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Knowledge and Perception About Breastfeeding and Complementary Feeding Practices Among Mothers of Infants: A Cross-Sectional Study

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ABSTRACT

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Background: How a baby is breastfed and consumes complementary foods in the first two years of life are key determinants of infant growth, immunity and long-term health. Despite this, suboptimal feeding is common in Pakistan due to poor knowledge, cultural practices and limited counseling.

Objective: To assess the knowledge and perception of mothers of infants aged 0–24 months regarding breastfeeding and complementary feeding practices and to describe current feeding practices in Lahore, Pakistan.

Methods: A cross-sectional questionnaire-based survey was conducted among 206 mothers of infants aged 0–24 months during July 2022 to December 2022 in Day-care center, Lahore College for Women University and the outpatient pediatric department, Mayo Hospital, Lahore. Convenient sampling was used to select the participants. Demographic characteristics, breastfeeding initiation and frequency, complementary feeding practices and maternal knowledge and attitudes were collected using a structured 29-item questionnaire. Data were analyzed descriptively using SPSS version 25.0 and results reported as percentages.

Result: The first food introduced to infants was breast milk 72.3%, followed by formula milk 18.9% and cow's milk 8.8%. But only 13.6% of mothers initiated breastfeeding within one hour of delivery, and 59.2% had heard of exclusive breastfeeding.

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Complementary feeding was commonly delayed, with 40.3% of mothers introducing complementary foods only at 7–8 months against the WHO-recommended six months. Among the infants, Cerelac was the most commonly selected food for weaning 36%, followed by fruit puree 22%, mashed potato 21%, and khichri 19%. Awareness gaps were evident: only 38.8% of mothers knew appropriate portion sizes and 51.2% didn't know the portion size of food. While 78% mothers were concerned about their child's weight and 21% were not concerned about their child's weight and 58% mothers pressurized their infants to eat all the food on their plate and 41 % didn't pressurize their child.

Conclusion: Although breast milk remains the preferred first feed, delayed initiation of breastfeeding, delayed and inappropriate complementary feeding, and limited maternal knowledge of portion control point to substantial gaps in infant feeding practice. Specific maternal education, hospital-based breastfeeding counseling and community awareness programs are required to implement a practice in accordance with WHO and UNICEF recommendations.

Introduction

Breastfeeding is what babies are supposed to have when they are born. It gives them all the food they need for the few months. Breast milk has a lot of things in it like special helpers that keep babies from getting sick and things that help them grow. It also has things that fight off germs. This is really important because babies do not have immune systems yet. Breastfeeding is also good for mothers. It helps them stop bleeding after they give birth. It helps their uterus go back to normal faster. The World Health Organization and the United Nations Children's Fund say that babies should start breastfeeding within the hour of being born. They also say that babies should only have breast milk for the first six months. After that they can have food that is good for them along with breast milk until they are at least two years old. (UNICEF, 2016; WHO).

It is known that in Pakistan, despite the fact that breastfeeding is done by almost everyone, exclusive breastfeeding during the recommended time of six months is not practiced (Hanif, 2011; Zafar et al., 2014). One of the main reasons is the introduction of traditional practices of feeding that people follow, such as the uptake of pre-lacteal feeds like honey, sugar water, and mustard oil, immediately after birth. This is confirmed by the data from the Pakistan National Nutrition Survey (NNS) of 2011, with only 9.6 % of children in the Sindh province being exclusively breastfed to the age of six months, while strikingly 51% of mothers breastfed their infants within one hour after giving birth. The 2018 NNS showed an increase and growth in the number of breastfeeding mothers to exclusive breastfeeding at the age of six months (48.4%) and breastfeeding in the first hour after the birth of the child (45.8%), but it is not sufficient. (Bhutta et al., 2011; Afzal et al., 2025).

Complementary feeding refers to the transition from exclusive breastfeeding to feeding with family foods and is just as important a step. It begins with the introduction of any food other than breast milk and concludes with the cessation of milk feeding. The period between these two milestones, known as complementary feeding, coincides with rapid growth and high nutrient demands, particularly for iron, zinc, and vitamin A, which are not adequately supplied by breast milk alone after 6 months. Delayed or inappropriate complementary feeding is linked to protein-energy deficiency and, in severe cases, neurological compromise, whereas premature complementary feeding increases exposure to contaminated water and unhygienic feeding equipment in low-resource settings, heightening the risk of diarrhoeal disease (Yulianto et al., 2018; Duarte et al., 2022).

Infant and young child feeding practices also shape long-term dietary patterns and disease risk. Poor complementary feeding contributes to the coexistence of undernutrition and overnutrition in the same population: while chronic malnutrition and stunting remain major public health problems in Pakistan, the early introduction of energy-dense, nutrient-poor foods, such as commercial cereals, sugary snacks, and cow's milk given in excess, has been associated with rising rates of childhood overweight (Shamim et al., 2006; Afzal et al., 2026). Maternal knowledge, beliefs and household practices around portion size, food variety and feeding pressure during meals are therefore central to shaping unhealthy trajectories from infancy onward (Kamel et al., 2020; Hassen et al., 2021).

A large volume of research from Pakistan and surrounding areas has shown differences between the recommended and actual practice. Low rates of initiation of breastfeeding, exclusive breastfeeding, and early or late introduction of complementary foods have been noted in studies conducted in Karachi, Lahore, and rural Sindh, which are related to mothers' education, socio-economic status, and counseling services (Ijaz et al., 2015; Khan et al., 2017; Arif et al., 2021; Afzal et al., 2025). Comparison studies at an international level on baby-led complementary feeding and the knowledge of health professionals also show that lack of knowledge is not only limited to mothers but also to the healthcare providers (Ghazanfar et al., 2017; Zakar et al., 2018). However, community-level data describing both breastfeeding and complementary feeding knowledge together, particularly from urban Lahore, remain limited.

This study was therefore designed to evaluate maternal knowledge and perception of breastfeeding and complementary feeding practices among mothers of infants aged 0–24 months in Lahore, Pakistan, and to document prevailing feeding patterns, including the timing of milk and food introduction, portion awareness, and feeding-related attitudes. The findings are intended to inform targeted nutrition education strategies for this population.

Materials and Methods

Study Design and Setting

This was a descriptive, cross-sectional, questionnaire-based survey conducted from July 2022 to December 2022 at the day-care centre of Lahore College for Women University and at outpatient paediatrics department of Mayo Hospital, Lahore, Pakistan.

Study Population and Sampling

Participants were selected using convenience sampling. Assuming a 16% expected prevalence of the outcome of interest and a 5% margin of error, the calculated sample size was 206 mother–infant pairs. Mothers of healthy infants aged 0–24 months presenting at recruitment sites who provided informed consent were included and mothers of infants with congenital feeding anomalies, severe acute malnutrition requiring hospitalization or mothers unable to provide informed consent were excluded from the study. Those who declined were replaced.

Data Collection Tool

Data were collected using a structured, interviewer-administered questionnaire comprising 29 items. The instrument recorded demographic information (maternal and paternal age and education, infant age and sex), breastfeeding practices (initiation timing, frequency, and duration), complementary and complementary feeding practices (timing, first foods introduced, food texture and frequency), and maternal knowledge, perception, and attitudes toward feeding (awareness of exclusive breastfeeding, portion size, feeding during illness, and feeding-related behaviours such as pressuring the child to finish food).

Data Analysis

Data were entered and analysed using the Statistical Package for the Social Sciences (SPSS), version 25.0. Categorical variables were summarised as frequencies and percentages and presented using bar charts.

Ethical Considerations

Written informed consent was obtained from all participating mothers prior to data collection.

Results

Table 1 Demographics

Variable	Category	Percentage (%)
Age of mother	18–23 years	24%
	23–29 years	51%
	30 years and above	23%
Mother's education	Literate	64%
	Illiterate	35%
Father's education	Literate	71%
	Illiterate	28%
Sex of baby	Boys	57%
	Girls	42%
Age of infant	0-12 months	30%
	13-24 months	62%

The above table 3.1 shows the demographic characteristics of the mothers and infants included in the study. 51% of the mothers were aged 23–29 years, followed by 24% who were aged 18–23 years, while 23% were aged 30 years or above. Regarding maternal education, 64% of mothers were literate, whereas 35% were illiterate. Similarly, 71% of fathers were literate and 28% were illiterate. Regarding the age of infants, 30% were 0-12 months old and 62% were 13-24 months old. Regarding the sex of the infants, 57% were boys and 42% were girls, indicating a slightly higher proportion of male infants in the study sample.

Table 2 General Feeding and Complementary Feeding (Weaning) Practices

Part	Question / Variable	Response / Category	Percentage (%)
Part A: General Feeding Practices	Child feeding	Fed the child	81
		Did not feed the child	19
	First milk introduced to newborn	Breast milk	72
		Formula milk	19

		Cow's milk	9
	Infant feeding type	Breastfeeding	35
		Formula feeding	15
		Cow's milk	8
		Both breast and formula milk	42
	Frequency of breastfeeding/day	1-3 times	24
		4-6 times	28
		6-8 times	36
		9-10 times	1
		None	11
	Frequency of formula feeding/day	1-3 times	25
		4-6 times	18
		6-8 times	18
		9-10 times	3
		None	36
	Frequency of cow's milk/day	1-3 times	9
		4-6 times	12
		6-8 times	6
		9-10 times	0
		None	73
	Medical issues during breastfeeding	Diarrhea	6
		Acute respiratory infection	1
		Vomiting	2
		None	91
	Medical issues during formula feeding	Diarrhea	6
		Acute respiratory infection	1

		Vomiting	2
		None	91
	Medical issues during cow's milk feeding	Diarrhea	6
		Acute respiratory infection	2
		Vomiting	1
		None	91
Part B: Complementary Feeding (Weaning) Practices	Initiation of complementary feeding	Started complementary feeding	94
		Did not start	6
	Age at initiation of weaning	4 months	29
		5-6 months	30
		7-8 months	41
	Frequency of food intake/day	1-2 meals	32
		3-4 meals	47
		5-6 meals	11
		Occasionally	10
	Preferred food groups	Fruits and vegetables	19
		Milk and milk products	16
		Meat and meat products	5
		Whole grains and legumes	14
		All food groups	46
	Frequency of fruits and vegetables/day	1-2 times	43
		3-4 times	24
		4-5 times	5
		Occasionally	22

		Not introduced	6
	Preferred food consistency	Liquid diet	18
		Mashed food	16
		Semi-solid food	23
		All types of food	43
	Frequency of cereals/grains/day	1-2 times	33
		3-4 times	34
		4-5 times	5
		Occasionally	20
		Not introduced	8
	Frequency of meat/meat products/day	1-2 times	29
		3-4 times	16
		4-5 times	1
		Occasionally	42
		Not introduced	12
	Preference for Cerelac over home-cooked foods	Prefer Cerelac	34
		Do not prefer Cerelac	66
	Snack consumption	Consume snacks	57
		Do not consume snacks	43

The above Table 2 presents the general and complementary feeding practices of the infants. Fifty-nine percent of mothers had knowledge of exclusive breastfeeding, while breast milk was the most commonly introduced first milk, reported by 72% of mothers. Regarding feeding type, 42% of infants received both breast and formula milk, followed by 35% who were breastfed. Among breastfed infants, the most common frequency was 6-8 times daily, reported by 36% of mothers, while 11% of infants were not breastfed. Formula feeding was less frequent, with 36% of infants not receiving formula, while cow's milk was not consumed by 73% of infants. Most mothers reported no feeding-related medical problems, with 91% reporting no issues during breastfeeding and formula feeding and 91% reporting no issues during cow's milk feeding.

Complementary feeding had been initiated in 94% of infants, with 41% starting at 7-8 months, indicating that delayed initiation was common. Most infants consumed 3-4 meals daily, reported by 47%, while 46% consumed all major food groups. Fruits and vegetables were consumed 1-2 times daily by 43% of infants, whereas cereals and grains were consumed 3-4 times daily by 34%.

Meat and meat products were taken sometimes by 42% of the infants, and 12% of the infants had not been fed any meat products, meaning that the consumption of protein-rich products among the infants was relatively low. Most of the infants did well on all types of foods, which is represented by 43%. Sixty-six percent of the mothers did not prefer Cerelac to home-made foods. But 57% of the infants were taking snacks.

Figure 1 Comparative Analysis of Breastfeeding vs. Cow Milk Initiation Timing Following Delivery

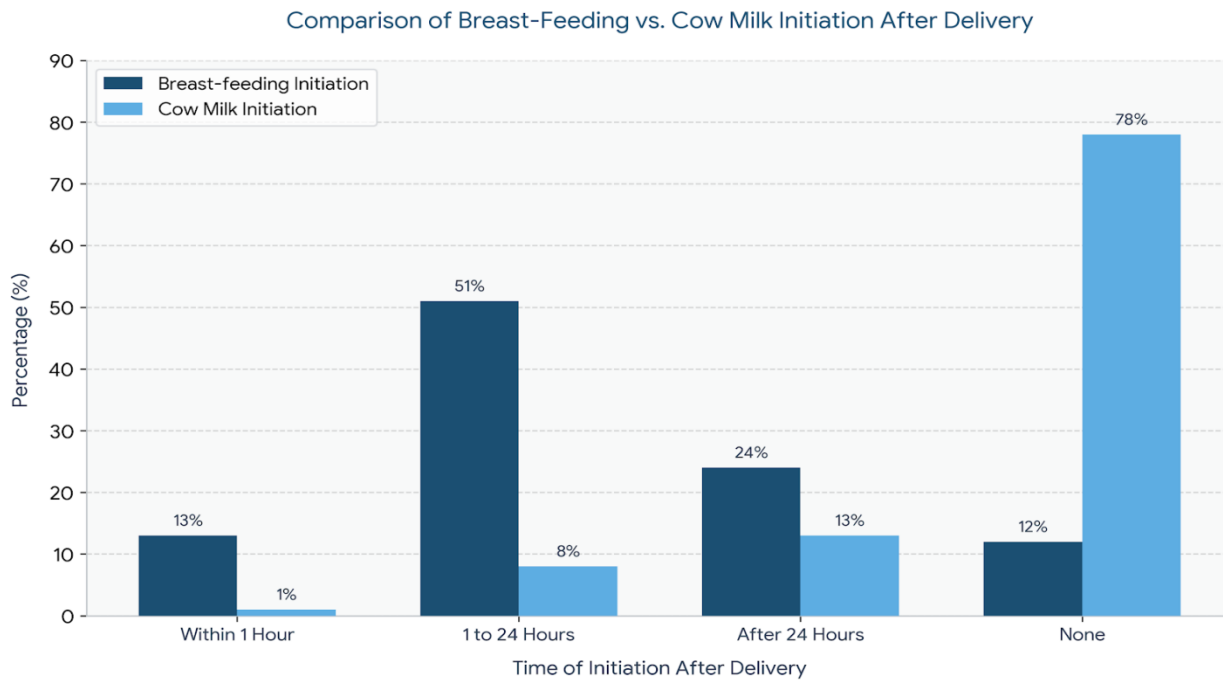


Figure 1 illustrates the comparison of breastfeeding and cow milk initiation at different time periods after childbirth. While most women (51%) started breastfeeding between 1-24 hours after childbirth, the percentage was significantly lower among the women who initiated cow milk (8%). Breastfeeding initiation within an hour was observed among 13% of women, while the percentage was significantly lower among those initiating cow milk (1%). Late initiation after 24 hours was observed among 24% of breastfeeding women compared to 13% among cow milk initiators. Importantly, 78% of women did not initiate cow milk (none), whereas the percentage was significantly lower (12%) among those not initiating breastfeeding.

Figure 2 Maternal Knowledge, Attitudes, and Practices Regarding Breastfeeding and Child Nutrition

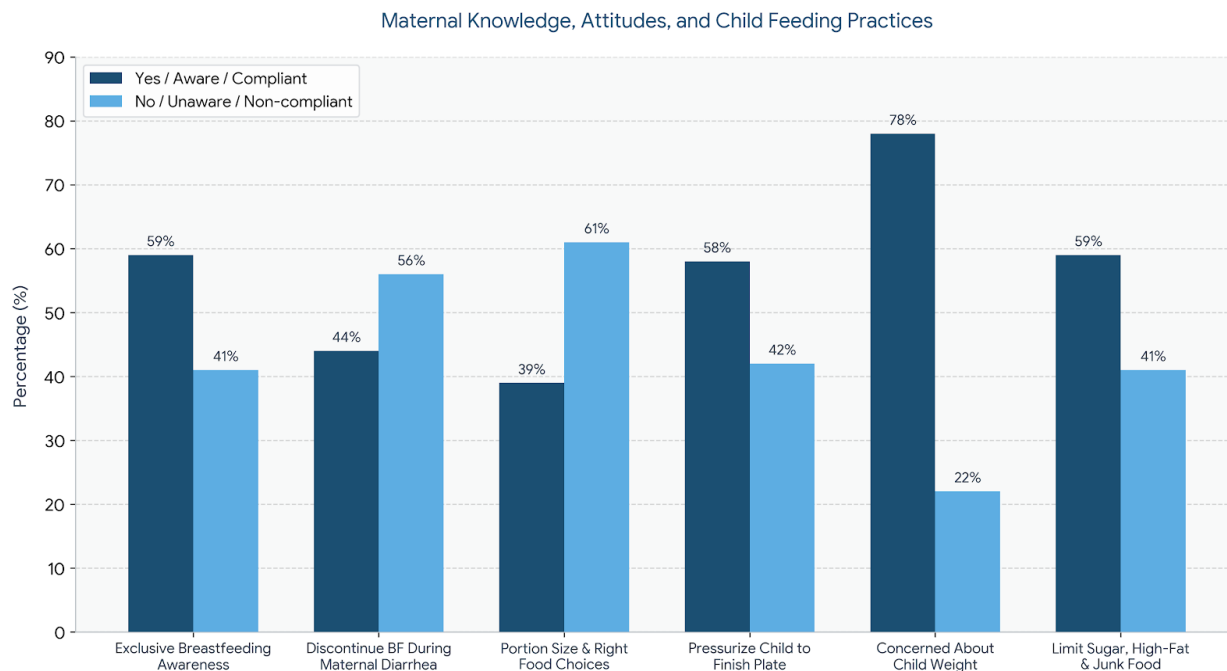


Figure 2 shows information regarding maternal knowledge, attitudes and practices concerning six nutrition and feeding factors. Mothers' awareness about exclusive breastfeeding is moderate as 59% of them are aware while 41% are not. It is also significant to note that 56% of mothers are under the misconception that breastfeeding should be stopped during the period of maternal diarrhea, while 44% know better. Concerning complementary feeding, 61% of mothers have no knowledge of the proper quantity and type of food, while 39% know better. Practices of feeding show that 58% of mothers encourage their children to eat all the food from the plate, while 42% do not, and 78% of them worry about the weight of their children, while 22% are not worried.

Discussion

The study shows that even though breast milk is still the main first food for infants in this sample from Lahore (72.3%), there are still several important differences between the recommended and actual practices concerning infant feeding. Only 13.6% of the mothers reported initiating breastfeeding within one hour of birth, which is considerably lower than the 45.8% early-initiation rate found in the 2018 Pakistan NNS and also below the figures from earlier hospital-based studies carried out in Lahore, where up to 81% of mothers had practiced breastfeeding, although early initiation in those cases was still inconsistent. This delay is worrying since early skin-to-skin contact and feeding with colostrum are closely linked to a lower rate of neonatal mortality and to better bonding as well as to an improved milk supply, and in low-resource maternity settings the delays are often due to hospital or birth attendant practices rather than to maternal preference alone. (Ajmal et al., 2022).

Awareness of exclusive breastfeeding was present in just under 60% of mothers, broadly consistent with previous Pakistani surveys reporting exclusive-breastfeeding awareness in roughly half of respondents, but still leaving a large minority uninformed. Similarly, only 44.2% of mothers correctly knew that breastfeeding should continue, rather than be discontinued, during maternal diarrhoeal illness, an important counselling gap given that premature cessation of breastfeeding during minor maternal illness needlessly deprives the infant of nutrition and immune protection at a vulnerable time (Hazir et al., 2013).

The timing of complementary feeding in the present study indicated that delayed initiation was relatively common. In this sample, 40.3% of mothers initiated complementary feeding at 7–8 months, whereas only 29.6% initiated complementary feeding at 6 months, the recommended age for introducing complementary foods while continuing breastfeeding. These findings are consistent with evidence from other Pakistani populations. In a cross-sectional study conducted among 2,013 mothers in two rural districts of Sindh, reported that 70.0% of mothers introduced solid, semi-solid, or soft foods between 6 and 8 months of age. The same study also reported inadequate complementary-feeding practices, with only 9.9% of children achieving minimum dietary diversity, 38.2% meeting minimum meal frequency, and 7.9% receiving a minimum acceptable diet (Khan et al., 2017).

Similarly, a systematic review of complementary-feeding practices in Pakistan found that 9 out of 15 studies assessing the timing of complementary feeding reported initiation between 6 and 9 months, suggesting that delayed or suboptimal timing remains common across different Pakistani settings. The review identified limited maternal knowledge, low maternal education, socioeconomic conditions, and cultural beliefs as important factors influencing complementary-feeding practices. The similarity between these findings and the present study suggests that inappropriate timing of complementary feeding remains an important infant-feeding concern in Pakistan. However, variations in the degree of delayed initiation across studies may be caused by variations in maternal education, socioeconomic characteristics, geographic location, and access to nutrition information. (Manikam et al., 2018)

Choosing Cerelac as a primary first food (36.9%) echoes a broader trend observed in previous studies conducted in Pakistan that prefer infant commercial cereals over homemade complementary foods. This phenomenon is explained by convenience and the perception of nutritiousness, although empirical evidence of nutritional superiority is lacking. However, it is worth noting that a large portion of mothers (65.5%) expressed a preference for homemade feeding options when asked the question directly, indicating that attitudes toward traditional foods remain largely positive and can be reinforced through proper counselling. (Spyreli et al., 2019).

After complementary feeding is established, feeding-related knowledge and behavior may be the most notable finding. Fewer than four in ten mothers (38.8%) reported knowing the appropriate portion size for their child's age, yet 78.6% expressed concern about their child's weight, and 58.7% reported actively pressuring their child to finish all food on the plate. This combination mirrors patterns described in the broader paediatric feeding literature, where parental pressure to eat has been associated with reduced ability of children to self-regulate intake and with the development of problematic eating behaviours later in childhood. It suggests that nutrition education for this population should extend beyond simply promoting more feeding, and instead address appropriate portion sizing, responsive feeding techniques, and recognition of a child's own satiety cues (Ventresca Miller et al., 2017; Khichi et al., 2026).

In the present study, meat and meat products were consumed 1–2 times daily by 29% of infants and 3–4 times by 16%, while 42% consumed them occasionally and 9% had not yet been introduced. This relatively low consumption of meat is comparable with national Pakistani data, where only 19.1% of children aged 6–23 months consumed flesh foods, including meat, fish, poultry, and organ meats. Similarly, cereals and grains were commonly consumed in the present study, with 34% of infants consuming them 3–4 times daily and 33% consuming them 1–2 times daily. This agrees with Pakistani evidence showing that 75.2% of children consumed staples such as grains, cereals, roots, and tubers. Fruit and vegetable consumption in the present study was also relatively frequent, with 43% consuming them 1–2 times daily and 24% consuming them 3–4 times daily; however, 22% consumed them only occasionally and 4% had not yet been introduced. In comparison, national data reported consumption of other fruits and vegetables among 33.8% of Pakistani children aged 6–23 months, while only 18.7% consumed vitamin A-rich fruits and vegetables. The present study also showed that 41% of infants accepted all types of food, whereas 23% preferred semi-solid foods, 18% liquid foods, and 16% mashed foods, suggesting a gradual transition toward greater food-texture acceptance. Overall, these findings indicate that although cereals were widely incorporated into infant diets, the comparatively lower intake of meat and some fruits and vegetables remains consistent with the limited dietary diversity documented among Pakistani infants. (Khan et al., 2017; Amer et al., 2020).

Several limitations should be considered when interpreting these findings. Maternal knowledge, sociodemographic characteristics, and feeding outcomes cannot be causally inferred from the cross-sectional design. Maternal self-report was used for data collection, which may be prone to recall or social desirability bias, especially when it comes to delicate topics like portion awareness or feeding pressure. The sample may not be representative of mothers who do not use these facilities or of rural populations because it was taken from a single tertiary hospital and a daycare center in Lahore. Anthropometric verification of infant growth status was also not undertaken in this analysis, limiting the ability to directly link feeding practices to nutritional outcomes. Future research incorporating multivariable analysis of the determinants of delayed complementary feeding and portion-size knowledge, alongside anthropometric assessment, would strengthen the evidence base for targeted intervention

Conclusion

Breast milk remains the most common first feed for infants in this urban Lahore sample, but early initiation of breastfeeding within the first hour of life remains low, and complementary feeding is frequently delayed beyond the WHO-recommended six-

month window, with commercial infant cereal favoured as the first complementary food by more than a third of mothers. Maternal knowledge of appropriate portion sizes is limited, coexisting with great parental concern about child weight and frequent pressure on children to finish their food. These findings indicate that infant feeding practices in this population diverge from international recommendations in ways that plausibly affect both undernutrition and the development of unhealthy eating behaviours, underscoring the need for structured maternal education on both breastfeeding and responsive, appropriately timed complementary feeding

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