asked whether they had initiated breast-feeding and for how long, and whether the baby was concomitantly given infant formula, i.e., standard or non-standard infant formula). Interviews were scheduled consecutively for each age group (2, 4, 6 and 12 months) over a 4 week period between November 1998 and March 1999.

Data analysis

Initiation of breast-feeding was defined as feeding the infant human milk for any period. Breast-feeding was defined as exclusive if the infants consumed human milk as the only source of milk, irrespective of other solids and fluids. Infants who consumed infant formula for less than a week were also considered exclusive breast-feeders. Breast-feeding was defined as partial if the infant consumed a combined diet of human milk and infant formula for more than a week, irrespective of other solids and fluids. Total breast-feeding rates included both exclusive and partial breast-feeding. Long-term breast-feeding was defined as exclusive or partial breast-feeding for 6 months or longer.

The association between breast-feeding and the following sociodemographic characteristics was examined: a) maternal education: 10–12 years (high school education) and ≥ 13 years (over high school education, academic degree); b) maternal employment: homemaker, currently employed, maternity leave; c) parity: 1, 2, 3, 4, ≥ 5 children; and d) father being a Yeshiva student: yes or no. The analysis was performed for all infants who had received human milk for 2 weeks or longer. A separate analysis was done for long-term breast-feeders and included infants who were 6 months and older at the time of the interview.

Statistical analysis

The data were analyzed with the SPSS (Statistical Package for Social Sciences; SPSS, Inc, Chicago, IL, USA) program. Comparisons of categorical variables were made with Pearson chi-square test and of continuous variables with independent *t*-test. We used the Kaplan-Meier survival curve of cumulative probabilities to examine the reported duration of breast-feeding. For infants who continued to receive human milk at the time of the interview, duration was censored [13]. This method allows analyzing the duration of breast-feeding in infants who, by the end of the observation period, had not experienced cessation of breast-feeding. Stepwise logistic regression controlling for the sociodemographic characteristics was performed to estimate the odds ratios and 95% confidence intervals for breast-feeding. The log rank test was used to establish the relationship between the

duration of breast-feeding and maternal education. Unless otherwise indicated, measurements were expressed as mean \pm SD. Probability values of <0.05 were considered significant.

Results

Background data

The initial sample included 2,781 infants. The mothers of 886 infants (31.9%) were unreachable by phone after at least three separate attempts. Of the remainder, the mothers of 1,803 infants (95.1%) agreed to participate in the study. Thirty singleton infants who weighed less than 2,000 g and 108 multiple-gestation infants (45 twins and 6 triplets), regardless of their weight, were excluded. Thus, the final number of infants included in the study was 1,665 (839 males, 50.4%, and 826 females, 49.6%). Four hundred (24%) were aged 2 months, 451 (27.1%) 4 months, 509 (30.6%) 6 months, and 305 (18.3%) 12 months. There were no differences in male-to-female ratio among the four age groups ($P = 0.721$). The mean gestational age was 39.9 ± 1.7 weeks and the mean birth weight $3,305.4 \pm 487.7$ g ($3,374.9 \pm 485.3$ g for males, $3,234.7 \pm 480.4$ g for females). The majority of the infants (95%) were born in the Sourasky Medical Center, Tel Aviv (37.6%); Sheba Medical Center, Tel Hashomer (17.1%); Ma'ayenei Hayeshua Hospital, Bnei Brak (17.3%); Wolfson Hospital, Holon (15.4%); and Rabin Medical Center (Beilinson Campus), Petah Tiqva (7.6%). The remaining 5% were born in 14 other hospitals. All interviewed mothers were Jewish.

Rate and duration of breast-feeding

Altogether, 1,307 of 1,665 mothers (78.5%) initiated breast-feeding. Similar initiation rates were reported among all age groups (80%, 78.9%, 78.6% and 75.7%, at 2, 4, 6 and 12 months, respectively; $P = 0.564$). Total breast-feeding rates were 55.8% (223/400) at 2 months (exclusive 35.8%, partial 20%), 36.8% (166/451) at 4 months (exclusive 18.2%, partial 18.6%), 29.9% (152/509) at 6 months (exclusive 11.2%, partial 18.7%), and 11.8% (36/305) at 12 months (exclusive 5.2%, partial 6.6%) (P value for total, exclusive, and partial breast-feeding rates < 0.001). The Kaplan-Meier curve [Figure 1] showed that $85 \pm 1\%$ (cumulative use \pm SE) of the infants who were ever breast-fed still received human milk after 3 weeks, $76.6 \pm 1.2\%$ after 1 month, $52.1 \pm 1.5\%$ after 3 months, and $35.5 \pm 1.6\%$ after 6 months. The mean duration \pm SE of total breast-feeding was 5.2 ± 0.2 months. The mean duration \pm SE of breast-feeding was significantly longer for the more educated mothers compared with the less educated ones: 6.3 ± 0.2 (95% CI 5.9–6.7) vs. 3.9 ± 0.2 months (95% CI 3.5–4.3); $P < 0.001$, log rank test.

Table 1 demonstrates the association between sociodemographic characteristics and rate of total breast-feeding of infants who breast-fed for 2 weeks or longer ($n=1,213$). Higher rates were found among the more educated mothers (≥ 13 years) ($P < 0.001$). Further division of this group into 13–15 years ($n=500$) and ≥ 16 years ($n=351$) of education yielded similar rates for

CI = confidence interval

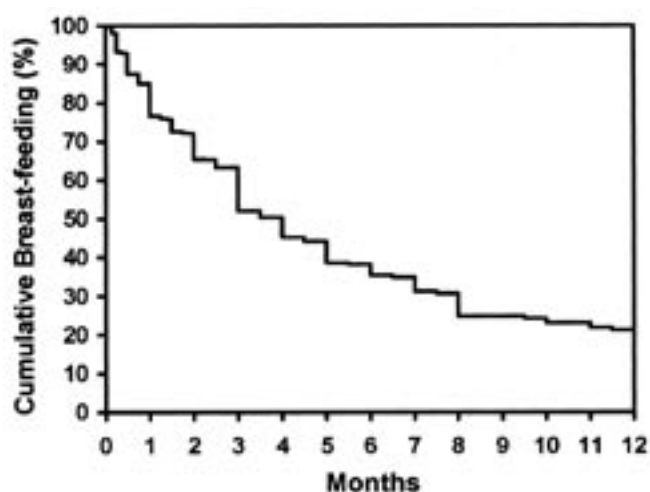


Figure 1. The estimated percentage of infants who breast-fed for a given period (n=1,307) is demonstrated by the Kaplan-Meier curve of cumulative probabilities.

Table 1. The association between sociodemographic characteristics and total breast-feeding rates

	No. (%) of mothers breast-feeding for 2 weeks or longer (n=1,213)*	No. (%) of mothers breast-feeding for 6 months or longer (n=229)*
Maternal education		
10–12 years	507/803 (63.1)	67/373 (18)
≥ 13 years	697/851 (81.9)	160/434 (36.9)
Maternal employment		
Homemaker	418/609 (68.6)	86/307 (28)
Currently employed	490/659 (74.4)	122/440 (27.7)
Maternity leave	293/376 (77.9)	20/52 (38.5)
Parity		
1 child	406/540 (75.2)	67/252 (26.6)
2 children	325/473 (68.7)	44/222 (19.8)
3 children	208/306 (68)	41/159 (25.8)
4 children	84/117 (71.8)	16/52 (30.8)
≥ 5 children	169/204 (82.8)	57/118 (48.3)
Father being a Yeshiva student		
Yes	278/299 (93)	99/168 (58.9)
No	935/1366 (68.4)	130/646 (20.1)

* Answers were incomplete.

both (82.4% and 81.2%, respectively). Assessment by employment status revealed a significant difference among homemakers, currently employed women, and women on maternity leave. The former had the lowest rates of breast-feeding, whereas the latter had the highest (68.6% vs. 77.9%, $P < 0.004$). Assessment by parity showed that grand multiparas (≥ 5 children) had a significantly higher rate of breast-feeding compared with primiparas and women with two, three, and four children ($P < 0.001$). Furthermore, women married to Yeshiva students (n=299) were significantly more likely to breast-feed than women married to non-Yeshiva students (93% vs. 68.4%, $P < 0.001$).

Stepwise logistic regression analysis indicated that those most likely to breast-feed for 2 weeks or longer in decreasing

Table 2. Predictors of breast-feeding*

	Total breast-feeding					
	Two weeks or longer (n=1,213)			Six months or longer (n=229)		
	OR	95% CI	P	OR	95% CI	P
Maternal education						
≥13 years	2.1	1.6–2.7	<0.001	2.1	1.4–3	<0.001
Maternal employment						
Currently employed	1.1	0.8–1.4	0.524	0.8	0.5–1.1	0.196
Maternity leave	1.6	1.2–2.2	0.003	2.1	1.1–4	0.027
Father being a Yeshiva student						
Yes	5.3	3.3–8.5	<0.001	5.5	3.7–8	<0.001

* Using stepwise logistic regression analysis.

order were women married to Yeshiva students, the more educated women (≥13 years), and those on maternity leave [Table 2]. Parity was omitted from the analysis because it was highly correlated with the first predictor. Indeed, the data showed that women married to Yeshiva students had a mean of 4.5 ± 3.2 children (compared with a mean of 2.2 ± 1.5 children for women married to non-Yeshiva students, $P < 0.001$). The predictors for long-term breast-feeding (6 months or longer) were similar [Table 2].

Discussion

The present study showed that 78.5% of the Jewish mothers residing in the Tel Aviv district breast-fed for a mean duration of 5.2 ± 0.2 months. Given that 11.8% of the mothers were still breast-feeding at 12 months and that the breast-feeding rates beyond this age were not recorded, the actual mean duration was probably higher. Similar results were reported by the Israel Center for Disease Control and the Department of Nutrition of the Ministry of Health [11]. Our breast-feeding rates are higher than those recently reported in the United States (69.5%) [3] and Britain (69%) [14], but fall behind North European countries such as Norway (99%) [7] and Sweden (93%) [15].

Despite the current recommendations for lengthy breast-feeding [1,2], we found that at 2, 4, 6 and 12 months only 55.8, 36.8, 29.9 and 11.8% of the infants, respectively, received human milk. A similar trend was reported in a recent study from Kaplan Medical Center, Rehovot, Israel, where 51% of the women continued to breast-feed for 3 months, 25% for 6 months, and 8% for 1 year [16]. Interestingly, the rates of initiation of breast-feeding in our study meet the national goals set by the U.S. government for 2010, but the rates at 6 and 12 months are lower than their expectations (50% and 25%, respectively) [17]. In addition, at 2 months of age, only 35.8% of our infants were exclusively breast-fed and at 6 months the rates dropped to 11.2%. It seems that despite recommendations for exclusive breast-feeding for the first 6 months of life [1,2], a substantial percentage of our breast-fed infants receive complementary for-

mula already at a younger age. Similar rates of exclusive breast-feeding were reported in the USA at 6 months of age, between 7.9% [18] and 17.2% [3].

Special attention needs to be given to the sharp decline in breast-feeding rates in the first and the third month postpartum [Figure 1]. The reasons for very early weaning are related to breast-feeding difficulties, young age, low level of education, or lack of confidence in the ability to breast-feed [19]. We assume that it can also be related to mothers' belief that the major immunologic benefits of breast-feeding are obtained within the first few weeks after birth. We found that compared with homemakers, women on maternity leave were significantly more likely to breast-feed. We suspect that the decline in breast-feeding rates in the third month is related to women's return to work once maternity allowance payments by the National Insurance Institute of Israel are stopped. In the study by Birenbaum et al. [20], 23.4% of Israeli mothers reported that returning to work after 3 months was the reason for weaning their babies. It was also found in the USA that returning to work or studies and problems with breast-feeding or pumping at the work or study place were strong predictors of breast-feeding discontinuation at 12 weeks postpartum [19]. It seems that lack of lactation support is a major cause for discontinuation of breast-feeding and greater efforts should be made to maintain a "mother-friendly" workplace.

The positive correlation found in our study between maternal education and rate and duration of breast-feeding was also noted in other surveys conducted in Israel [20,21] and abroad [3,14]. This may show that women with a higher level of education have more access to scientific data and therefore are more aware of the importance of breast-feeding to their child's health and development.

We noted higher breast-feeding rates among women married to Yeshiva students compared with women married to non-Yeshiva students [Table 2]. These Orthodox women follow the ancient Jewish tradition that considers breast-feeding as the natural and only option to feeding babies. Furthermore, since contraceptives are forbidden in some of these communities, breast-feeding also serves as a natural birth control method and as a means of spacing pregnancies. Other studies also found higher rates of breast-feeding initiation and duration among women married to Yeshiva students [22] and Orthodox Jewish women [21,23].

The present study revealed a significant relationship between breast-feeding and parity, with the highest rates of breast-feeding in grand multiparous women. High rates were also found among primiparous women. Bergman and Feinberg reported similar findings [21]. The high breast-feeding rates found in grand multiparas can be explained, in part, by the fact that these women predominantly belong to Orthodox religious families who, similar to our group of women married to Yeshiva students, have a high birthrate [24]. As to primiparous mothers, it seems likely that they are able to devote more time to the baby and that no prior experience, good or bad, influences their decision to breast-feed. They may also be more prone to follow medical recommendations for breast-feeding.

Recall bias is a possible limitation of our study. Although the time elapsed between the feeding events and the interviews may be as long as 12 months, it was shown that mothers provide reliable information even years after cessation of breast-feeding [25]. Another limitation is a potential non-response bias, a known phenomenon of health telephone surveys. This is related to errors in telephone number, change of address, and the limited attempts to contact a household. However, for a survey of this magnitude, a non-response rate of 31.9% seems reasonable. A third limitation concerns the fact that breast-feeding rates of women married to Yeshiva students, a group of Orthodox Jews, were compared with those of women married to "non-Yeshiva students," a group that may include secular, traditional, and religious families. However, the difference between the groups is impressive and cannot be related solely to limitations of the sampling method.

In conclusion, our study shows that the rate of initiation of breast-feeding in the Jewish population of central Israel is relatively high, yet it falls short of rates found in other developed countries that have taken an active role in promoting breast-feeding. Non-human milk foods are introduced into infants' diet already at a young age, indicating that the duration of exclusive breast-feeding is lower than current recommendations. The advantages of human milk should be an incentive for mothers to breast-feed their newborn and for healthcare providers to promote breast-feeding and support its continuation. Intervention programs for promoting breast-feeding should be implemented, focusing especially on the less educated women, homemakers, and families with one to four children.

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I much prefer a compliment, insincere or not, to sincere criticism

Plautus (254-184 BC), comic Roman dramatist whose works are known for their robust humor and lively colloquial dialogue.
His plays influenced the early development of comic drama in England and France

Capsule

Occupational deaths among healthcare workers

Sepkowitz and Eisenberg from the Memorial-Sloan-Kettering Cancer Center, New York, studied the rates of death among health workers in the USA. The occupational death rate for healthcare workers is unknown. In contrast, the death rate for other professions with occupational risk, such as police officer or firefighter, has been well defined. With available information from federal sources and calculating the additional number of deaths from infection by using data on prevalence and natural history, the annual death rate for healthcare workers

from occupational events, including infection, is estimated at 17–57 per 1 million workers. But a much more accurate estimate of risk is needed. Such information could inform future interventions, as was seen with the introduction of safer needle products. This information would also heighten public awareness of this often minimized but essential aspect of patient care.

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