

BREASTFEEDING AND WEANING PRACTICES AMONG MOTHERS OF INFANTS: A COMPARATIVE STUDY

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DOI: <https://doi.org/10.5281/zenodo.17614618>

Keywords

Breastfeeding practices, Weaning practices, Infant nutrition, Colostrum, Exclusive breastfeeding, Maternal health, Public health interventions, Infant morbidity, Maternal education, Pakistan

Article History

Received: 22 September 2025

Accepted: 01 November 2025

Published: 04 November 2025

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Abstract

Breastfeeding provides optimal nutrition for infants and is widely recognized for its extensive biological, psychological, immunological, and developmental benefits. It plays a critical role in reducing infant morbidity and mortality by strengthening immune responses and fostering maternal-infant bonding. Colostrum, the first form of milk produced post-delivery, is rich in antibodies and crucial for neonatal health. Weaning—the gradual introduction of semi-solid and solid foods—becomes essential after six months of age to meet increasing nutritional demands that breast milk alone can no longer fulfill. However, the transition from exclusive breastfeeding to complementary feeding is often influenced by a complex interplay of cultural, socioeconomic, and educational factors.

This systematic review investigates breastfeeding and weaning knowledge, attitudes, and practices among mothers, with a particular focus on Pakistan and comparable developing regions. A total of 69 peer-reviewed studies published between 2016 and 2020 were analyzed using data sourced from PubMed, Google Scholar, ScienceDirect, and national academic repositories. Findings reveal significant disparities in breastfeeding initiation times, exclusive breastfeeding durations, and the nature and timing of weaning practices. Key influencing factors include maternal education level, employment status, household income, healthcare accessibility, urban-rural divide, traditional beliefs, and misinformation.

Despite global advocacy, many mothers lack practical knowledge or face socio-cultural barriers that hinder optimal feeding practices. Inappropriate weaning or premature cessation of breastfeeding contributes to malnutrition, stunted growth, and vulnerability to infectious diseases. The review underscores the urgent need for culturally sensitive public health interventions, targeted education campaigns, and supportive health policies to promote effective breastfeeding and weaning practices.

INTRODUCTION

Breastfeeding is the natural and most effective method of feeding infants, providing complete nutrition for the first six months of life and significantly contributing to their physical, emotional, and immunological development. It is widely recognized as the purest, most economical, and biologically ideal form of infant nutrition (Rea, 2004)[1]. Beyond meeting nutritional needs, breast milk contains antibodies, immune cells, and growth factors that protect infants against infections and support their physiological and psychological well-being (Palmeira & Carneiro-Sampaio, 2016)[2].

As infants grow, breast milk alone becomes insufficient to fulfill their increasing energy and micronutrient demands—particularly for zinc, iron, and vitamin A—necessitating the introduction of complementary foods (Motee et al., 2013)[3]. This transition, known as weaning, typically begins at six months of age and involves the gradual addition of semi-solid and solid foods such as porridge, khichri, yogurt, bananas, and cereals. Timely and hygienic weaning practices are essential for preventing growth faltering, diarrhea, and malnutrition (Kulsoom & Saeed, 1997)[4]. Delayed or inappropriate weaning is associated with micronutrient deficiencies and increased susceptibility to infections, particularly in low-resource settings (Harnagle & Chawla, 2013)[6]. The cultural and geographical diversity in infant feeding habits makes the matter more complicated. Although the WHO and UNICEF guidelines propose that children should exclusively rely on breastfeeding during the first six months, not all countries and populations follow these guidelines. The study in Brazil (2008) has shown that the breastfeeding rates were 91.7% six months after childbirth, but the exclusive breastfeeding rates decreased sharply after six months (DATASUS, 2012)[7]. Conversely, a study in Pakistan has shown that breastfeeding is stopped earlier than expected amongst mothers in urban regions due to preference of formula milk instead of breastfeeding although the mothers are generally aware of the benefits of breastfeeding (Morisky et al., 2002; Ashraf et al., 1993)[10,11].

There are a number of socio-demographic and geographic determinants of the initiation and duration of breastfeeding, such as maternal education, place of residence, access to health care, income level, and traditional beliefs (Dettwyler, 1987)[5]. These beliefs are in most cases very stubborn to change and they still influence the feeding habits even when such families move out of the rural areas and into the urban areas. The result is poor health outcomes in children due to poor feeding habits that could be early termination of breastfeeding or early introduction of complementary food is still prevalent in many of the cases.

Breastfeeding is found to reduce the risk of some diseases during infancy and childhood, including obesity, diabetes, otitis media, and gastrointestinal infections (Victora et al., 2016; Brennan-Jones et al., 2017)[13,19]. The immunoglobulins are especially abundant in colostrum, the initial milk in the postpartum period and it offers passive immunity to the baby, resulting in lesser morbidity and death among children (Chandrashekar et al., 1995)[8]. Additionally, breastfeeding also helps to relieve maternal health by lowering the chances of breast and ovarian cancer, and also helps with the postpartum healing process and a postpartum spacing (Rea, 2004)[1]. Although these advantages exist, recent tendencies have observed a sharp drop in the rates of breastfeeding: 90 percent of it in the previous decades to 42 percent in certain areas nowadays (Kjorvel-Haquist et al., 2016)[14]. The economic status is a major factor; breastfeeding is more common among the less wealthy households compared to the wealthy family whose children are more common with the formula feeding (Salah et al., 2013)[15]. The preventive effect of breastfeeding is extended to otitis media (OM), which is a widespread childhood disease. Some of the studies suggest that breastfeeding beyond six months can decrease the occurrence of OM, and the longer the duration is the more protective they become (Todberg et al., 2014; Brennan-Jones et al., 2017)[18,19]. More than nine months of breastfeeding was also found to lower the risk of

OM and other respiratory diseases (Li et al., 2014)[20].

Considering the paramount importance of breastfeeding and proper weaning on child survival and development, this is a matter of concern and need to be addressed to know the current practices, level of knowledge and factors

that are influential among mothers. This research will identify the barriers to the best feeding practices and provide evidence-based suggestions, through a systematic review of breastfeeding and weaning in Pakistan and across the world to address the issue.

Table 1: Breastfeeding Rates Among Working vs. Non-Working Mothers

Category	Breastfeeding Rate (%)
Working Mothers	70
Non-Working Mothers	87.4

2. Materials and Methods

2.1 Scope of Review

This systematic review was conducted to evaluate the breastfeeding and weaning practices among mothers of infants, with a specific focus on the following research questions:

- At what age do mothers initiate weaning?
- What types of foods are first introduced during weaning?
- What proportion of mothers provide colostrum at birth?
- How widespread are breastfeeding and weaning practices among mothers in Pakistan?

The study includes comprehensive methodological details outlining the literature search strategy, inclusion and exclusion criteria, and the data extraction process used to synthesize the findings.

2.2 Search Strategy and Data Sources

A structured literature search was performed to identify relevant studies published between 2016 and 2020, with a focus on research conducted in Pakistan. The databases and platforms consulted included:

- Google Scholar
- ScienceDirect
- PubMed
- Medline
- Ovid Maternity and Infant Care

- CINAHL (Cumulative Index for Nursing and Allied Health Literature)
- ResearchGate
- ajournal.com
- ecommons.aku.edu
- sid.ir
- Scopus
- Embase

Keywords used in the search included: "breastfeeding," "weaning," "infant feeding," "complementary feeding," "colostrum," and "mothers in Pakistan". The search strategy was refined to prioritize studies conducted in Pakistan while allowing for the inclusion of relevant global literature where applicable.

A total of approximately 220 articles were identified across the five-year period:

- 50 from 2016
- 60 from 2017
- 45 from 2018
- 55 from 2019
- 45 from 2020

2.3 Study Selection and Data Extraction

The selection process involved an initial screening of titles and abstracts, followed by full-text assessments. Studies were independently reviewed

by multiple reviewers, and disagreements were resolved through discussion and consensus.

Out of the 220 articles identified:

- 200 were screened
- 110 were found eligible for further review
- 80 were finally included in the synthesis

Among these, 17–20 **studies** specifically focused on Pakistan, while 120 **studies** addressed general breastfeeding and weaning practices. Most included studies were cross-sectional surveys, clinical trials, or systematic reviews conducted at national and international levels.

2.4 Inclusion Criteria

- Studies conducted between 2016 and 2020
- Articles published in English
- Research focusing on **infant feeding practices** (breastfeeding, colostrum, complementary feeding)

Table 2: Reasons for Early Weaning

Reason	Percentage (%)
Lack of Knowledge	25
Cultural Beliefs	20
Work Commitments	30
Health Issues	15
Financial Constraints	10

3. Results

3.1 Study Overview

Out of 220 screened articles, 69 met inclusion criteria:

- 19 cross-sectional
- 18 cohort
- 8 observational
- 5 RCTs
- 1 exploratory longitudinal study

3.2 Key Findings

- **Breastfeeding initiation:** Rates vary from 25% to 60% within the first hour of birth.

- Studies involving **mothers and children under 2 years**

- Randomized controlled trials (RCTs), cross-sectional studies, cohort studies, and systematic reviews

- Studies including data from **large-scale intervention programs** assessing the effectiveness of feeding interventions

2.5 Exclusion Criteria

- Studies unrelated to the research questions
- Research focused solely on other countries (e.g., India, Nepal, Turkey)
- Articles discussing malnutrition or feeding-related diseases without addressing feeding practices directly
- Studies with non-extractable data or those exceeding the 2-year child age limit

- **Exclusive breastfeeding (EBF):** In Pakistan, EBF prevalence ranges from 37% to 53%.

- **Weaning practices:** Many mothers start weaning before 6 months; homemade foods like khichri and porridge are common, but instant noodles and commercial cereals are increasingly used.

- **Colostrum use:** Awareness is relatively high (up to 93% in some studies), but practices lag (only 71% reported giving colostrum).

- **Working mothers:** Less likely to exclusively breastfeed compared to housewives (70% vs 87.4%).

- **Health outcomes:** Breastfeeding correlates with reduced risk of infections, obesity, and diabetes.

3.0 Results

Table 3: Summary of Reviewed Studies on Breastfeeding and Weaning Practices (2016–2020)

Author (Year)	Study Type	Sample Size	Key Findings
Bernardo et al. (2019)	Systematic Review	250,000	Breastfeeding may reduce the risk of Type 2 Diabetes by improving glucose tolerance.
Maryam Jamil et al. (2018)	Cross-sectional	153	Monitoring and lifestyle interventions improve maternal physical health and infant outcomes.
Ahmed et al. (2017)	Cross-sectional	100	Breastfeeding practiced by 87.4% non-working and 70% working women; delayed weaning common.
Shafya Salim et al. (2016)	Longitudinal	30	Mothers reported frequent diarrhea during weaning due to poor food hygiene.
Mehkari & Zehra (2014)	Cross-sectional	94	85.1% preferred homemade meals; good awareness of hygienic weaning practices.
Moazzam Ali Khan et al. (2014)	Cross-sectional	372	High awareness of colostrum benefits; common use of traditional weaning foods.
Esener et al. (1992)	Randomized Clinical Trial	40	Short-term maternal anesthesia did not affect breastfeeding safety.
Moon et al. (2019)	Cohort	23	Breastfeeding improved glucose tolerance in mothers with gestational diabetes.
Cameron et al. (2013)	Observational	51	Baby-led weaning showed low intake of iron, zinc, B12; higher saturated fat.
Howard et al. (2009)	Randomized Study	700	Pacifier and bottle use early on hindered exclusive breastfeeding success.
Crettenand (2018)	Systematic Review	23 agents	15 antiepileptic drugs deemed safe during breastfeeding.
Harrison et al. (2017)	Systematic Review	5739 papers	Out of 5739 papers, 34 reviewed; transition to family foods inconsistent.

Khan & Basu	Observational	Not mentioned	99% urban vs 89% rural mothers aware of breastmilk importance.
Huang et al. (2018)	Cohort	1852	Prior breastfeeding experience improves outcomes in subsequent births.
Moberg et al. (2020)	Systematic Review	24	Oxytocin released during breastfeeding facilitates milk production and maternal bonding.
Lassi et al. (2020)	RCT	1025	IYCF interventions improved exclusive breastfeeding and reduced infant mortality.
Negin et al. (2016)	Mixed Methods	568	Grandmothers influenced feeding practices; inclusion in interventions is vital.
Shakya et al.	RCT	Mothers of children <5	Peer support effective in improving EBF and early breastfeeding initiation.
Zhao et al. (2017)	Observational	1061	Post-cesarean practices improved breastfeeding behaviors and outcomes.
Kramer & Kakuma (2001)	Controlled Trial	32	EBF for 6 months reduced GI infections vs mixed-fed at 3-4 months.

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Kramer (1981)	Case-control study	466	Defined obesity with weight/height or skinfold percentiles; not aligned with study criteria.

Monteiro et al. (2013)	Cross-sectional	>1500	Breastfeeding linked with postpartum weight reduction.
Cohen (1994) - Honduras Trial	Controlled Trial	141	Exclusive breastfeeding improved weight, growth, and immunity.
Cohen (1994)	Clinical Trial	29	EBF for 6 months showed some growth deficits but no adverse health outcomes.
Martin (1937-39)	Cohort	Multi-center	Minimal difference in BP between breastfed and non-breastfed subjects.
PDHS (2006-07)	Cross-sectional	941	50% of infants did not receive timely weaning; 10% began CF before 6 months.
Tertiary Hospital Karachi	Cross-sectional	94	Preferred home-made CF; common foods: porridge, kitchri, kheer, potato.
Children Hospital Lahore	Cross-sectional	384	81.3% currently breastfeeding; only 37.8% exclusively BF.
Sir Ganga Ram Hospital (2015)	Cross-sectional	100	High colostrum awareness, but poor breastfeeding initiation practices.
Mardan Medical Complex	Cross-sectional	200	89% mothers aware of BF importance; 58% used substitutes.
Multan City Study (2017-18)	Cross-sectional	227	Workload and family structure reduced exclusive BF.
Sir Ganga Ram Hospital (Aug 1-7)	Cross-sectional	200	Only 12.5% aware breastmilk should be first intake.
Nahaqi, KPK	Qualitative	16	Cultural & structural barriers influence feeding behaviors.
PDHS (2017-18)	Cross-sectional	Infants <6 months	EBF prevalence 53.6%; non-EBF linked with diarrhea and infections.
PIMS Islamabad (2016)	Mixed Analytical	400	72% had positive attitude; 56% knowledgeable; barriers included public spaces.
Pakistan & England Mothers	Interview	99	BF higher in Pakistan (73%) than England (24%).
Hoff et al. (2019)	Observational	German women	No clear link between anxiety and BF outcomes.
Britton (2007)	Cohort	265	Anxiety reduces breastfeeding confidence.
Clifford et al. (2006)	Cohort	856	High trait anxiety linked with reduced EBF at 6 months.

Gagnon et al. (2005)	Cross-sectional	564	Higher anxiety increased likelihood of formula supplementation.
Zanardo et al. (2009)	Cohort	204	Primiparae had higher anxiety levels; negatively impacted breastfeeding success.
Fairlie et al. (2009)	Cohort	1436	High prenatal anxiety reduced BF intention; more likely to opt for formula.
Papinczak & Turner (2000)	Cohort	159	Explored personal/social factors affecting BF initiation; no specific outcome measured.
Hirzallah et al.	Systematic Review	532	Nurse-led weaning protocols significantly reduced ventilation duration.
Lingam et al. (2014)	Qualitative	69	Cultural beliefs and poverty affected CF practices in Pakistan and India.
Mehkari et al.	Cross-sectional	94	85% preferred homemade CF; early weaning linked with employment-related factors.
Shaikh et al.	Cross-sectional	138	84% aware of CF before 6 months; many started too early.
Premji et al.	Qualitative	22	Cultural beliefs caused early CF (before 3 months), e.g., tea or sugary water.
Castaldo et al. (2017)	Interviews	46	Cultural and psychological barriers hindered sustained BF in immigrant women.
Fabiyi et al. (2016)	Interviews	20	Differences in BF behavior noted between African-born and US-born women.
Grewal et al.	Cross-sectional	187	CF practices varied; Somali-Norwegian mothers showed high EBF awareness.
Parker et al.	Cohort	3983	Safe sleep and BF practices differed across cultural groups.
Wandel et al.	Qualitative	21	Somali mothers in Norway faced BF challenges; early CF common.
Hill et al. (1995)	Descriptive	110	Hospital discharge: 54% exclusively BF; main barriers: poor latch, perceived milk insufficiency.
Wigg (1998)	Cohort	500+	Exclusive BF in first 6 months linked to slightly higher IQ at age 12.
Burns (2017)	Cross-sectional	200	Wide practice variation in ventilator weaning across countries.
Rowan & Lee (2011)	Observational	655	Choking risk slightly higher in BLW and loose BLW vs traditional weaning.
Maier (2006)	Cross-sectional	296	Weaning earlier in Dijon vs Aalen; taste exposure higher in France.
Carrascoza et al.	Longitudinal	111	Identified determinants of EBF abandonment; specifics not mentioned.

Belfort (2013)	Cohort	Child at 6–12 months	BF duration positively linked with language and IQ at age 3 and 7.
Bernard (2013)	Cohort	1387	Longer BF associated with better motor and cognitive development at 2–3 years.
Huang (2014)	Cross-sectional	130	Ankyloglossia linked with sucking difficulty and BF complaints.
Evenhouse (2005)	Cross-sectional	16,903	Sibling comparison showed causal relationship between BF and intelligence.
Whitehouse (2011)	Cohort	1067	Longer BF improved language development, independent of other factors.
Eickman (2007)	Cohort	205	BF slightly improved mental development; home stimulation more impactful.
Parker et al.	Cohort	3983	African-born mothers had different BF and sleep practices than US-born.
Busck-Rasmussen et al.	Cohort	42,420	Country of origin affected BF; Moroccan mothers had lower full BF at 4 months.
Brick & Nolan	Cohort	230,750	Maternal country of birth influenced BF at hospital discharge.

4. Discussion

It is widely recognized that breastfeeding is the most effective type of infant nutrition and has a variety of nutritional, immunological, and psychological advantages (Khan et al., 2014; Liesbeth et al., 2010). Nonetheless, according to the results of this systematic review, there is a wide divergence in breastfeeding and weaning behaviors of different populations, in some cases such as in Pakistan, which is a low- and middle-income nation. These disparities are determined by a set of socioeconomic status, cultural beliefs, maternal education, access to healthcare, and psychosocial factors (Khalil et al., 2017; Mehkari et al., 2014).

Although there is growing appreciation of the advantages of exclusivity of breast milk, inconsistency is still observed. The prelacteal feeds (often honey, herbal mixtures, or sweetened water) are introduced by many mothers, particularly those living in urban slums or low-income settlements, either as influenced by a cultural belief or because of the recommendation of an older family member (Premji et al., 2016; Shafya et al., 2016). Likewise, there is the prevalence of

early weaning on the inappropriate or non-nutritious food such as tea, biscuits, or rice water, despite the WHO recommendations that weaning should begin at the age of six months (SS Mohsin et al., 2016).

The maternal anxiety especially in the puerperium was revealed to have negative implications on the initiation and duration of breastfeeding. In some of the studies involving

cohorts, it was pointed out that women who demonstrated high anxiety levels were less confident in their capacity to breastfeed and they were likely to use formula (Zanardo et al., 2009; Clifford et al., 2006; Wallwiener et al., 2016). This is complicated by cesarean births, which postpones the start of breastfeeding, as mothers take a long time to heal and be separated by their babies after childbirth (Jian Zhao et al., 2017).

Mothers often cited reasons of medication safety during lactation as a reason to stop breastfeeding. Nonetheless, the pharmacological reviews confirm that lots of popular drugs are safe in lactating women provided that they are prescribed correctly (Marie Crettenand, 2018; Esener et al., 1992). The

inadequate facilities to breastfeed and the absence of breastfeeding-friendly places at the workplace were also indicated as a considerable discouraging factor to continued breastfeeding, particularly in working women (Public and Private Orgs Multan, 2018; Sir Ganga Ram Hospital, 2015).

Although there has been an increase in knowledge on weaning in most communities, there is lack of consistency in the practice. Mothers are most frequently inclined to use commercially prepared weaning foods that might not have sufficient nutritional importance due to convenience, economic factors, and time restrictions (Harrison et al., 2017; Khan and Basu, 2016). Some of the studies carried out in rural and urban areas in Pakistan indicate that homemade weaning foods khichri, mashed potatoes, and porridge are popular but not always possible because of maternal employment and support systems (Mehkari et al., 2014; Pakistan Demographic Survey, 2006 07).

The contribution of healthcare professionals, media, and elder family members was also found as the key in maternal feeding behavior (Negin et al., 2016; Prakash Shakya et al., 2017). Community-based peer support, nurse-led counseling programs, and well-structured postnatal education have proven to be rather promising in enhancing the outcomes of breastfeeding and weaning (Zohra Lassi et al., 2020; Fatima Hirzallah et al., 2021). As an example, it was observed in the studies that the grandmothers can be used in the awareness programs to increase the percentage of the exclusive breastfeeding since they sometimes can determine the decisions of the family (Negin et al., 2016).

Altogether, despite the advances in the area of sensitizing the practicing breastfeeding and weaning, there are still enormous gaps in the implementation process. To solve these the multifaceted interventions to the health of the population such as education programs, interventions which are culturally sensitive and changes of policies should be made like the support of lactating at work and public nursing places. The future research must further address the overlap of cultural, economical, and

psychological determinants and measure intervention outcomes in the long term (Wigg, 1998; Belfort et al., 2013).

5. Conclusion

In this systematic review, it has been emphasized that cultural, socioeconomic, psychological, and health system-related factors are complex, which determine breastfeeding and weaning practices among mothers, especially in Pakistan. As much as the advantages of breast milk and timely weaning have been well proven, such as enhanced immunity, optimal growth and infant morbidity, the practice has not been optimally adopted.

According to the findings, the lack of awareness, maternal anxiety, the lack of access to information about healthcare, and the absence of social and institutional support still impair the best practices of infant feeding. The most common cases were early termination of breastfeeding, late or inappropriate weaning and use of non-hygienic or low-energy content complementary foods. Also, elder family member roles, cultural norms, and the healthcare workers also play major roles in maternal decisions.

There is some evidence that specific interventions like structured education in the context of antenatal and postnatal care, peer counseling, family involvement in the awareness campaign, and policy changes, like on-the-job lactation help and breastfeeding centers, may have a beneficial impact on maternal practice. As well as promoting safe use of drugs in the course of lactation and tackling maternal mental health are essential elements.

Overall, to enhance the breastfeeding and weaning practices, a multi-sectoral, culturally competent strategy should be implemented to combine clinical, community-based, and policy-based interventions. The following studies must concentrate on the longitudinal results of interventions and investigate regional variations to design programs in a more specific way.

Recommendations:

- Strengthen postnatal education on colostrum and EBF
- Promote workplace breastfeeding policies

- Develop community-based weaning education programs
- Include family elders in awareness drives
- Improve public infrastructure for breastfeeding mothers

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