

Breast feeding in Israel: maternal factors associated with choice and duration

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Abstract

Study objectives – To determine the influence of maternal characteristics on the incidence and duration of breast feeding.

Design – All the women who delivered in three obstetric wards within a two year period were surveyed. These three wards cover 93% of all births in the Jerusalem district. Women were interviewed on breast feeding of the previous child on the first or second day post partum by a research nurse.

Participants – Altogether 8486 women whose previous pregnancy had resulted in a live born singleton who survived for at least one year.

Measurements and main results – Breast feeding information was linked to demographic and health information from hospital records. Using logistic regression analysis, failure to start breast feeding was best predicted ($p < 0.001$) by caesarean delivery, infant's birth weight, maternal smoking habits, and mother being non-immigrant. Maternal age (< 24 or > 40 years) and father being an ultraorthodox Jew were also positively ($p < 0.05$) associated with the decision to breast feed. Long term breast feeding (three months or more) was strongly affected ($p < 0.001$) by maternal education level, with both women with the fewest and the greatest number of years of schooling more likely to breast feed. A similar association was observed in all ethnic groups. Primipara and grandmultipara (parity > 4), new immigrants, ultraorthodox Jews, and non-smokers breast fed their babies for longer.

Conclusions – The importance of maternal characteristics in relation to breast feeding was shown. Caesarian delivery and the infant's birth weight were strongly related to the decision to breast feed as were the demographic characteristics of mother's age and her country of birth. Education was not related to this decision but was strongly associated with the duration of breast feeding, as was parity. The behavioural characteristics of smoking and being ultraorthodox were related to both the decision to start and the duration of breast feeding. Efforts to encourage breast feeding ought to be targeted during the hospital stay and post partum period towards women identified as being at increased risk.

The growing public and professional recognition of the benefits of breast feeding have led to concern about unsuccessful breast feeding and its early termination. Intervention programmes have been promoted to encourage breast feeding.¹⁻³ The efficiency of measures designed to maintain breast feeding for longer depends on identifying mothers at particular risk. Those women who are more likely to elect to formula feed their babies have been shown in developed countries to be characterised by low income,⁴⁻⁷ limited number of years of schooling,⁸⁻¹⁰ young age,⁹⁻¹² previous children,¹¹⁻¹² out of wedlock births,⁵⁻¹¹ work outside home,¹³ and belonging to socioeconomically disadvantaged ethnic groups.⁴⁻⁶⁻⁸⁻¹¹⁻¹³⁻¹⁵

Only a few studies¹⁻⁸ have attempted to control simultaneously for the confounding effects of various maternal demographic factors such as age, parity, or social class, which are highly correlated with the level of formal education and ethnic origin. Furthermore, most investigations obtained the data through telephone and postal surveys rather than by direct interview with the mother.⁷⁻¹¹⁻¹⁶ Other studies have been less affected by selection bias, but were either small in size¹⁰⁻¹³ or limited to a single maternity ward.¹¹

The Jerusalem population is very heterogeneous with a wide diversity of socioethnic groups. We investigated data, obtained by interviews post partum, over a two year period from the entire parturient population of Jerusalem.

The purpose of this study was to examine factors influencing the likelihood of choosing to breast feed and persisting for at least three months. We evaluated the independent effect of maternal characteristics on duration of breast feeding, using a multiple regression analysis technique to adjust for the influence of possible confounding variables.

Methods

SAMPLE

As part of the Jerusalem Perinatal Study, 93% of all the Jewish women who delivered between November 1974 and December 1976 in the Jerusalem district were interviewed on the first or second post partum day by a research nurse. Data from the interviews, including information about breast feeding of the previous child were recorded and linked to demographic and health information derived independently from hospital records and birth certificates.

The interviews included questions on health insurance, private obstetric care, previous illnesses, menstruation, threatened abortion and hormone treatment, birth control methods

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used since any previous pregnancy, and duration of breast feeding after the previous birth.

The data were made available from the Jerusalem Study on Oral Contraceptive Use,¹⁷ one of the interlocking epidemiological studies making up the Jerusalem Perinatal Study.^{17,18}

The study group included 8486 of the interviewed women, whose last pregnancy had resulted in a live born singleton who survived for at least one year. The women were all specifically questioned about the duration of breast feeding after their previous birth.

Data obtained by questioning the mother may be subject to recall bias.¹⁹ The validity of mothers' reporting their breast feeding history more than 20 years after their children's birth has been studied in the Jerusalem population.²⁰ It was concluded that interview with mothers about their breast feeding practices seems to be valid for widely different educational and cultural groupings in the Jewish population in Israel.

VARIABLES

The dependent variable breast feeding duration, was dichotomised into prematernity leave, leave of three months or less, and post maternity leave, leave of more than three months. This division follows from the three months' paid maternity leave in Israel. A separate analysis was undertaken examining the decision to initiate breast feeding, as the dependent variable. No distinction was made between full and partial breast feeding.

The independent variables included maternal age at delivery; birth order; maternal education (measured by the number of years of schooling and classified into five categories according to the classification used by the Israeli Bureau of Statistics); social class (determined by the level of municipal taxes levied to the mother's residential neighbourhood and classified into three categories¹⁷); ethnicity (determined by the country of birth of the respondent: for those born in Israel the country of birth of their mother was used); and birth weight, as well as the following variables which were used dichotomously: father is Yeshiva student (rabbinical seminar); mother being a house wife, maternal smoking, Israeli born, and caesarean section.

DATA ANALYSIS

Logistic regression controlling for sociodemographic variables²¹ was used to estimate the odds ratios for initiating breast feeding and for breast feeding after the end of maternity leave for those who breast fed. In addition, interaction effects were sought between maternal education and ethnic origin (Asia, North Africa, or Europe/America). The duration of breast feeding was evaluated using a stepwise multiple regression technique adjusting for the effects of confounding factors in a linear additive model.²² A second order polynomial model (in education) was fitted. Statistical significance was determined using the F test, with significance defined as $p < 0.05$.

Results

STUDY POPULATION

The study population was relatively young (80% under 30 years of age) and half of the women had been born in Israel. Forty one per cent of the women had had a high school education (eight to 12 years of schooling) and an additional 34% had had more than 12 years of formal education. Thirty three per cent were primipara and 19% grandmultipara (five children or more). Sixty per cent of the women worked outside the home and 14% smoked. Almost half (46%) of the women belonged to the middle or higher social class and 22% belonged to the ultraorthodox Jewish community of Jerusalem, as their husbands were Yeshiva students or teachers.

INITIATION OF BREAST FEEDING

Altogether 79.3% started to breast feed. Women aged 24 years or younger and those aged 40 years or more were most likely to choose to breast feed ($p < 0.05$), but the number of elder parturients was relatively small. Birth order, maternal education, social class, age at marriage, and work outside the home did not significantly influence the decision to begin breast feeding (table 1). This may partly reflect the overall high incidence of breast feeding.

Mothers married to Yeshiva students ($p < 0.01$) or born outside Israel ($p < 0.001$) were significantly more likely to breast feed. Maternal smoking had a significant negative ($p < 0.001$) effect on breast feeding. Low birth weight of the infant (< 2500 g) and delivery by caesarean section were also significantly associated with a tendency to formula feed.

DURATION OF BREAST FEEDING

While 36.8% of all the women studied breast fed for longer than three months, 46.5% of those who started continued for at least three months. Primipara and grandmultipara were significantly ($p < 0.001$) more likely to breast feed for three months or more (table 2). Mothers married to Yeshiva students ($p < 0.001$) and those with infants weighing 3500 to 4000 g at birth ($p < 0.002$) were found to prolong the breast feeding period significantly.

Factors of maternal smoking and mothers born in Israel were observed to be associated significantly with a negative ($p < 0.001$) effect on long term breast feeding.

The mother's formal education was significantly related to breast feeding for longer than the period of maternity leave. Mothers with the fewest years of schooling on the one hand, and those with the highest level education on the other, were most likely to breast feed for extended periods.

Examination of the duration of breast feeding as a continuous variable showed that the education level had a strong effect on the duration of breast feeding regardless of the mother's ethnic origin (figure).

Discussion

The present large study population provided

Table 1 Incidence and adjusted odds ratios of breast feeding in relation to maternal and obstetrical characteristics.

Characteristics	No	% of women breast feeding	Odds ratio	95% confidence interval
Maternal age (y) †				
< 24	3641	81.0	1*	
25–29	3090	78.5	0.82	0.71 0.95
30–34	1326	76.7	0.79	0.63 0.98
35–39	368	77.1	0.78	0.56 1.08
≥40	61	88.1	1.40	0.60 3.24
Birth order:				
1	2766	79.5	1*	
2	1978	78.0	0.83	0.80 1.07
3–4	2165	78.9	1.02	0.86 1.18
≥5	1577	81.0	0.82	0.84 1.33
Maternal education (schooling)(y):				
0	210	87.9	2.00	1.27 3.17
1–4	125	81.7	1.24	0.76 2.01
5–8	1920	79.9	1.07	0.92 1.24
9–12	3402	78.8	1*	
≥13	2829	78.6	0.99	0.87 1.14
Social class:				
High	3918	80.1	1*	
Medium	2674	78.1	1.01	0.87 1.17
Low	1894	79.2	1.02	0.86 1.21
Father Yeshiva student ‡:				
No	6627	78.3	1*	
Yes	1859	82.7	1.26	1.07 1.50
Mother housewife				
No	3424	78.7	1*	
Yes	5062	79.6	1.09	0.96 1.24
Parents age at marriage (y)				
≤17	659	81.2	0.89	0.73 1.11
18–19	1845	81.1	0.95	0.82 1.10
20–24	4697	80.0	1*	
25–29	1063	73.7	0.80	0.67 0.95
≥30	222	70.3	0.70	0.50 0.98
Maternal smoking §:				
No	7299	80.2	1*	
Yes	1187	73.4	0.75	0.65 0.88
Israeli born §:				
No	4208	81.2	1*	
Yes	4278	77.3	0.74	0.66 0.83
Birth weight (g) ‡				
< 2500	476	74.1	0.74	0.59 0.92
2500–2999	1545	79.0	1.01	0.87 1.17
3000–3499	3643	79.4	1*	
3500–3999	2228	80.9	1.10	0.96 1.26
≥4000	594	77.7	0.90	0.73 1.12
Caesarean section §:				
No	8114	80.3	1*	
Yes	372	59.0	0.38	0.30 0.47

* Reference group for adjusted odds ratios derived from logistic regression analysis. Variable statistically significant at † $p < 0.05$, ‡ $p < 0.01$, and § $p < 0.001$.

an opportunity for an extensive evaluation of the independent effect on breast feeding of several maternal factors. Although most women (80%) were breast feeding on discharge from hospital, a number of variables was associated with failure to initiate breast feeding. As previously described^{11 23} caesarean section was found to discourage breast feeding. Low birth weight infants were also less likely to be breast fed. More support should therefore be targeted to women who have a low birth weight baby, or are delivered by caesarean section during the critical time in hospital when breast feeding is being established.

Socioeconomic background may also be an important factor influencing breast feeding decisions during the hospital stay, since women who were born in Israel and those who smoked had a significantly lower rate of early lactation.

The importance of maternal characteristics in relation to the duration of breast feeding has been shown in the present study. In agreement with previous reports,^{8 10 12 16} maternal age, parity, education, and ethnic origin were significantly associated with a duration of breast feeding of over three months.

The educational level of the mother and her ethnicity have been previously found to be the two most important independent factors that influence the decision to breast feed.^{8 16} However, the interaction between these factors may differ in various populations. The incidence of breast feeding seemed to be more related to maternal education and less dependent on ethnicity.^{8 12 16} This relationship was confirmed by the present data. However, a positive linear association between education level and breast feeding duration, as previously shown,^{8 12 16} was not found.

In contrast, in our study, mothers with little education breast fed for a longer mean duration than mothers with a high school education. Nevertheless, women tended to breast feed for longer as their educational attainments increased beyond 12 years of schooling. This observation produced a truncated 'U'-shaped or an 'S'-shaped curve – a pattern that has been described previously by Rassin *et al.*⁴ It may be attributed to the tendency of less educated mothers to cling to traditional practices on one hand, and the predilection of more educated women to adopt modern western

Table 2 Incidence and adjusted odds ratios of breast feeding for three months or more in relation to maternal and obstetrical characteristics, only for those who initiated breast feeding.

Characteristics	No	% breast feeding for ≥ 3 months	Odds ratio	95% confidence interval
Maternal age (y) †:				
≤ 24	3112	42.8	1*	
25–29	2569	47.1	1.07	0.93 1.23
30–34	1087	50.1	1.22	1.00 1.51
35–39	306	59.2	1.52	1.12 2.08
≥ 40	58	67.2	2.08	1.11 3.89
Birth order §				
1	2312	45.5	1*	
2	1611	42.0	0.80	0.70 0.92
3–4	1819	45.6	0.83	0.72 0.97
$\geq 5+$	1390	54.5	1.01	0.82 1.25
Maternal education (schooling) §:				
0	204	63.2	1.32	0.95 1.84
1–4	107	54.2	0.99	0.65 1.50
5–8	1611	42.6	0.88	0.77 1.01
9–12	2904	42.6	1*	
13+	2306	52.2	1.44	1.27 1.64
Social class:				
High	3325	50.9	1*	
Medium	2200	40.6	0.90	0.78 1.03
Low	1607	45.2	0.98	0.83 1.14
Father Yeshiva student §:				
No	5487	43.8	1*	
Yes	1645	55.3	1.61	1.39 1.88
Mother housewife				
No	2830	46.1	1*	
Yes	4302	46.8	0.95	0.85 1.07
Parent's age at marriage (y):				
≤ 17	578	48.9	1.21	1.00 1.47
18–19	1604	46.4	1.10	0.96 1.25
20–24	3972	45.2	1*	
25–29	815	49.2	1.08	0.91 1.29
≥ 30	163	54.0	1.26	0.88 1.80
Maternal smoking §:				
No	6196	48.6	1*	
Yes	920	32.6	0.63	0.54 0.73
Israeli born §:				
No	3663	51.5	1*	
Yes	3469	41.1	0.61	0.55 0.68
Birth weight (g) ‡:				
≤ 2500	383	45.4	1.10	0.88 1.38
2500–2999	1296	43.9	0.93	0.81 1.06
3000–3499	3050	45.2	1*	
3500–3999	1903	50.2	1.22	1.09 1.38
≥ 4000	482	46.9	0.98	0.80 1.20
Caesarean section:				
No	6659	46.5	1*	
Yes	227	45.5	0.96	0.73 1.27

* Reference group for adjusted odds ratios derived from logistic regression analysis. Variable statistically significant at † $p < 0.05$, ‡ $p < 0.01$; § $p < 0.001$

trends encouraging lactation on the other hand.^{15 16}

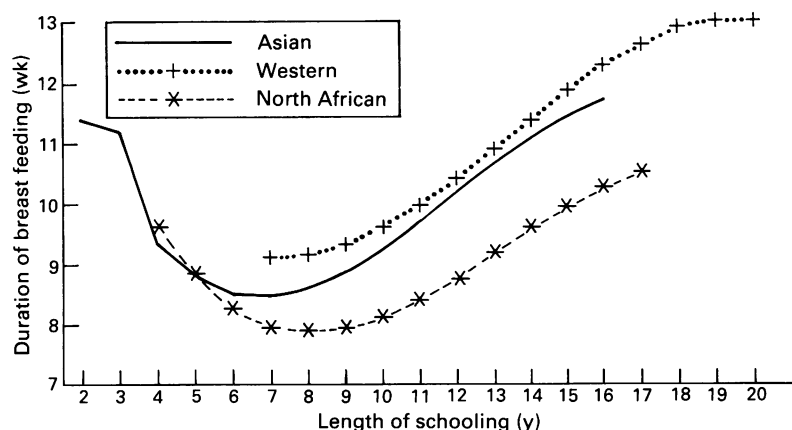
The influence of maternal education on the duration of breast feeding was independent of other maternal characteristics such as age, parity, social class, and work outside the home. Maternal education level remains a major indication of the need for direct nutrition advice.²⁷

Maternal work outside home did not correlate with breast feeding duration. This unexpected observation has nevertheless been reported previously.²⁵ Social class, determined by parental occupation,¹⁷ and maternal age at marriage, did not influence breast feeding duration. However, other sociocultural traits, such as maternal smoking and belonging to the ultraorthodox Jewish community, did affect the incidence of breast feeding. This may reflect the importance of family psychosocial support to breast feeding success.²⁴

The present study provides an analysis of the determinants of breast feeding initiation and duration in Jerusalem women. The data collection for this study resulted in a good

coverage of the target population and most of the mothers' relevant characteristics were included in the data. However, no information was available about the exclusiveness of breast feeding. Although the data were collected during the 1970s, the relevance of the study has not diminished since it improves our understanding of the interaction of maternal characteristics with breast feeding in the light of the continuing importance of promoting breast feeding.²⁶

The effectiveness of intervention programmes designed to promote breast feeding²³ depends on the ability to identify mothers at high risk of stopping breast feeding early. The present data about breast feeding in Jerusalem allowed us to test, by applying a multivariate statistical technique, the independent predictive power of maternal and obstetric factors. Different variables were characteristic of women identified as being at risk for either failing to start breast feeding during the hospital stay or breast feeding for only a short time. Advice from health professionals at the



Duration of breast feeding adjusted for maternal age, birth order, social class, profession, age at marriage, smoking, birth weight and caesarean section using a multiple regression analysis by maternal education and ethnic origin.

maternity ward should be guided towards women who give birth by caesarean section and to mothers of low birth weight babies. Breast feeding promotion programmes in the first weeks postpartum may be of greatest benefit to young women with fewer than 12 years of schooling and who smoke.

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