

Breast-feeding and feeding practices of infants in a developing country: a national survey in Lebanon

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Abstract

Objective: Breast-feeding (BF) provides the ideal food for the healthy growth and development of infants. The prevalence of BF in Lebanon shows mixed results. The present study was the first large-scale, extensive survey on BF parameters in Lebanon that aimed to explore demographic, socio-economic and other fundamental issues associated with the initiation and duration of BF by Lebanese mothers.

Design: The survey was cross-sectional in design and administered over 10 months.

Setting: Information on all variables was collected from mothers at health centres.

Subjects: Two-stage sampling was conducted to select participants. A total of 1000 participants were randomly selected. A consent form was provided to each participant. Data were collected from 830 of these.

Results: Almost all mothers were Lebanese, married and had given birth in a hospital. About a third stated that breast milk was the first food introduced after birth. Although 55.9% started breast-feeding their newborns within a few hours after birth, and 18.3% within half an hour, 21.2% replied that they initiated BF a few days after birth. Only 4.6% of the mothers replied that they never breast-fed their infant. Timing of initiation of BF was associated with the type of delivery (vaginal/Caesarean section) and hospital-related factors (rooming-in, night feedings and frequency of mother–infant interaction). Of the mothers who breast-fed exclusively beyond 6 months, 86.7% had initiated BF a few hours following delivery, while only 13.3% had initiated BF a few days later. Compared with the exceptionally high proportion of BF initiation, exclusivity of BF was low, dropping to 52.4% at 1 month. Exclusivity of BF was also associated with place of residence (urban/rural) and negatively associated with educational level of the mother. Duration of BF was inversely associated with the use of pain killers during delivery and maternal education. Rural mothers and those who practised exclusive BF maintained BF for a longer duration.

Conclusion: Initiation rates of BF are very high in Lebanon but rates of exclusive BF are low and duration of BF is short. Future research targeting the factors associated with BF, with particular emphasis on exclusivity, is needed. For the 95.4% of mothers who initiated BF, an ecological perspective on intervention aimed at women and their social support system is required to improve duration and exclusivity.

Keywords
Breast-feeding
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Breast-feeding (BF) is an unequalled way of providing the ideal food for the healthy growth and development of infants. Its advantages range from physiological to psychological for both mother and infant. A study by Raisler *et al.*¹ showed that breast-fed infants experienced less vomiting and diarrhoea than those who were formula-fed. Breast milk also transmits information to the infant's body about its environment via antibodies, whole proteins and other constituents^{2–5}. Other studies have found BF to be protective against ear infections and respiratory illnesses^{6,7}. The benefits of BF are even greater in developing countries, where resources are scarce and where neonatal and infant morbidity and mortality rates as well as the prevalence of malnutrition and infectious

diseases remain comparatively high^{8,9}. Poverty, under-development, cultural factors, poor environmental sanitation and lack of awareness of appropriate feeding are potential contributors to patterns of inadequate BF and infant nutrition.

Lebanon has a total estimated population of 3.67 million within an area of 10 452 km² bordering the Mediterranean Sea and Syria. The infant mortality rate is 27 per 1000 live births and life expectancy is 71.8 years. The present economy is recuperating from years of economic impediments caused by 15 years of civil war, contributing to the current low per capita income¹⁰.

BF prevalence patterns in Lebanon show mixed results. Deeb¹¹ reported that there was a delay in the initiation of

BF post delivery by most Lebanese mothers, with 61.2% starting after 6 hours during which the newborn was given glucose-water and/or formula, a feeding practice clearly contradictory to recommendations for the initial steps of BF. Potentially contributing to this delay, research has revealed that 83% of hospitals and 90% of maternity clinics in Lebanon did not allow the mother to spend the first 24 hours with her baby, consequently obscuring BF initiation in new mothers¹². By way of comparison, a 2-year ongoing cohort study discerned that 85.9% of infants in Greater Beirut were breast-fed during the first month of life regardless of supplementation with formula and that 56.3% were breast-fed without supplementation of formula¹³. Regrettably, these figures decreased to 63.2% and 24.7%, respectively, at 4 months of age.

While infant and child research has advanced in post-war Lebanon, local literature pertaining to prevalence, exclusivity and patterns of BF remains scarce. The present study represents the first large-scale survey on BF parameters in Lebanon. The two aims of this explanatory study were: (1) to determine the prevalence of BF in Lebanon with regard to factors associated with delivery as well as maternal socio-economic and demographic variables; and (2) to explore the factors associated with the initiation and duration of BF in Lebanon.

Materials and methods

Questionnaire design

The survey utilised in this research assessed the prevalence of BF in Lebanon from a multidimensional perspective. The survey included nine sections; however, only seven were relevant to the present research:

1. Data regarding number of children in the family by gender, and how many of them were breast-fed by gender.
2. Information about the last child (born 1–5 years ago): age, sex, place of birth, who attended the birth, type of delivery, use of analgesics, length and weight of child at birth.
3. Information about BF patterns for the last child: timing of first breast-feed, period of exclusive BF (using the World Health Organization definition of exclusive BF¹⁴), other liquids provided to the infant, timing of introduction of solid foods, source of advice for introduction of solid foods, duration of BF and reason for termination of BF.
4. Hospital delivery practices related to BF: liquid first given to the infant post delivery, hospital influence on this choice, provision of formula in the hospital, provision of information while in hospital about the benefits of BF and methodology, hospital staff encouragement to breast-feed within 1–2 hours post delivery, rooming-in and number of visits per day of infant to mother (in the case of no rooming-in).

5. Solid food introduction patterns.
6. General information about the mother such as age, height, weight, nationality, religion, place of birth, place of residence, marital status, educational level, occupational status and whether the mother herself was breast-fed.
7. Other demographic information such as educational level and occupation of the father.

The questionnaire was pilot-tested prior to initiation of interviews and modified accordingly. The validity and reliability of the questionnaire was examined with test–retest reliability (Cohen's kappa, $\kappa = 0.78$), inter-rater ($\kappa = 0.83$) and intra-rater reliability ($\kappa = 0.82$).

Study population

Two-stage sampling was conducted to select participants. A random sample of health centres operated by the Ministry of Social Affairs was first selected from the six provinces of Lebanon. Then mothers who met the criteria for inclusion were randomly recruited to participate in the research. Inclusion criteria were having a last child between 1 and 5 years of age and gestational age at birth to be 37 weeks or above.

Informed consent was requested of all mothers before initiation of the interview process. A total of 1000 participants were randomly selected. Data were collected from 830 of these (17% included incomplete questionnaires, premature births and refusal). The data reported in this paper includes 830 mother–infant pairs.

Data collection and statistical analysis

The survey was administered over 10 months. Survey teams were trained in standard data collection techniques. The aim of the study was explained and a consent form was provided to each participant. Information on all variables was collected from participating mothers at the health centres.

For statistical analysis, SPSS version 12.0 (SPSS Inc., Chicago, IL, USA) was used and all analyses were performed and reported by one person who had not been involved in data collection. The chi-square statistic was used for testing the significance of cross-tabulations and *t*-tests were conducted for calculating mean differences and standard deviation (SD), with *P*-values of less than 0.05 considered significant. Multivariate logistic regression analyses were done to evaluate the associations between infant's age at BF initiation and maternal, childbirth and infant data. The same analysis was also performed for BF duration. In both regression analyses we used a dichotomous dependent variable by categorising the infant's age at BF initiation as 'a few hours after birth' or 'a few days after birth'; and for the second analysis as ≤ 5 months or ≥ 6 months. The odds ratios (OR) and their 95% confidence intervals (CI) for each independent variable

were derived through the regression analysis. An OR was considered significant if its 95% CI did not include 1.00.

Ethical review

Since this was a non-invasive study, none of the mothers and their infants was at risk of being harmed in any way. The names and personal information of the participants have remained in strict confidence. We used informed consent forms from mothers and we negotiated with heads of health centres for their approval as well.

Results

Completed questionnaires were collected from 830 mothers. The mean (\pm SD) age of these mothers was 30.81 ± 5.90 years. The mean number of children they had was 4.91 ± 1.61 . Almost all mothers (99.2%) were Lebanese and married. More than half had less than high school education, and the vast majority were homemakers (Table 1).

When considering birth weight of the last child, the mean reported weight was 3313.87 ± 587.78 g. Nearly all mothers gave birth in a hospital (92.5%) and for 88.6% a physician was present to assist the delivery. Delivery was by Caesarean section in 22.9% of cases, and 44.1% stated they had used analgesics during and/or immediately following the delivery.

Table 1 Characteristics of the study population

Characteristic	<i>n</i>	Value*
<i>Infant</i>		
Boys/girls	825	52.4/47.6
Birth weight (g)†	802	3316.13 ± 584.65
Birth length (cm)	526	50.68 ± 2.88
<i>Mother</i>		
Age (years)	829	30.81 ± 5.90
Non-pregnancy weight (kg)	781	64 ± 11.74
Height (m)	594	1.63 ± 0.07
Number of children	830	4.91 ± 1.61
Lebanese	830	99.2
Married	827	99.2
Education	829	
Primary or less		19.9
Intermediate		33.7
High school		23.4
University		20.9
Other		2.1
Occupation	828	
Homemaker		77.3
Professional		2.2
Other		20.5
Place of birth	704	
Urban/rural		43.4/48.9
Place of residence		
Urban/rural		49.9/47.4

*Percentages for categorical variables; mean \pm standard deviation (SD) for continuous variables.

†SD in these data is relatively large due to 38 infants who were small for gestational age. These were predominantly rural residents with low educational levels, and primarily assisted by a midwife during delivery.

BF initiation

More than a third (37.6%) of the mothers surveyed stated that breast milk was the first food introduced after birth. The next most frequent food was formula (28.2%), followed by liquids such as sweetened water (13.8%) and herbal tea (4.3%) (Table 2).

Although 55.9% started breast-feeding their newborns within a few hours of birth and 18.3% within half an hour, 21.2% replied that they initiated BF a few days after birth. Over half the population in our survey was not explicitly encouraged by hospital staff to initiate early BF.

The vast majority of mothers reported that physicians (42.8%) were influential in their decision to breast-feed, followed by their own mothers (22.0%). Other sources of influence included relatives (11.0%), a mother-in-law (10.0%), the media (7.0%) and books (7.1%).

Influences on BF initiation

Several factors influenced BF initiation. With respect to type of delivery, 49.2% of those who delivered by Caesarean section initiated BF a few days after birth as opposed to 14.4% of those who delivered vaginally ($P = 0.000$). Hospital-related factors were also significant: 92.6% of mothers whose newborns were brought to them for night feedings initiated BF a few hours after birth versus 75.0% if the baby was not brought for night feedings ($P = 0.000$). Also, 91.0% of mothers who delivered at hospitals allowing rooming-in started BF within a few hours after birth ($P = 0.000$) compared with 73.2% of those who delivered at hospitals that did not allow rooming-in. In hospitals that did not allow rooming-in, the frequency of seeing the infant was significantly related to BF initiation: 93.3% of mothers who were able to see their infants every 3 hours or less initiated BF a few hours after birth versus 74.8% of those seeing their infants less often ($P = 0.000$). A third of mothers (34.3%) who were encouraged by hospital staff to initiate BF within half an hour after birth were also more likely to actually initiate within half an hour as opposed to only 10.3% of those who were not encouraged to do so ($P = 0.000$). Mothers who breast-fed within a few hours of birth were less likely to state that timing of initiation was the hospital's choice (75.8%) than those who initiated after a few days (87.3%).

Table 2 First foods given to baby after birth ($n = 811$)

Food	Frequency (%)
Breast milk	305 (37.6)
Infant formula	229 (28.2)
Sweetened water	112 (13.8)
Herbal tea	35 (4.3)
Other	9 (1.1)
Orange blossom water	8 (1.0)
Water	4 (0.5)
Do not know	109 (13.4)

($P = 0.004$). Remarkably, receiving free formula samples had no impact on the timing of BF initiation in this population.

BF duration and influencing factors

Only 4.6% of the mothers replied that they never breast-fed their infant. At 1 month of age the proportion of exclusively breast-fed infants was 52.4%, gradually declining to 23.4% at 4 months and 10.1% at 6 months.

Among mothers who breast-fed exclusively beyond 6 months, 86.7% had initiated BF a few hours following delivery, while only 13.3% of mothers of the exclusively breast-fed infants had initiated BF a few days later ($P = 0.025$).

Mothers who breast-fed exclusively for the first 6 months of their infant's life were predominantly born in a rural region and were currently residents of rural areas; they were also slightly older (mean 31.95 ± 6.21 years vs. 30.63 ± 5.79 years, $P = 0.052$) with a greater non-pregnancy weight (mean 67.85 ± 14.10 kg vs. 64.32 ± 11.35 kg, $P = 0.011$) and generally had more children (mean 5.35 ± 1.83 vs. 4.88 ± 1.55 , $P = 0.010$). Only 7.9% of mothers who had higher level (secondary and above) education reported to have breast-fed exclusively for the first 6 months of life compared with 27.2% of those with less education (intermediate and less). Also, homemakers were more inclined to breast-feed exclusively for 6 months or more, although this yielded no significant relationship, probably because there is little discrepancy in this variable.

Other factors influencing BF duration included the use of analgesics during delivery: 66.3% of those not using

analgesics breast-fed for 6 months and beyond as opposed to 33.7% who used painkillers. Type of delivery was not found to interfere with duration of exclusive BF; neither did gender of the child nor educational level of the father.

Infants who were exclusively breast-fed for 6 months or more were also breast-fed longer, with complete cessation of breast-feeding occurring at an average age of 16.21 ± 6.77 months; not exclusively breast-fed infants were breast-fed until an average age of 9.40 ± 7.40 months ($P = 0.000$). Analogous findings are reported from the UK¹⁵ and Germany¹⁶.

Table 3 shows that only maternal educational level and current place of residence were important determinants of BF for at least 6 months following birth in the multivariate model. The odds of BF were over twice greater among rural women but approximately three times greater among women with less formal education versus those with high education.

Termination of BF

A large number of mothers stopped BF because they believed that breast milk was insufficient (26.2%) and 20.9% believed that the child was old enough. These were the two main reasons reported; however, other reasons to stop BF were also revealed as shown in Table 4. It is interesting that only about 4% of mothers stopped BF due to doctor's advice as a result of maternal and/or infant illness. This finding suggests that physicians in Lebanon do not essentially promote formula use in the same way as Waterson¹⁷ observed in many developing countries.

Table 3 Factors associated with the duration of exclusive breast-feeding

Independent variable	%	P-value	Exclusive breast-feeding for at least 6 months ($n = 538$)	
			OR	95% CI
Mother's educational level		0.034	2.2471	1.222–4.1312
1 = Low	27.2			
0 = High	7.9			
Non-pregnancy weight		0.040	0.9502	0.5268–1.7139
1 = ≤ 60 kg	21.7			
0 = > 61 kg	27.4			
Maternal place of birth		0.012	0.9490	0.4812–1.8713
1 = Urban	30.0			
0 = Rural	57.1			
Current place of residence		0.006	0.3580	0.1767–0.7254
1 = Urban	32.4			
0 = Rural	63.4			
Number of children		0.010	1.2397	0.6789–2.2640
1 = 3 +	26.6			
0 = 1 to 2	24.0			
Painkiller use (following delivery)		0.040	0.8564	0.4567–1.6058
1 = Yes	33.7			
0 = No	66.3			
Initiation of breast-feeding		0.025	0.9502	0.5268–1.7139
1 = A few hours after birth	86.7			
0 = A few days after birth	13.3			

OR – odds ratio; CI – confidence interval.

Log likelihood = 336.912; $\chi^2(7) = 22.446$; $P = 0.0021$.

Table 4 Reasons for cessation of breast-feeding ($n = 799$)

Reason	Frequency (%)
Thought breast milk insufficient	209 (26.2)
Child was old enough	167 (20.9)
Breast refusal by baby	86 (10.8)
Mother ill	80 (10.0)
Fatigue	59 (7.4)
Lactation problems	49 (6.1)
Due to subsequent pregnancy	46 (5.8)
Baby ill	37 (4.6)
Breast/nipple problems	32 (4.0)
Doctor's advice	30 (3.8)
Pain and discomfort	27 (3.4)
Lack of time	22 (2.8)
No designated area to breast-feed at work	17 (2.1)
Embarrassed to breast-feed	16 (2.0)
Need more sleep for myself	12 (1.5)
Thought it was no longer necessary	11 (1.4)
Weight-reduction diet	7 (0.9)
Need help to feed the baby	7 (0.9)
Influence of relative/friend	5 (0.6)
Influence of husband	4 (0.5)
Influence of mother	2 (0.3)

Introduction of liquids and solid foods

Liquids

Introduction of items other than breast milk mostly began with fluids rather than solids: 72% of mothers had given other fluids besides breast milk before the introduction of solid foods (Table 5). It was disturbing, however, to ascertain that a large number of infants received supplements of herbal teas (41.8%), sweetened water (37.6%) and water (36.3%) before the age of 6 months.

Solids

Timely introduction of solid foods remains an important factor for healthy infant growth. In our population, 21.9% of the infants were introduced to solid or semi-solid foods before 4 months of age; although the majority started solid foods at 4 months and later. The mean age of solid food introduction did not differ among exclusively breast-fed and non-exclusively breast-fed infants during the first 6 months of life.

Table 6 shows the various solid or semi-solid complementary foods used for weaning and the respective ages (mean \pm SD and median) at which they were introduced to the infants of the study. The most common 'starting' foods were fruits, followed by cereals, vegetables, dairy, dessert, meat, eggs and finally legumes.

Discussion and conclusion

From a public health perspective, it is highly desirable that neonates be breast-fed immediately or within half an hour of birth and also exclusively breast-fed during the first 4–6 months of life¹⁸. The present research showed that although almost all mothers initiated BF (95.4%), sweetened water and other fluids were given to 20.7% of

Table 5 Distribution of sampled population by fluids given other than breast milk before the introduction of solid foods

Other fluids given	n	%
Infant formula	742	43.8
Herbal tea	739	41.8
Sweetened water	740	37.6
Water	742	36.3
Juice	743	10.4
Powdered milk	742	3.1
Cow's milk	740	1.1
Other fluids	614	1.5

Table 6 Age at introduction of various food types: mean \pm standard deviation (SD) and median

Food	n	Mean \pm SD	Median
Fruit	666	5.40 \pm 1.96	5
Vegetables	654	6.10 \pm 2.50	6
Cereals	657	5.62 \pm 2.58	5
Legumes	615	9.35 \pm 4.84	8
Meat	630	8.67 \pm 4.40	8
Egg	626	8.80 \pm 4.37	8
Dairy	644	7.43 \pm 3.81	6
Dessert	636	7.47 \pm 4.06	6

the newborns despite the fact that over 90% had delivered in a hospital which was primarily responsible for the choice of first food. The study also revealed that BF declined significantly at 4 and 6 months of age: only 23.4% of infants at 4 months and 10.1% at 6 months of age were exclusively breast-fed. These figures are low even in comparison to many developed countries¹⁴, such as Luxembourg, where 54% of mothers breast-feed their newborns at 4–6 months of age, while this figure is 37% in The Netherlands and 41% in Japan¹⁹. It is important to recognise the underlying causal factors of early BF cessation or early termination of exclusive BF in Lebanon within the context of the developed as well as the developing world. Early BF termination suggests that women are not receiving adequate support in their efforts to breast-feed. For instance, maternity leave for working mothers was 40 days at the time of this research, and recently this was increased to only 60 days. Attributes empowering women to exert their rights, including a woman's right to breast-feed her infant, such as the Baby-friendly Hospital Initiative, as well as endorsing a 'Baby Friendly Community' with a 'breast-feed anytime, anywhere' pronouncement are much needed steps for a healthier society.

Results also indicate significant influence of hospital practices on initiation of BF. Mothers giving birth in hospitals which allowed rooming-in, encouraged night feedings, allowed the mother to see the infant frequently and had staff who encouraged BF were more likely to initiate BF early, a critical prerequisite to successful BF experiences. These results suggest the critical need to work with hospital policies to ensure delivery environments

that are conducive to and supportive of women's decisions to breast-feed.

The multivariate analysis revealed that mother's educational level is the most important factor for the maintenance of an ideal BF pattern, followed by place of residence (rural vs. urban). These findings are congruent with other reports^{20–22} that found higher education to correlate with a shorter period of BF. This suggests that interventions should be tailored to target urban women populations with higher education, with a focus on the duration message. Research should also explore the misconceptions about BF held by women of higher education living in urban areas, so that intervention programmes can be developed to reverse such beliefs. Qualitative methods are more appropriate for this type of research question.

Although several studies have been conducted on rural or population-based BF patterns, few compare the behaviour of rural versus urban women in relation to BF. Abdulrahman²³ found that Bahraini urban mothers breast-fed for a shorter time, similar to our findings. On the other hand, Hanson *et al.*²⁴ reported the need to support rural women with less education for initiating and maintaining BF in rural Minnesota. This is probably due to differences between developing and developed countries.

Some reports from other developing Arab countries show employment status of the mother to significantly affect BF status. For instance, Fida and Al-Aama²⁵ have reported that maternal employment was the stated cause of BF cessation in about 13% of mothers in western Saudi Arabia. However, reports on BF and employment remain inconsistent, with other studies finding, as we did, no relationship²⁶.

Our study also indicates that many mothers stopped BF due to a number of avoidable obstacles, notably misconceptions that were held regardless of educational level and place of residence. To cite a prominent example, many mothers stopped BF because they thought the baby was still hungry and hence needed supplementary feeding – behaviour which has been reported in a study in The Netherlands²⁷. None of the mothers in the study, however, declared that they stopped BF on the advice of a doctor.

In the Norwegian Infant Nutrition Survey, Lande *et al.*²⁸ reported 21% of their infant population to have been given solid foods before the age of 4 months, and similar findings are reported in Germany²⁹ and the USA³⁰. In Bahrain, about 62% of infants were introduced to solid foods between 3 and 6 months of age²³. Cereals, mostly rice, have been a principal supplementary food in several Arab countries due to availability and low cost, as demonstrated by Abdulla in Iraq³¹ and Wahiba *et al.* in Egypt³². Abdulrahman also showed the avoidance of meat and fish during infancy in Bahrain due to traditional attitudes²³. More often than not, mothers, despite their educational level, are pressured regarding the growth of their newborns. One such study described by Churchill

and Kanawati reported that, in Lebanon, a fat baby was regarded as healthy, encouraging mothers to offer cooked starches, especially rice with milk and sugar³³. Assistance with BF, weaning and proper introduction of solid foods should be incorporated in the management of postnatal recovery efforts, such as videos shown at the hospital before discharge, booklets sent home with the mothers, government-led television campaigns, and follow-up telephone calls.

An important shortcoming of the present survey is the possibility of recall bias since mothers had to recall events that occurred at least 1 year prior to the interview. Mothers with currently healthy infants or children may remember their experiences differently from those with unhealthy children. When possible, a prospective survey with follow-up questionnaires would better convey the BF and feeding practices of infants in Lebanon.

In conclusion, the present study revealed that initiation of BF in Lebanon was exceptionally high (95.4%) and that the main problem resided in the low rates of exclusive BF (52.4% and 23.4% at 1 and 4 months, respectively). Future research on the determinants of BF behaviour is needed with particular emphasis on the factors influencing exclusive BF and mothers' attitudes and knowledge about it. Moreover, an ecological perspective on intervention is needed³⁴. Such a perspective suggests that multiple interventions at multiple levels maximise the impact on the target population. As suggested above, interventions are needed to raise the awareness of women, and activities are also needed at the level of women's social support system including physicians and health practitioners. The position of Lebanese family physicians, paediatricians and obstetricians/gynaecologists on infant feeding practices has not been sufficiently studied. Their support in dissemination of accurate health and nutrition information is required to improve duration and exclusivity as well as timely introduction of solid foods. Hospital organisational practices need to be improved to support women in their choice. We have detailed elsewhere³⁵ the inadequate support extended by most Lebanese hospitals to new mothers in matters of infant feeding. The Ten Steps to Successful Breastfeeding³⁶ need to be re-emphasised with all Lebanese hospitals and maternity clinics. Also, efforts should be made to train hospital staff in proper support mechanisms for new mothers. In addition, community-based interventions to support women to breast-feed anywhere and to provide supportive environments are needed. Universities and health-care facilities should be encouraged to work with non-governmental organisations via volunteer medical students, nursing students and public health majors to establish hotlines that mothers could call to ask detailed questions about BF problems. Resource mothers programmes could also be initiated in communities. Finally, policies should be improved with regard to maternity leave and to requiring hospitals to become baby-friendly. These interventions – if

implemented – will ensure a supportive environment and will make the healthy choice to breast-feed the ‘easier’ choice for new mothers, thus ensuring higher rates of exclusive BF and prolonged duration.

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