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Prevalence of Age-Appropriate Infant and Young Child Feeding (IYCF) Practices among Children Aged 6-23 Months

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Abstract

Age-appropriate Infant and Young Child Feeding (IYCF) feeding is crucial for a child's growth in the initial years of his/her life, especially in the first 2 years. Practising the recommended breast feeding and complementary feeding has been proved to reduce morbidity and mortality in infants and young children. To estimate the prevalence of age-appropriate infant and young child feeding (IYCF) practices among children aged 6-23 months. This community-based cross-sectional study was conducted among all the children aged 6-23 months residing in the field practice areas of the Urban and Rural Health Training Centres under the Department of Community Medicine, Hamdard Institute of Medical Sciences and Research (HIMSR), New Delhi located in South East district of Delhi. The prevalence of age-appropriate IYCF practices among the 400 children was assessed. Early initiation of breast feeding was 49.5% and 55% children were exclusively breast feed. Continued breast feeding after the age of 1 year was found to be 75.1%. 35.2% were given prelacteal feeds after birth. The prevalence of the 8 core IYCF indicators, i.e., early introduction of breast feeding, exclusive breast feeding up to 6 months, continued breast feeding after 1 year of age, timely introduction of complementary feeding, minimum meal frequency, minimum dietary diversity and minimum acceptable diet were found to be unsatisfactory.

INTRODUCTION

While malnutrition is a multifaceted issue, improper feeding habits account for more than two-third of cases globally^[1]. According to the seminal findings presented in the Lancet Series of articles on Maternal and Child Nutrition, exclusive breastfeeding throughout the first six months of a child's life has been recognised as one of the most effective strategies for lowering childhood mortality^[2]. Globally, achieving optimum breastfeeding coverage may avoid 13% of deaths in children under the age of 5, and proper complementary feeding practices would lead to a further 6% decrease in mortality in this age group^[3]. Breastfeeding is also associated with a lower prevalence of maternal diseases such as diabetes mellitus, ovarian and breast cancer⁽⁸⁾ and childhood diseases such as upper respiratory tract infections^[4] and diarrhoea^[5]. Non-exclusive breastfeeding, on the contrary, raises a baby's risk of malnutrition, respiratory illnesses, diarrheal diseases and even death. Due to the expenditures associated with non-breast milk feeds as well as the higher healthcare utilisation observed in such children, it also results in a higher economic burden on the family^[6]. Recurrent infections and malnutrition are also caused as a result of inadequate and inappropriate complementary feeding. Immunodeficiency, growth retardation and ultimately mortality ensue^[7]. Growth faltering is most evident during this time period^[8] particularly during the first phase of complementary feeding (6-12 months) when foods of low nutrient density and inadequate energy begin to replace breast milk and rates of diarrhoeal illness caused by food contamination are at their highest^[9]. After about 2 years of age, it is very difficult to reverse stunting that occurred at earlier ages, suggesting a critical window for prevention of growth faltering^[10]. This is a problem in India, where studies have shown that exclusive breastfeeding is not appropriately practiced and complementary feeds are initiated later than recommended^[11].

MATERIALS AND METHODS

The community-based cross-sectional study was conducted among all the children aged 6-23 months residing in the field practice areas of the Urban and Rural Health Training Centres under the Department of Community Medicine, Hamdard Institute of Medical Sciences and Research (HIMSR), New Delhi located in South East district of Delhi. The study was to be conducted in a period of 1 year and 6 months starting from February 2021 till August 2022. Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC) of Hamdard Institute of Medical Sciences and Research, New Delhi, before the start of the study.

Inclusion Criteria: Children aged 6-23 months whose parents/primary care givers gave informed consent to participate in the study.

Exclusion Criteria:

- Children with recognized and specific conditions due to which they could not receive either breast milk or other types of milk except specialized formula, i.e., children with classic galactosemia, maple syrup urine disease or phenylketonuria⁽⁶⁴⁾
- Children with congenital disorders that significantly interfered with feeding practices (eg. Congenital Heart Defects, Down's syndrome, cerebral palsy etc.)⁽⁶⁵⁾
- Children with known/diagnosed congenital anomalies that caused feeding difficulties, eg. cleft lip, cleft palate, laryngomalacia, tracheoesophageal fistulae etc.^(66,67)
- Children who were severely unwell and required hospitalization and hence were not available at the time of the visit
- A household where a COVID-19 positive patient was present

435 parents/primary care givers were approached, out of which 400 gave consent and were present throughout the interview and thus, were included in the study.

Simple random sampling was done using an online random number generator.⁽⁶⁹⁾ House-to-house visits were conducted for the children selected from the lists and their data was collected after the parents/primary caregivers of the child gave their consent.

For the data collection process, pretested, validated and semi-structured questionnaires mentioned below, were used.

A semi-structured questionnaire was used to collect sociodemographic information of the parent/primary care giver and the child. The general information collected included questions on demographic characteristics of the parent/ primary caregiver i.e age, gender, relationship with child, address, education level, socioeconomic status (according to BG Prasad classification) assessed by monthly family income and family size. Information of the child such as age, gender, birth order, living order, birth weight, place of delivery and person present during delivery was recorded. Relevant history of the child including any current complaints, birth history, past history, immunization status, and developmental milestones were recorded.

A pretested, validated questionnaire was used to assess nutritional status of the child based on anthropometric measurements. The anthropometric

measurements collected were taken and recorded according to standard procedure.(70)

WHO Indicators for Assessing Infant and Young Child Feeding Practices: A pretested, validated questionnaire, was used to evaluate the breast feeding and complementary feeding of the child as practiced by the parent/primary caregiver. This was adapted from the standard WHO Indicators for Assessing Infant And Young Child Feeding Practices (Part 2-Measurement).(22) It contained 8 core indicators on breastfeeding and complementary feeding practices.

The Breastfeeding Indicators that Were Assessed are:

- **Early Initiation of Breast feeding:** Participants that reported that they breast feed the child within an hour of delivery were considered as positive responses.
- Whether prelacteal feed was given or not was recorded.
- **Exclusive Breast feeding Practiced Until 6 Months of age:** This was recorded as yes if the child was not fed anything apart from breast milk including, water, food, milk from any other source, or any prelacteal feed. The only exception was medication prescribed to the child.
- Whether breastfeeding was continued after 1 year of age as measured depending on if a child of 12-23 months was breast feed the previous day.

Statistical analysis: The data collected was transferred to Microsoft Excel format. Data cleaning and coding was done. For advanced statistical analysis of the data, SPSS version, 26 (SPSS Inc., USA) software was used. The descriptive statistics, i.e., frequency and percentage, mean, median was calculated using MS Excel and SPSS. Chi-square test was applied to test the difference between proportions and if the cell had a value less than 5 Fischer's Exact test was performed. A p-value of <0.05 at a 95% confidence interval was taken as significant.

RESULTS AND DISCUSSIONS

130 (32.5%) children were in the 6-11 months age group. 149 (37.2%) children belonged to the age group of 12-17 months, followed by 121 children belonged to 18-23 months age group. among 400, 52% of the children were male and 48% were female.

60.7% of the study participants were residents of the field practice area of Rural Health Training Centre and 39.3% were residents of the field practice area of Urban Health Training Centre. Most of the study participants were Hindu by religion (69%) followed by Muslims (30.3%). Other religions including Christians, Sikhs etc. constituted 0.7%.

Parent/primary caregivers who were employed were 9.3%, while the majority of parent/primary caregivers were housewives (90.7%).

Majority of participants was nuclear type i.e., 199 (49.7%) followed by joint families, 141 (35.3%). The majority of the participants, 153 (38.3%), belonged to the IIIrd class, closely followed by IVth class at 145 or 36.3%.

144 (36%) mothers had total 2 births until the time of the study, while for 136 mothers, the current child was their first born.

59 children did not have a recorded birth weight, either due to home delivery of the child or unavailability of medical record or Mother and Child Protection (MCP) Card. 59 children (14.75%) had a record of <2.5kg birth weight, i.e., Low Birth Weight. Most children, 282 (70.5%), had a normal birth weight between 2.5-4 kg. None had a birth weight record of more than 4kg.

79.5% children were institutional deliveries where as 20.5% children were delivered at home. Among the 82 children delivered at home, 69 (84.1%) children were delivered by an untrained birth attendant. In comparison, children delivered at home by trained birth attendants accounted for just 15.8%. For the 318 (79.5%) children delivered at institutions, delivery by doctors was the most common (92.1%). Other deliveries were conducted only in the presence of a nurse (6%) or ANM (1.9%).

This study assessed the Infant and Young Child Feeding Practices (IYCF) of 400 children aged 6 to 23 months. Some indicators were based on 24-hour recall while others were based on historic recall.

The breast feeding indicators of IYCF practices namely: Early introduction of breastfeeding (EIBF), exclusive breast feeding up to 6 months of age (EBF), and continued breast feeding after 1 year of age (CBF). As seen in the table, 198 (49.5%) children were given their first breast feed immediately or within the

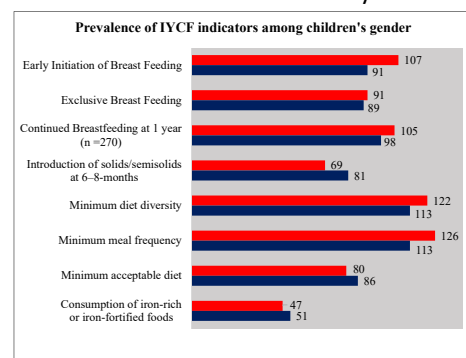


Fig.1: Bar chart representing prevalence of WHO-recommended age-appropriate IYCF practice indicators among children aged 6-3 months divided by gender

Table 1: Infant and Young Child Feeding (IYCF) breast feeding indicators as reported by parents / primary caregivers of children aged 6-23 months

IYCF: Breast feeding Indicators	Frequency	Percentage
Initiation of breast feeding		
Immediately / within the 1st hour	198	49.5%
Within the 1st day (1–23 hours)	103	25.8%
>24 hours	99	24.8%
Exclusive breast feeding		
Yes	180	45.0%
No	220	55.0%
Total	400	100.0%
Continued breast feeding after 1 year (children aged 12–23 months)		
Yes	203	75.1%
No	67	24.8%
Total	270	100.0%

Table2: Prelacteal feeds received by children aged 6–23 months

Prelacteal feed	Frequency	Percentage
Yes	141	35.2%
No	255	63.7%
Don't know/ Don't remember	4	1%
Total	400	100.0%

Table3: Infant and Young Child Feeding (IYCF) complementary feeding indicators as reported by parents / primary caregivers of children aged 6-23 months

IYCF: Complementary Feeding Indicators	Frequency	Percentage
Introduction of Complementary Feeding		
Before 6 months	42	10.5%
At 6-8 months	150	37.5%
After 8 months	208	52.0%
Minimum Meal Frequency (MMF) 1		
Children receiving MMF	239	59.8%
Children not receiving MMF (Children who do not consume any other food apart from breastmilk/liquids)	161	40.2%
	(50)	(12.5%)
Minimum Dietary Diversity (MDD) 2		
=4 food groups	235	58.8%
<4 food groups	165	41.2%
Minimum acceptable diet (MAD)3		
Children who received MAD	166	41.5%
Total	400	100.0%

Table4: Disaggregated view of Minimum Dietary Diversity based on age categories

Age categories	MDD	Frequency	Percentage
6-11 months	Satisfied	80	61.5%
	Not satisfied	50	38.5%
	Total	130	100.0%
12-17 months	Satisfied	80	53.7%
	Not satisfied	69	46.3%
	Total	149	100.0%
18-23 months	Satisfied	75	62.0%
	Not satisfied	46	38.0%
	Total	121	100.0%

Table 5: Children aged 6 – 23 months who received iron-rich or iron fortified foods

Consumption of iron-rich foods	Frequency	Percentage
Yes	98	24.5%
No	294	73.5%
Don't know	8	2.0%
Total	400	100.0%

first hour of birth, 103 were given within the first day (25.8%) and 99 (24.8%) were given after >24 hours. Out of 400 children, those who were given exclusive breastfeeding up to 6 months were found to be 180 or 45% of total. Whereas, those who were not given EBF were 220 or 55%. 270 children were in the age group of 12-23 months in this study. Continued breast feeding after 1 year of age was found to be practiced among 203 (75.1%) of these children and the rest 67 (24.8%) were not breast feed. This indicator was assessed based on 24-hour recall, while the former 2 were based on historic recall. (Table 1)

The number of children who were given prelacteal feeds after birth were 141 or 35.2%. Prelacteal feeds included traditional practices such as giving janam gutti, honey, dates, sugar water etc., as well as infant formula fed at home or in the hospital after delivery. Children who had not received any prelacteal feeds were 255 or 63.7%. 4 (1%) parents / primary caregivers said that they did not know or could not recall if prelacteal feed was given to the child after birth.

1 MMF-Proportion of children 6-23 months of age who received solid, semi-solid, or soft foods the minimum number of times or more.

Minimum is Defined as:

- -2times for breast feed infants 6-8 months
 - -3 times for breast feed children 9-23 months
 - -4 times for non-breast feed children 6-23 months
- MDD-Proportion of children 6-23 months of age who receive foods from 4 or more food groups
MAD- Proportion of children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day

(Table 3) depicts the findings of the complementary feeding indicators under IYCF which are namely:

Timely introduction of complementary feeding (TICF), Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD) and Minimum Adequate Diet (MAD). Children who had TICF at the recommended age of 6-8 months were 150 or 37.5%. A smaller proportion of children had been started with CF before 6 months of age i.e., 42 (10.5%) and majority were started with CF after 8 months i.e., 208 (52.0%). >half the children had received MMF as per the recommendation in the last 24 hours, i.e., 239 or 59.8%, while 161 (40.2%) children did not. Among these 161 children, 50 (12.5%) children were not given any food apart from breast milk or liquids. >half the children, 235 (58.8%), received MDD as per the recommendation in the last 24 hours while the rest 165 (41.2%) did not. Finally, the children who had a minimum adequate diet were less than half the total, i.e., 166 or 41.5%.

In the 6-11 months age group, out of 130, 80 (61.5%) children had been given MDD as per the recommendation. 50 (38.5%) children in this age group did not receive MDD. Among 149 children in the 12-17 months age group, >half the children i.e., 80 or 53.7%, children received MDD while the rest did not. Similarly, 75 or 62% children in the highest age group, received MDD while only 48 (38%) did not. The age group disaggregation as well as the overall MDD finding for the study show a similar pattern where more than 50% of children received MDD in the past 24 hours as per the recommendation. (Table 4)

In (Table 5) above, frequency of children who received iron-rich or iron-fortified foods in the last 24 hours is low, i.e., 98 (24.5%), compared to 294 (73.5%) children who did not receive such food. Out of the total, 8 (2.0%) parents / primary caregivers did not know whether their child has been given iron-rich or iron-fortified foods in the past 24 hours.

(Table 18) provides a combined view of all the 8 core indicators. This table presents the findings of the prevalence of age-appropriate IYCF practices among the 400 children in this study. Early initiation of breastfeeding was 49.5% and 55% children were

exclusively breast feed. Continued breast feeding after the age of 1 year was found to be 75.1%. 37.5% children had timely introduction of solid and semisolid foods at the age of 6-8 months, while 58.8% children had received minimum diet diversity (MDD) and 59.8% children had the minimum meal frequency. 41.5% children had the minimum acceptable diet in the last 24 hours. Lastly, a low proportion, 24.5% children, had received iron-rich or iron-fortified foods.

The mean age of the children was 14.5 ± 4.8 months. This is very similar to a study done in an East Delhi urban slum in 2020 by Behera S. *et al.* in Sundar Nagari area where the mean age of 181 children between 6-24 months was 14 ± 5.13 months^[12].

Female children in this study were 48% while the rest were males. Behera S and Anin S. *et al.*, also found closely similar distributions, as did another study conducted in 2015 in an urbanized village in East Delhi by Gupta A *et al.* The mean age of the parent / primary caregiver was 26.9 ± 5.3 years, with maximum number of them (79.5%) belonging to the 18-29 years age category. Liaquathali, *et al* also found a similar preponderance of mothers in this age group (89.5%) in Tamil Nadu^[13].

In the current study, 69% of the participants were Hindu by religion, followed by 30.3% Muslims and the rest practiced other religions, which is akin to the findings in Behera S. *et al* study^[12]. While the study done in Nepal also had a higher proportion of Hindus, however, the percentage in this group was significantly larger compared to this study (92.8%).

Infant and Young Child Feeding Practices: Globally, India ranks 79th out of 98 in the World Breast feeding Trends initiative world ranking list with a score of 45 out of 100. Although it is a dire number, there has been upward movement over the years. The national rate of exclusive breastfeeding according to NFHS-5 currently stands at 63.7%; 59.6% in urban areas. This contributes positively towards the WHO target of achieving a global EBF rate of 50% by 2025.(23) The indicators in the National Family Health Surveys, although having occasional dips, have over the years showed a progressive rise^[14].

The prevalence of IYCF practices in this study, were assessed based on the WHO guidelines of Indicators for Assessing Infant and Young Child Feeding Practices” document which contains 8 core breastfeeding and complementary feeding indicators.^[15] Among the breastfeeding indicators, prevalence of early initiation of breastfeeding (EIBF) was found to be 49.5%, similar to the NFHS-5 finding of 51.2% in Delhi NCT. However, for this indicator, the study participants in the NFHS-5 data are children born in the last 3 years

and hence, include a larger age group of children than those in this study. Houghton *et al.*, in a study done in Badarpur area of South Delhi in 2020, found a lower EIBF prevalence of 38%.

Exclusive breastfeeding up to 6 months of age (EBF) was 45% in this study, which is lower than the NFHS-5 value of 64.3% for the capital. A 2012 study done in East Delhi, found EBF to be 57.1%.^[16] Considering the substantial proof for the benefits of exclusive breast feeding, it is concerning that the rate of breastfeeding in the urban areas of Delhi has not improved significantly over the past 10 years.(7,9,89,90) In 2020, a study on the regional analysis of the NFHS-4 survey by Dhama *et al.*, showed that in North India, prevalence of EBF was about 56%, higher than the finding in this study. 5 Although, a similar finding as this study was seen in a study done in 2018 by Gebremedhin S. *et al.*, in Sub-Saharan Africa.^[17]

Further among the breastfeeding indicators in this study, continued breastfeeding after 1 year (CBF) was calculated to be 75.1%. Dhama *et al.*, Davalgi S *et al.* and Liaquathali *et al.*, found a higher prevalence of CBF of >80% in North India, Karnataka and Tamil Nadu respectively^[5-13-18].

The results of EIBF, EBF and CBF in this study are closely similar to the multi-country study conducted by Tariqujjaman *et al.* in 2022, that found the breastfeeding indicators in India to be 43.4%, 52.9% and 83.2% for the 3 indicators respectively^[19]. This comparability can be explained by the similar timings of the two study periods.

Prelacteal feeds are a common reason behind failed exclusive breastfeeding and early initiation of breast feeds. Prevalence of prelacteal feeds in this study was found to be 35.2%. In contrast, a very high prevalence of prelacteal feeding was seen in Nagpur in 2012 in an urban slum^[20]. Similar finding to this study was seen by Ibrahim, *et al.* in Nigeria and slightly higher was seen by Dharashive *et al.*, in Pune^[21] Cultural beliefs, traditions prevalent in the community, the influence of elders in the family and advice of health workers play an important role in the practice of prelacteal feeding.

The WHO core complementary feeding indicators include timely introduction of solids, semi-solid and soft foods (TICF), Minimum Meal Frequency (MMF), Minimum Meal Diversity (MDD) and Minimum Adequate Diet (MAD). In a study done by Gatica-Domínguez *et al.*, in 2021, analysing the national surveys of 80 different countries, found the combined prevalence of MFF, MDD and MAD in South Asia to be about a mere 20.8%, scoring among the lowest while East Asia and the Pacific region scored the most.

37.5% prevalence of TICF was found in this study. In a similar study done in West Bengal in 2021, Chakraborty *et al.*, found TICF to be much higher, i.e., 81% among 390 under-2 children^[22].

In this study, MMF was found to be 59.8%. In East Delhi in 2020, MMF among 181 children was found to be higher by almost 10% and a similar finding in Nepal as well^[12-23]. However, in Sub-Saharan Africa, there was a >10% lower prevalence in 2021. 17

MDD, Minimum Dietary Diversity, meaning the number of children who received at least 4 food groups out of 7 the previous day, came out to be 58.8% among 400 participants. Much lower rates were seen in east Delhi, West Bengal and Africa^[22-12-17]. However, Liaquthali *et al.* found a much higher prevalence than in this study of more than 70%^[13]. Low-income countries have a lower MDD prevalence, however within a country, socioeconomic standing could present variations in the practice. MDD could also vary with the age of the child, with rates improving as age increases.

The MAD among breast feed and non-breast feed children in this study was calculated to be 41.5%, which was significantly higher than Behera S. *et al.* and Gebremedhin S. *et al.*, finding of 16.6% and 9.8% in the capital and in Africa, as well as the finding of 16.8% in the NFHS-5 survey^[14-12-17]. However, Anin *et al.*, found that in Northern Ghana, the rate was comparable with a 38.9% prevalence of MAD^[24]. Only 24.5% children in this study received iron-rich or iron-fortified foods in the last 24 hours which is higher than 14% seen in Kancheepuram, Tamil Nadu but lower than 37.6% seen in the study from several countries of Africa. (44,86) The reasons for low consumption quoted by Liaquthali *et al.* were unavailability of such foods locally, lack of knowledge among mothers and child not accepting the food. The reasons underlying this indicator were not assessed in the current study.

CONCLUSION

This study found infant and young child feeding practices to be generally poor among the children aged 6-23 months in urban slums of South East Delhi. The prevalence of the 8 core IYCF indicators, i.e., early introduction of breast feeding, exclusive breast feeding up to 6 months, continued breastfeeding after 1 year of age, timely introduction of complementary feeding, minimum meal frequency, minimum dietary diversity and minimum acceptable diet were found to be unsatisfactory. A substantial prevalence of prelacteal feeding was also found.

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