e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 1426-1444

Original Research Article

Breastfeeding Practices among Higher Educated Mothers in Rajasthan: A Cross-Sectional Hospital-Based Study

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Received: 01-03-2026 / Revised: 15-04-2026 / Accepted: 21-05-2026

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Conflict of interest: Nil

Abstract

Background: Breastfeeding is a cornerstone of infant survival and optimal growth, and global recommendations emphasize initiation within one hour of birth, exclusive breastfeeding (EBF) for six months, and continued breastfeeding up to two years or beyond. Despite improved national indicators in India, breastfeeding practices remain suboptimal and vary by region and socioeconomic profile.

Objectives: To assess breastfeeding practices among higher educated mothers in Rajasthan and to examine their association with sociodemographic and obstetric factors.

Methods: This cross-sectional study included 300 mothers with infants aged 6–18 months attending a paediatric outpatient department. Higher educated mothers (graduate and above) were enrolled using predefined inclusion and exclusion criteria. Data were collected using a structured, pre-tested questionnaire covering sociodemographic profile, breastfeeding initiation, exclusivity, duration, complementary feeding, and use of prelacteal and bottle feeds. Breastfeeding indicators were calculated as per standard definitions. Associations between categorical variables were tested using chi-square, with $p < 0.05$ considered statistically significant.

Results: Among 300 mothers, 57 (19%) were professionals, 71 (24%) post-graduates and 172 (57%) graduates; 82% belonged to upper or upper-middle socioeconomic classes, and 86% were housewives. Exclusive breastfeeding rate at 6 months was 16%, whereas 84% practiced predominant breastfeeding in the first six months. Timely first suckling rate (within 12 hours) was 44.74%, and 93.67% initiated breastfeeding within 24 hours. Colostrum feeding was practiced by 96.67% of mothers, while 33% gave prelacteal feeds, more often in joint families than nuclear families (54.81% vs 15.15%, $p < 0.001$). Bottle-feeding rate before 12 months was 39.47%, and mean duration of breastfeeding was 17.16 months (median 18 months). No significant association was observed between breastfeeding status (exclusive vs predominant) and maternal education, socioeconomic status, working status or type of family ($p > 0.05$).

Conclusion: Even among higher educated mothers in Rajasthan, exclusive breastfeeding rates at six months and early initiation remain considerably below recommended levels, with high use of predominant breastfeeding, prelacteal and bottle feeds. Maternal education alone did not guarantee optimal breastfeeding practices, highlighting the need for intensified, targeted breastfeeding counselling during antenatal and postnatal contacts, including among educated and higher-income groups.

Keywords: Breastfeeding, exclusive breastfeeding, higher educated mothers, prelacteal feeds, complementary feeding, Rajasthan.

DOI: 10.25258/ijcpr.18.6.232

Introduction

Breastfeeding is universally recognized as the optimal method of infant feeding, providing ideal nutrition, immune protection and long-term health benefits for both infants and mothers. [1] The World Health Organization and UNICEF recommend breastfeeding initiation within the first hour after birth, exclusive breastfeeding for the first six months of life, and continued breastfeeding along with appropriate complementary foods up to two years and beyond. [1] In India, national surveys have documented gradual improvement in early initiation and exclusive breastfeeding rates, but large gaps persist across different states and subpopulations. [2] According to NFHS-5, only

about two-thirds of infants below six months are exclusively breastfed, and less than half begin breastfeeding within one hour of birth. [3] Within Rajasthan, previous studies have reported considerable heterogeneity in breastfeeding knowledge and practice, even where awareness levels are relatively high. [4,5] Higher maternal education is often assumed to correlate with healthier behaviors, including optimal infant feeding. However, evidence from Indian and international studies suggests a more complex relationship, where higher education may coexist with employment-related constraints, urban lifestyles, increased exposure to breast milk substitutes, and changing social norms, resulting in early supplementation or cessation of breastfeeding.

Studies from different districts of Rajasthan, such as Alwar, north-west Rajasthan and Jaipur, have shown that despite generally good knowledge and positive attitudes, exclusive breastfeeding and timely initiation remain suboptimal, and are influenced by parity, joint versus nuclear family structure, and socio-cultural beliefs. This raises the question of whether formal education alone is sufficient to ensure adherence to recommended breastfeeding practices. [4,5] Against this background, the present study was undertaken in a tertiary-care setting in Rajasthan to assess breastfeeding practices among higher educated mothers (graduate and above) and to examine how these practices relate to sociodemographic and obstetric characteristics.

Materials and Methods

Study design and setting: This was a cross-sectional, observational study conducted in the Dept. of Paediatrics, Santokba Durlabhji Memorial Hospital, Jaipur Rajasthan. The study was conducted for the period of 1 year. The study population comprised mothers of infants aged 6–18 months attending the clinic during the study period.

Study population and sample size: A total of 300 mother–infant pairs were included. Only "higher educated" mothers, defined as those who had completed at least graduation (graduate, post-graduate or professional degree), were eligible. The sample size was based on feasibility of the study.

Inclusion and Exclusion Criteria

Inclusion Criteria

- Mothers who had completed graduate, post-graduate, or professional education.
- Mothers of singleton infants aged 6–18 months attending the paediatric outpatient department.
- Mothers who consented to participate and were able to recall feeding practices during the first six months.

Exclusion Criteria

- Mothers of infants with major congenital malformations or chronic illnesses affecting feeding.
- Mothers with serious illness that significantly impaired breastfeeding (e.g., prolonged ICU stay).
- Infants who were adopted or whose primary caretaker during the first six months was not the biological mother.

Data collection tool and procedure: Data were collected using a pre-tested, structured questionnaire administered to mothers by trained investigators in the local language. The tool captured:

- Maternal characteristics: age, education (graduate/post-graduate/professional), occupation (housewife/employed), socio-econ omic status (modified Kuppuswamy's scale), type of family (nuclear/joint), parity, and mode of delivery.
- Child characteristics: age (months), sex, birth weight, current nutritional status (IAP PEM grading using 50th NCHS percentile).
- Breastfeeding practices: timing of initiation after birth, giving of colostrum, prelacteal feeding (yes/no, type, adviser), exclusive and predominant breastfeeding up to six months, duration of each feed, feeding schedule (on demand vs time-scheduled), problems during breastfeeding, age and reasons for stopping breastfeeding.
- Complementary feeding practices: age at introduction, type of first complementary foods (homemade vs commercial), use and dilution of top milk, methods of feeding supplements (katori–spoon, bottle, others).

Information on counselling sources for exclusive breastfeeding and initiation (doctor, nurse, relatives, print media, self, none) was also recorded.

Operational definitions: Breastfeeding indicators and categories followed standard WHO/IYCF definitions and those used in the thesis:

- **Exclusive breastfeeding (EBF):** Infant received only breast milk and no other liquids or solids (except ORS, medicines, vitamins or minerals) up to six months.
- **Predominant breastfeeding:** Infant mainly received breast milk but also water or other non-milk liquids in the first six months.
- **Timely first suckling:** Initiation of breastfeeding within 12 hours of birth.

- **Timely complementary feeding:** Introduction of nutritionally adequate complementary foods between 6–9 months of age.
- **Bottle feeding:** Use of feeding bottle for milk or other liquids before 12 months of age.

Ethical Considerations: The study protocol was approved by the institutional ethics committee prior to data collection. Written informed consent was obtained from all participating mothers. Confidentiality of responses was maintained and data were anonymized for analysis.

Statistical Analysis: Data were entered and cleaned using standard spreadsheet software and analysed with appropriate statistical tools (as per the original thesis, e.g., SPSS/Excel). Descriptive statistics (frequency, percentage, mean, median) were calculated for key variables. Breastfeeding indicators (exclusive, predominant, timely first suckling, timely complementary feeding, and continued breastfeeding at one year, bottle-feeding, ever-breastfed, mean and median duration) were derived according to standard formulas.

Associations between breastfeeding status (exclusive vs predominant) and maternal education, socio-economic status, working status and family type, as well as between selected practices and family type or employment, were assessed using chi-square tests. A p value of less than 0.05 was considered statistically significant.

Results

In the present study, a total of 300 mothers' infant pairs were included. The general characteristics of the study group is presented in Table no. 1. Among the 300 mothers, 172 (57%) were graduates, 71 (24%) post-graduates and 57 (19%) professionals. According to the modified Kuppuswamy scale, 114 (38%) belonged to upper class (Class I), 132 (44%) to upper-middle class (Class II), and 54 (18%) to lower-middle class (Class III); no participants were from Class IV or V. [Figure 1] Most mothers were housewives (258, 86%), while 42 (14%) were employed; 165 (55%) lived in nuclear families and 135 (45%) in joint families. Regarding parity, 126 (42%) were primipara, 170 (57%) para 2, and only 4 (1%) had parity ≥3. Spontaneous vaginal delivery occurred in 191 (64%) mothers, lower segment caesarean section in 105 (35%) and forceps delivery in 4 (1%). At birth, 26 (8.67%) infants weighed ≤2.5 kg, 265 (88.33%) between 2.5–3.5 kg and 9 (3%) >3.5 kg. Based on IAP PEM grading (using 50th NCHS percentile), 261 (87%) children were nutritionally normal, while 25 (8.33%), 13 (4.33%) and 1 (0.33%) fell into Grade I, II and III malnutrition respectively. [Table 1]

At the time of interview, 4 (1.33%) children were still only breastfed, 232 (77.33%) received both breast milk and complementary feeds, and 64 (21.33%) were on complementary feeds only. The breastfeeding status at one month of age, and four months, is shown in Table no. 2. Overall, only 48 mothers (16%) maintained exclusive breastfeeding for the full six months, whereas 252 (84%) practiced predominant breastfeeding during the first six months ($p < 0.001$). [Table 2]

The distribution of exclusive versus predominant breastfeeding according to maternal education showed that among 48 exclusively breastfeeding mothers, 9 (18.75%) were professionals, 16 (33.33%) post-graduates and 23 (47.92%) graduates. Among 252 predominantly breastfeeding mothers, 48 (19.05%) were professionals, 55 (21.83%) post-graduates and 149 (59.13%) graduates. The association between maternal education level and breastfeeding status was not statistically significant ($p > 0.05$).

Similarly, when analysed by socio-economic status, 39.58% of exclusively breastfeeding mothers and 38.89% of predominantly breastfeeding mothers belonged to Class I, 43.75% and 44.05% to Class II, and 16.67% and 17.06% to Class III, respectively. This association was also not significant ($p > 0.05$). Regarding working status, 43 (89.58%) exclusively breastfeeding mothers and 215 (85.32%) predominantly breastfeeding mothers were housewives, whereas 5 (10.42%) and 37 (14.68%) were employed, respectively, with no significant difference ($p > 0.05$).

Breastfeeding practices were similar in joint and nuclear families: among exclusively breastfeeding mothers, 23 (47.92%) were from joint and 25 (52.08%) from nuclear families; among predominantly breastfeeding mothers, 112 (44.44%) lived in joint and 140 (55.56%) in nuclear families ($p > 0.05$).

Table 1: General characteristics of Study Subjects (n = 300)

	Characteristics	Number	Percentage
Age distribution	6-8 months	44	14.67%
	9-11 months	70	23.33%
	12-14 months	100	33.33%
	15-18 months	86	28.67%
Sex	Male	164	54.67%
	Female	136	45.33%
Birthweight	<=2.5	26	8.67%

	>2.5 -3.5	265	88.33%
	>3.5	9	3%
Present nutritional status*	Normal**	261	87.00%
	Grade I	25	8.33%
	Grade II	13	4.33%
	Grade III	1	0.33%
Present feeding status	Only breastfed	4	1.33%
	Breastfed & complimentary fed	232	77.33%
	Only complimentary fed	64	21.33%

***IAP PEM Grading; **5Oth percentile of NCHS standard**

Table 2: Breast Feeding Status According to Age

	Age in months	One month	Two months	Three months	Four months	Five months	Six months
Exclusive breast feed	Number	205	128	57	51	50	48
	%	68.33%	42.67%	19.00%	17.00%	16.66%	16.00%
Predominantly breast feed	Number	95	172	243	249	250	252
	%	31.60%	57.30%	81.00%	83.00%	83.33%	84.00%
Total		300	300	300	300	300	300

P < 0.001 (H.S.)

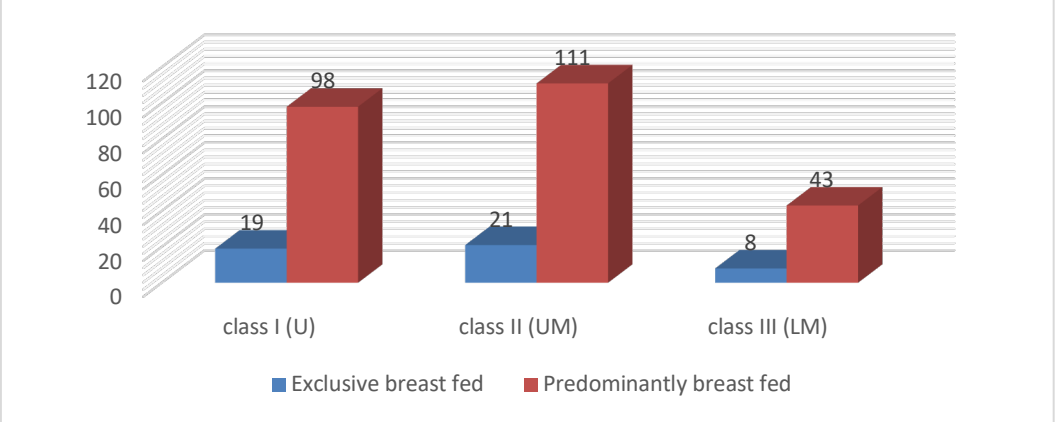

Figure 1: Number of cases according to Class of patients

Exclusive breastfeeding advice was predominantly provided by doctors in 43 (89.58%) of the 48 exclusively breastfeeding mothers; discharge tickets were cited by 3 (6.25%) and other sources by 2 (4.17%).

For breastfeeding initiation, 91 (30.33%) mothers reported doctors as the main source of guidance, followed by nurses in 46 (15.33%), mothers or mothers-in-law in 40 (13.33%), relatives in 4 (1.33%) and books in 7 (2.33%). Notably, 75 (25%) mothers reported that no one advised them regarding initiation. Only 43 (14.33%) mothers initiated breastfeeding within 30 minutes of birth and 56 (18.67%) within one hour.

When stratified by breastfeeding status, 20.83% of exclusively breastfeeding mothers and 13.10% of predominantly breastfeeding mothers initiated within 30 minutes; most in both groups initiated between 1–6 hours. The difference between groups was not statistically significant (p > 0.05).

Table 3: Initiation of breast feeding According to breast feeding status

No of hours after birth	Exclusively breast feed		Predominantly breast feed		Total	
	No.	%	No.	%	No.	%
0-0.5	10	20.83%	33	13.10%	43	14.33%
0.5 - 1	10	20.83%	46	18.25%	56	18.67%
1-6	23	47.92%	142	56.34%	165	55.00%
6-24	5	10.42%	12	4.76%	17	5.67%
>24	0	0.00%	16	6.35%	16	5.33%
>72	0	0.00%	3	1.19%	3	1.00%
Total	48	0.16%	252	0.84%	300	100.00%

p>0.05 (N.S.)

Overall, 99 (33%) mothers practiced prelacteal feeding; the practice was significantly more common in joint families (74 of 135; 54.81%) compared to nuclear families (25 of 165; 15.15%) ($p = 0.00$). The most common prelacteal substance was honey, given by 115 (68.05%) mothers, followed by janam-ghutti in 28 (16.50%), tea in 11 (6.51%), jaggery in 9 (5.33%) and other substances (water, ghee with sugar, ajwain water, etc.) in 6 (3.55%). Prelacteal feeding was mainly encouraged by mothers or mothers-in-law (70, 28.11%) and grandmothers (57, 22.89%), followed by relatives (38, 15.26%), tradition and culture (27, 10.84%), self (4, 1.62%) and others (7, 2.81%).

Among mothers who did not give prelacteals, the commonest reason was doctors' advice (58, 41.43%), followed by relatives' advice (24, 17.14%), reading in books (14, 10%), nurses' advice (14, 10%), self-decision (8, 5.71%) and no specific reason (12, 8.57%).

Colostrum feeding was practiced by 290 (96.67%) mothers, while 10 (3.33%) discarded colostrum. Among joint families, 129 (95.56%) mothers practiced colostrum feeding compared to 161 (97.58%) in nuclear families; this difference was not significant ($p > 0.05$). Of the 10 mothers who did not give colostrum, 6 (60%) cited baby's illness, 3 (30%) baby not sucking and 1 (10%) mother's illness as reasons.

Demand feeding (feeding whenever the baby cried) was practiced by 258 (86%) mothers, while 42 (14%) followed a time schedule. Demand feeding was more common among predominantly breastfeeding mothers (221, 87.67%) compared to exclusively breastfeeding mothers (37, 77.10%), whereas time-scheduled feeding was more frequent among exclusively breastfeeding mothers (11, 22.90%) than predominantly breastfeeding mothers (31, 12.30%); differences were not statistically significant ($p > 0.05$). Regarding duration of each breastfeeding session, 63 (21%) mothers breastfed for 5–10 minutes, 124 (41.33%) for 10–15 minutes, 80 (26.67%) for 15–20 minutes, 21 (7%) for ≥20 minutes, and 12 (4%) for around 30 minutes. A significantly higher proportion of exclusively breastfeeding mothers (22.92%) fed for 20–30 minutes compared to predominantly breastfeeding mothers (8.73%) ($p < 0.05$).

Among the 252 mothers who did not practice exclusive breastfeeding, water supplementation was common: 104 (41.26%) gave boiled water and 62 (24.60%) gave plain or unboiled water. [Table 4] Reasons for water supplementation included baby thirsty or throat/mouth drying (31, 20.39%), summer season (21, 13.82%), perception that baby needed water (19, 12.50%), baby crying (19, 12.50%), proper hydration (10, 6.58%), elders' advice (9, 5.93%), doctor's advice (8, 5.26%), relatives' advice (12, 7.89%), baby's illness (10, 6.58%), baby's health (4, 2.63%), aids digestion (4, 2.63%) and no reason (3, 1.97%). [Figure 2]

Regarding milk supplementation, 80.88% used animal milk and 19.12% used powdered milk. For infants receiving top milk, 149 (50.55%) mothers diluted it (mostly between 25–50%), while 147 (49.67%) used undiluted milk.

Among exclusively breastfeeding mothers who supplemented later, 86.64% used undiluted milk compared to 42.69% of predominantly breastfeeding mothers, a statistically highly significant difference ($p < 0.001$). Katori–spoon feeding was the commonest means for supplementation, used by 149 (59.12%) mothers, followed by bottle feeding in 124 (41.89%) and other means (glass, dropper, cup, palady) in 23 (9.12%). There was no significant difference between exclusive and predominant breastfeeding groups in choice of feeding method ($p > 0.05$).

Table- 4: Type of supplementation for not exclusively breast feeding

Type	Total	Percentage
Plain/ Unboiled Water	62	24.60%
Boiled Water	104	41.26%
Animal Milk	55	21.84%
Powdered Milk	13	5.15%
Other Liquid	14	5.57%
Other Food	4	1.58%
Total	252	100.00%

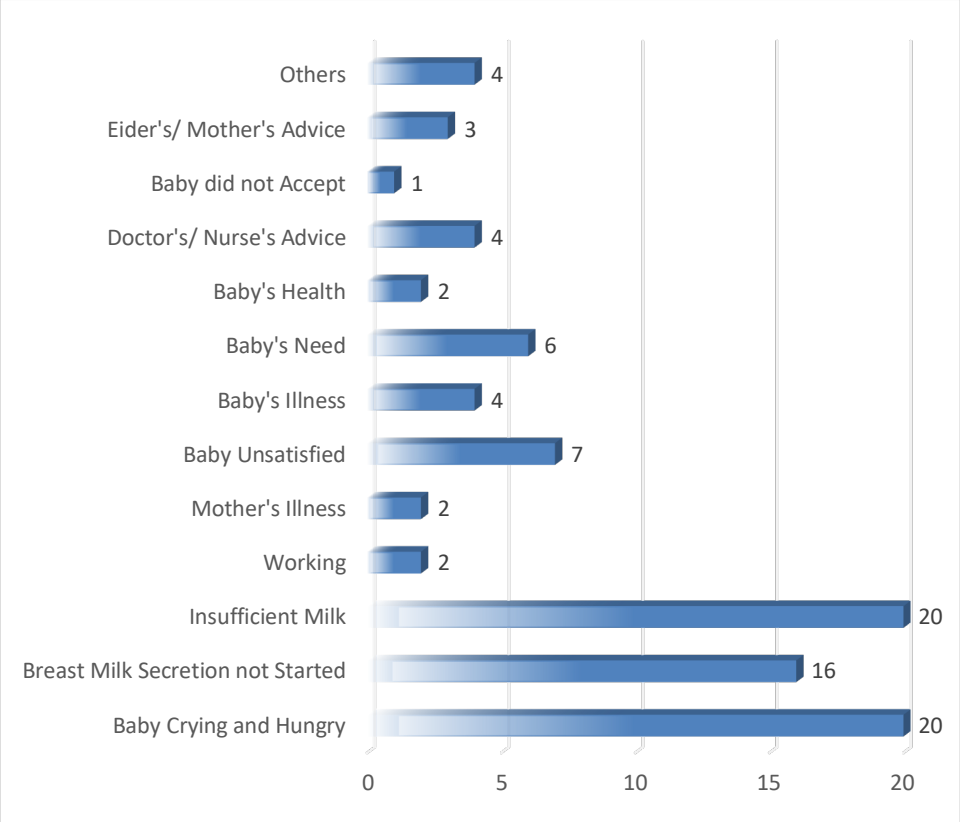

Figure 2: Reasons for early introduction of artificial feed for not exclusively breast feeding

Complementary feeding was introduced before six months by 125 (42.23%) mothers and between 6–9 months by 164 (55.41%); only 7 mothers introduced after nine months. Early introduction (<6 months) was more common among employed mothers (25 of 42; 59.52%) than housewives (100 of 254; 39.37%), and this difference was statistically significant ($p < 0.05$).

Most mothers (179, 60.47%) used commercial or market-prepared complementary foods, 99 (33.45%) used homemade preparations and 18 (6.08%) used both. In total, 68 (22.99%) mothers had stopped breastfeeding by the time of interview. Among them, 23 (33.82%) stopped before 6 months, 43 (63.24%) between 6–12 months and 2 (2.94%) between 12–18 months. When analysed by breastfeeding status, 2 of 48 exclusively breastfeeding mothers (4.16%) and 64 of 252 predominantly breastfeeding mothers (25.39%) had stopped breastfeeding before 12 months ($p < 0.05$).

Common reasons for stopping breastfeeding were cessation of breast milk secretion in 20 (29.41%), baby stopping breastfeeding in 15 (22.39%), pregnancy in 8 (11.94%), baby considered grown-up in 7 (10.45%), maternal employment in 7 (10.45%), mother's illness in 4 (5.97%) and other reasons (e.g., baby's illness, breast problems, gaps in breastfeeding) in 7 (10.45%). Among mothers who were still breastfeeding (n = 232), 101 (43.53%) planned to continue up to 18 months, 68 (29.31%) up to 24 months, and 26 (11.21%) beyond 24 months.

Table 4: Indicators of breastfeeding practices

Indicators	Age group (months)	Total children	Children with practices	Rate
Exclusive breastfeeding rate	0-6	300	48	16.00%
Predominant feeding rate	0-6	300	252	84.00%
Timely first suckling rate	<12	I 14	51	44.74%
Timely complimentary feeding rate	6-9	83	46	54.42%
Continue breast feeding rate at one year	12-15	120	99	82.50%
Bottle feeding rate	<12	114	45	39.47%
Ever breastfed rate	<12	114	114	100.00%
Mean duration of breast feeding (months)				17.16
Median duration of breast feeding (months)				18

Discussion

The present study among higher educated mothers in Rajasthan demonstrates a mixed pattern of infant feeding, with encouraging levels of ever-breastfeeding and colostrum use but suboptimal exclusive breastfeeding and continued reliance on traditional practices such as prelacteal and water supplementation. Despite a predominantly normal nutritional profile in the study children and a sample skewed towards higher socioeconomic status, only 16% of mothers maintained exclusive breastfeeding for the full first six months, while 84% practiced predominant breastfeeding with early introduction of additional fluids. These findings highlight that higher education and better socioeconomic position alone do not guarantee adherence to optimal breastfeeding recommendations.

In this study, exclusive breastfeeding declined steeply from 68.33% at one month to 16% by six months, with a corresponding rise in predominant breastfeeding. This pattern is comparable to earlier Indian reports that document substantial early supplementation despite initial high breastfeeding uptake. Kushwaha et al. [6] reported 14.8% of infants underweight for age in peri-urban Gorakhpur, and Tripathy et al. [7] found approximately 14% of infants below −2 SD for weight at 12 months when following IAP policy, suggesting that suboptimal feeding practices coexist with only modest undernutrition in some better-off groups. The exclusive breastfeeding rate in the current study is lower than NFHS estimates and also lower than many hospital-based cohorts, underscoring the gap between knowledge and sustained practice even among educated women.

No significant association was observed between breastfeeding status (exclusive versus predominant) and maternal education level, socioeconomic class, working status or type of family. This aligns with previous work indicating that while education may improve awareness, its impact on actual feeding behaviour is heavily modulated by employment, family structure and socio-cultural norms. Wadhva et al. [8] reported broadly similar general characteristics but somewhat lower socioeconomic status than in the present cohort, and still noted erosion of breastfeeding practices over time in urban settings, supporting the concept of a "decline in breastfeeding" even in relatively advantaged populations.

Early initiation of breastfeeding in this study was far from universal; only 14.33% of mothers initiated within 30 minutes and 33% within one hour, though 93.67% started within 24 hours. Bahl et al. [9] documented 91.7% of infants put to the breast within 24 hours in Himachal Pradesh, comparable to the present 24-hour figure, but Ibhanesebhor et al. [10] reported a lower proportion initiating within 24 hours and only 26.8% within 30 minutes, similar to the low early-initiation rate seen here. Madhu et al. [11] more recently observed around 44% of mothers initiating breastfeeding within 30 minutes and 19% after 24 hours, suggesting that the timing in the current study is better than some older reports but still falls short of optimal early initiation benchmarks.

Prelacteal feeding remains entrenched, with one-third of mothers in the present study giving prelacteal feeds, significantly more often in joint families than in nuclear families. Hiwarkar et al. [12] reported an even higher prelacteal prevalence of 47.7% with a similar excess in joint families, while Kumar and Sinhababu [13] also documented prelacteal use around 26–40%, indicating that the magnitude of this practice in the current cohort is consistent with other Indian settings despite higher maternal education. The dominant prelacteal substances in this study—honey, janam-ghutti, tea and jaggery—mirror earlier reports, and reasons centred on advice from mothers-in-law, grandmothers, relatives, and "tradition and culture," again matching the pattern described by Hiwarkar and colleagues. [12] Conversely, avoidance of prelacteals was strongly influenced by medical advice and reading material, reinforcing the protective role of health-care counselling even in the face of family pressure.

Colostrum feeding was practiced by 96.67% of mothers, a much higher proportion than the 63.6% reported by Hiwarkar et al. [12] and the substantial colostrum discarding described by Kumar and others. [14] The lack of a significant difference between joint and nuclear families in colostrum feeding, combined with high overall uptake, suggests that messages about the benefits of colostrum may have gained wider acceptance among educated urban and semi-urban families.

Nonetheless, the minority who did not give colostrum cited baby's illness, poor sucking and maternal illness, indicating an opportunity to strengthen guidance on maintaining breastfeeding or expressing colostrum in such clinical situations.

Most mothers practiced demand feeding, with 86% feeding whenever the baby cried, comparable to the 74.4% demand-feeding rate reported by Bahl et al. and the 81.2% described by Wadhva et al. [8,9] Although time-scheduled feeding was more frequent in the exclusively breastfed group, the difference from the predominantly breastfed group was not statistically significant. The present study also shows that exclusively breastfeeding mothers more often allowed longer feeding sessions of 20–30 minutes than predominantly breastfeeding mothers, suggesting that early supplementation

may truncate breastfeeds and potentially reduce milk production and transfer.

Supplementation with water and animal or powdered milk contributed importantly to the low exclusive breastfeeding rate. Nearly two-thirds of mothers offered water before six months, citing infant thirst, hot weather and crying as main reasons, which echoes Ibhanesebhor's findings of thirst being a common justification and reflects enduring cultural beliefs that breast milk alone is inadequate for hydration. [10] Early introduction of artificial milk was primarily attributed to delayed onset or perceived insufficiency of breast milk, similar to the insufficient-milk and working-mother explanations noted by Ibhanesebhor and by Wadhva and colleagues. [8,10] Compared with Walia's report of a very high proportion of above-graduate mothers starting top milk by three months, the present study still shows widespread early supplementation but with somewhat more delayed introduction in a subset of mothers, possibly reflecting gradual shifts in practice. [15]

Use of feeding bottles was frequent, with over 40% of mothers resorting to bottles, despite katori–spoon being the most common method overall. This bottle-feeding rate is higher than the 14.8% reported by Kushwaha but lower than Wadhva's observation that more than 80% of mothers used conventional feeding bottles, situating the current cohort midway along the spectrum of bottle dependence described in the Indian literature. [6,8] Given established links between bottle use, reduced suckling efficiency and decreased milk production, these findings are worrisome in the context of already low exclusive breastfeeding.

Complementary feeding was frequently introduced before six months, especially among employed mothers, 59.52% of whom started complementary feeds before six months compared with 39.37% of housewives. This is in line with Walia's report that a large majority of educated mothers introduced semi-solids before six months and with Hiwarkar's and Sinhababu's findings of substantial early or borderline-timely weaning in various Indian communities. [12,13] The heavy reliance on market-prepared complementary foods (over 60% in the present sample) contrasts with the more traditional homemade preparations noted in some older studies, indicating a shift towards commercial products among educated urban families.

Stopping breastfeeding by 18 months was reported by nearly 23% of mothers, with cessation before 12 months significantly more common in the predominantly breastfed group than in the exclusively breastfed group. Walia et al. earlier documented that around half of mothers discontinued breastfeeding beyond 12 months, suggesting that while duration remains relatively long in many Indian cohorts, there is still attrition before the recommended two years. [15] In the present study, cessation of breast milk secretion was the leading reason for stopping, as also reported by Bahl and colleagues, [9] followed by baby-related factors, pregnancy, maternal work and illness, many of which are potentially modifiable through better lactation support and workplace policies. Encouragingly, a substantial proportion of mothers planned to continue breastfeeding up to 18–24 months or longer, similar to the extended breastfeeding intentions reported by Hiwarkar. [12]

Overall, this study's breastfeeding indicators—exclusive breastfeeding 16%, predominant feeding 84%, timely first suckling 44.74%, timely complementary feeding 54.42%, continued breastfeeding at one year 82.50%, bottle-feeding 39.47%, ever-breastfed 100%, and mean duration 17.16 months—place the cohort within the broad range reported by previous Indian studies, but with notably poor exclusive breastfeeding despite good colostrum use and reasonably prolonged overall duration. In comparison with earlier work from rural, slum and peri-urban populations, higher education in this sample appears to have improved certain practices (colostrum feeding, ever-breastfeeding, duration) without overcoming deeply rooted norms around prelacteals, water supplementation, early artificial feeding and bottle use. This underscores the need for intensive, consistent counselling and structural support (including for working women) that explicitly targets misperceptions about milk insufficiency, water requirements and convenience feeding, and that actively involves influential family members in order to translate knowledge into sustained optimal breastfeeding behaviour.

Strengths and limitations

The strengths of this study include a reasonably large sample of 300 higher educated mothers, detailed information on multiple breastfeeding and complementary feeding practices, and use of standard breastfeeding indicators. The comparison of practices by maternal education, socio-economic status, family type and employment provides useful insight into determinants among an ostensibly advantaged group.

However, limitations must be acknowledged. The cross-sectional design and reliance on maternal recall may introduce recall bias, particularly for timing and duration variables. The hospital-based sample from a single tertiary-care centre may not be fully representative of all higher educated mothers in Rajasthan or India.

Conclusion

Among higher educated mothers in Rajasthan, exclusive breastfeeding rates at six months and

early initiation of breastfeeding remain substantially below recommended levels, despite almost universal colostrum feeding and reasonably long overall duration of breastfeeding. Prelacteal feeding, early water and artificial feed supplementation, bottle use and reliance on commercial complementary foods are common, driven largely by cultural beliefs, family influences and work-related constraints.

Maternal education, socio-economic status, working status and family type were not significantly associated with exclusive versus predominant breastfeeding, indicating that education alone does not ensure optimal breastfeeding practices. There is an urgent need to strengthen breastfeeding promotion strategies targeting all mothers, including those who are highly educated, with emphasis on:

- Antenatal and postnatal counselling on exclusive breastfeeding for six months, avoiding prelacteal feeds and water supplementation.
- Involving husbands and elder family members, especially mothers-in-law and grandmothers, in counselling sessions to address entrenched traditional practices.
- Hospital policies that ensure early skin-to-skin contact, breastfeeding within one hour of birth and continued support in the immediate postnatal period.
- Workplace interventions and supportive legislation to enable continued breastfeeding among employed women, such as extended maternity leave, flexible hours, on-site childcare and facilities to express and store breast milk.

Future research using community-based, multi-centre designs and multivariable analyses is warranted to further elucidate determinants of optimal breastfeeding among educated women and to evaluate the effectiveness of targeted interventions in this group.

References

1. Froń A, Orczyk-Pawiłowicz M. Breastfeeding beyond six months: evidence of child health benefits. Nutrients. 2024;16(22):3891. doi:10.3390/nu16223891.
2. Reddy NS, Dharmaraj A, Jacob J, Sindhu KN. Exclusive breastfeeding practices and its determinants in Indian infants: findings from the National Family Health Surveys-4 and 5. Int Breastfeed J. 2023;18(1):69. doi:10.1186/s13006-023-00602-z.
3. Tripathi S, Pathak VK, Lahariya C. Key findings from NFHS-5 India report: observing trends of health indicators between NFHS-4 and NFHS-5. J Fam Med Prim Care. 2023;12(9):1759-63. doi:10.4103/jfmpc.jfmpc_377_23.
4. Kishore M, Kumar P, Aggarwal A. Breastfeeding knowledge and practices amongst mothers in a rural population of North India: a community-based study. J Trop Pediatr. 2009;55:183-8. doi:10.1093/tropej/fmn110.
5. Meharda B, Dixit M. A community based cross sectional study of breastfeeding practices of nursing mothers at block Phagi, district Jaipur (Rajasthan). Int J Community Med Public Health. 2015;2(4):404-8.
6. Kushwaha KP, Mathur GP, Prakash O. Infant feeding practices of periurban areas of Gorakhpur. Indian Pediatr. 1987;24:899-901.
7. Tripathy R, Das RN, Das MM, Parija AC. Growth in the first year in children following IAP policy on infant feeding. Indian Pediatr. 2000;37:1051-7.
8. Wadhva SK, Deshmukh V, Wahab SN, Vasudeo ND. Awareness and practice regarding breastfeeding in mothers. Indian J Mater Child Health. 1998;9(2):41-5.
9. Bahl L, Kaushal RK. Infant rearing practices and beliefs in rural inhabitants of Himachal Pradesh. Indian Pediatr. 1987;24:903-6.
10. Ibhanesebhor SE, Muogbo DC. Impact of baby friendly hospital initiative. Int Child Health. 1995;6:73-6.
11. Madhu K, Chowdhary S, Masthi R. Breastfeeding practices and newborn care in rural areas: a descriptive cross-sectional study. Indian J Community Med. 2009;34(3):243-6.
12. Hiwarker PA, Aswar NR, Durge PM, Shendre MO. Breastfeeding and weaning practices in rural mothers. J Obstet Gynaecol India. 1999;49(6):73-6.
13. Sinhababu A, Mukhopadhyay D, Panja T, Saren A, Mandal N, Biswas A. Infant- and young child-feeding practices in Bankura district, West Bengal, India. J Health Popul Nutr. 2010;28(3):294-9.
14. Kumar D, Agarwal N, Swami HM. Sociodemographic correlates of breastfeeding in urban slums of Chandigarh. Indian J Med Sci. 2006;60:461-6.
15. Walia BNS, Gambhir SK, Sroa SR, Choudhary S. Decline in breastfeeding practices in urban population of Chandigarh during a decade. Indian Pediatr. 1987;24:879-87.