Original Article

# Determinants of Inappropriate Complementary Feeding Practice among 6 months-2 years old children attending Institute of Child and Mother Health (ICMH), Dhaka

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## Abstract

**Background:** Nutritional status of infants and young children chiefly depends on proper feeding practice; despite child rearing that often vary across population. Childhood malnutrition remains one of the major underlying causes of morbidity and mortality among younger children particularly from lower and mid income countries (LMIC) like Bangladesh.

**Objective:** To identify determinants of practicing inappropriate complementary feeding (CF) among the infants and young children and to find out if these CF-determinants are associated with socio-demographic characteristics of child's families.

**Methods:** This cross-sectionally designed study hybrid with some analytical methods were conducted among 6-24 months old children attending the out-patient and indoor departments of Pediatric, Institute of Child and Mother Health (ICMH).

**Results:** Of total 273 children, only 20% received CF appropriately but 80% got it 'inappropriately' based on all parameters studied, on an average. Good CF practice were significantly associated with child's age group (P<0.01), gender (0.02), parental education (<0.01) and monthly income (<0.01). None of the factors like time of starting CF (right after 6 months), type of food groups (carbohydrate, protein, fat, vegetables, vitamin) introduced to young children were not associated with any of 6 types of major food groups, significantly, except for citrous fruits (p>0.01). Frequency of feeding per day was also not significantly associated with CF-feeding practice (p>0,83). Similarly, none of the consistency of food (p>0.95), its amount (p>0.28), feeding technique (p>0.72) and mother's motivation for child's self-feeding (p>0.27) were not significantly associated with CF practices. Most common reason for delayed CF was 'tried but failed' in 53% and 'did not know' the reason exactly in 10.5%. However, 10.5% mother's felt that breast milk was enough for the child to feed, early starting of CF being mothers' insuflcient breast milk in 63% and the rest 24% were ignorant on earlier starting the CF.

**Conclusions:** Major findings of this study revealed that factors like, gender, paternal education, monthly family income, citrus food significantly differed between appropriate and inappropriate CF practices. However we strongly recommend further muti-center studies involving larger sample size before refuting or accepting our findings that this study yielded based in one hospital set up only.

**Key Word:** Complementary Feeding, Practice, Children, Mother, Socio-demographic Status

*The Journal of Ad-din Women's Medical College; Vol. 10 (1), Jan 2022; p 21-27*
*DOI: https://doi.org/10.3329/jawmc.v10i1.67446*

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**Received Date:** 14 October, 2021

**Accepted Date:** 16 December, 2021

## Introduction

Complementary feeding (CF) remains one of the core indicators of Infant and Young Child Feeding Practices (IYCF) that essentially needs to be initiated at right age of infants/children. Delayed/ inappropriate CF or untimely introduction of CF too late or early, or, inadequate in quantity/quality of food and/or unhygienic practices can lead the children to detrimental threats to health and nutritional status of children.[1]

Childhood malnutrition remains a major public health problem especially in low and middle-income countries (LMIC). Prevalence of early introduction of CF, low food frequency, and less dietary diversity remains frequent in many countries, particularly from LMICs.[2]

In developing countries, inadequate knowledge and cultural practice on complementary feeding (CF) remains one of the main causes for childhood malnutrition[3,5] that are often influenced by cultural mal/practices, wrong beliefs and inadequate knowledge of parents regarding appropriate CF-practices.[4,5] But infant's nutritional status basically depends on feeding practices in our community- where child rearing practices vary widely among people, religions, casts, and geographic location of regions and districts. WHO recommended that exclusive breastfeeding (EBF) should be started in first 6 months and then to start CF immidiately.[6] WHO defined CF-period as "period during which other foods or liquids are provided along with breast milk" and states "any nutrient-containing foods or liquids other than breast milk are given to young children during CF remain complementary foods".[7]

In Bangladesh CF generally starts too early or late and, thus, children are fed inappropriately, in some events, as the icddr, b experts opined.[8] However, improvement of CF practices among our mothers should also be tried to make it possible through proper utilization of existing health services in Bangladesh, as found it evident in India.[9, 10] It is essential to utilize the missed opportunities as our EPI's immunization sessions follows. This will assist our rural mothers with the advice on particularly focusing on correct CF practice.[11] However, attention must also be focused on socioeconomic empowerment of poorer mothers with special emphasize on female education and utilization of EPI session to ventilate prudent information/knowledge on correct time to start CF, consistency/density of food, and quantity of food to be fed their children, as CF, rightly.[12]

## Materials and Methods

**Study design:** This was a cross sectional and analytical study.

**Study population:** of 273 children from 6-24 months aged children.

**Study place:** 6-24 months aged children mothers who attending at OPD and IPD of Pediatrics dept. Mothers who came to ICMH (outpatient and inpatient department) for, treatment of their children and who fulfilled the inclusion criteria were interviewed through a pre-tested and structured questionnaire, which was designed on the following essential components of CF:

- Starting time of CF
- Variety of CF-foods
- Frequency of feeding
- Consistency of foods
- Continuation of breast feeding, with CF
- Problems faced during CF
- CF reason of inappropriate-CF practice

Consistency of food was assessed as appropriate, are: thickness, stayed on the spoon and hold a shape on plate, or thin that flow off the spoon and don't hold shape on the plate. Food quantity was assessed showing a 250 ml cup.

Recommended quantity for 6-8m aged children:

-Gradually increased to approx ½ cup each meal,

-For 9-11mon children: approx ½ cup each meal

-For 12-23m children: approx 1 cup each meal.

-Appropriate time for CF was taken as complete time of 6 months.

**Data Analysis:** SPSS: Win, V. 23.0 was used for data analysis. All continuous variables were expressed in mean±SD, while Chi-Square test for proportions and % were used for categorical variables. P-values of <0.05 was regarded as significant, although.

## Results

Figure 1 shows that 55 (20.1%) children had received appropriate complementary feeding but 218 (79.9%) got inappropriate CF.

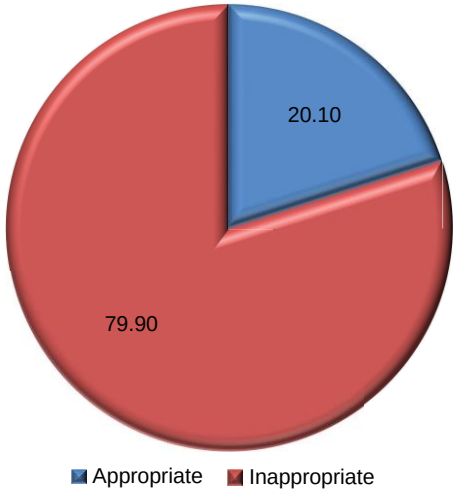


**Figure 1:** CF practices of young children.

**Table-1:** Association of CF practices with Socio- demographic Characteristics (n=273)

| Parameters | Feeding Practices | | | | P-value |
|---|---|---|---|---|---|
| | Appropriate n=55 | | Inappropriate n=218 | | |
| | No | % | No | % | |
| **Socio-demographic characteristics** | | | | | |
| Age group (mons) | | | | | |
| 6-8 months | 34 | 61 | 111 | 50.9 | 0.01 |
| 9-11 months | 18 | 32 | 102 | 46.8 | |
| 12-23 months | 3 | 5.5 | 5 | 2.3 | |
| Gender | | | | | |
| Male | 35 | 63 | 89 | 40 | 0.02 |
| Female | 20 | 36 | 12 | 59 | |
| **Place of child's residence** | | | | | |
| Rural | 26 | 47 | 97 | 44 | 0.62 |
| Urban | 19 | 34 | 68 | 31 | |
| Slum | 10 | 182 | 53 | 24 | |
| **Child's Mother's education** | | | | | |
| Primary | 9 | 16 | 15 | 72.9 | <0.01 |
| Secondary | 26 | 47 | 55 | 25 | |
| Higher-second | 8 | 14 | 3 | 1.4 | |
| Graduate | 12 | 21 | 1 | 0.5 | |
| **Child's Father's education** | | | | | |
| Primary | 7 | 12 | 10 | 47 | <0.01 |
| Secondary | 13 | 23 | 72 | 33 | |
| Higher-second | 9 | 16 | 34 | 15 | |
| Graduate | 26 | 47 | 8 | 3 | |
| **Monthly Family Income** | | | | | |
| < Tk. 5000+ | 21 | 38 | 12 | 58 | <0.01 |
| Tk.5000-10,000 | 26 | 47 | 88 | 40 | |
| > Tk. 10000 | 8 | 14 | 3 | 1 | |

Table-1 describes the association of CF practices with child age group, gender, place of residence, parental education and occupation, monthly family income. This revealed that the appropriate CF practice was significantly associated with younger children ($p<0.01$), being girls ($p=0.02$), parental education ($p<0.01$) and occupation for both mother and father ($p<0.01$), including their monthly income being higher ($p<0.01$).

**Table-2:** Association starting CF, food types, feeding frequency with of CF practice (n=273)

| Parameters | Feeding Practices | | | | P-value |
|---|---|---|---|---|---|
| | Appropriate, n=55 | | Inappropriate n=218 | | |
| | No. | % | No. | % | |
| **Time of starting** | | | | | |
| Before 6 mon. | 24 | 43 | 64 | 29.4 | 0.09 |
| At 6 months | 20 | 36 | 100 | 45.9 | |
| Within 6-11 months) | 5 | 9.1 | 46 | 21.1 | |
| after 12-23 months) | 6 | 10 | 8 | 3.7 | |
| **Types of food given as CF** | | | | | |
| Khichuri | 25 | 45 | 95 | 43.6 | 0.78 |
| Family diet | 11 | 20 | 34 | 15.6 | |
| Suji | 6 | 10 | 23 | 10.6 | |
| Cerelac | 4 | 7.3 | 23 | 10.6 | |
| Formula feeding | 5 | 9.1 | 14 | 6.4 | |
| Others | 3 | 5.5 | 16 | 7.3 | |
| Fruit juice | 1 | 1.8 | 13 | 6.0 | |
| **Six major types of food given as CF** | | | | | |
| Carbohydrate | 41 | 74 | 137 | 62.8 | 0.10 |
| Protein | 17 | 30 | 86 | 39.4 | 0.24 |
| Fat | 19 | 34 | 101 | 46.3 | 0.11 |
| Vegetables | 14 | 25 | 62 | 28.4 | 0.65 |
| Vit.A rich food | 23 | 41 | 67 | 30.7 | 0.11 |
| Citrus food | 7 | 12 | 64 | 29.4 | 0.01 |
| **Frequency of feeding/day** | | | | | |
| 6-8 m (2 times) | 16 | 29 | 60 | 27.5 | 0.83 |
| 9-11 m (3-5 times) | 28 | 50 | 106 | 48.6 | |
| 12-33m (3-5 times) | 11 | 20 | 52 | 23.9 | |

According to table-2, it yields the factors that influence inappropriate CF practices. This shows no significant association either in starting time of CF ($p=0.09$), nor with types of food ($p=0.78$). Further, association of CF

yields no association with major food groups for carbs (p=0.10), for protein (p=0.24), for fat (p=0.11), for vegetables (p=0.65) and for vit-A rich food (p=0.11) except citrus food (p<0.01). Finally, frequency of feeding/day also did not reveal any difference with appropriate CF practices (p=0.83).

**Table-3:** Association of CF practices with food consistency, food amount, feeding technique, mother's encouragement on self-feeding by the children (n=273)

| Parameters | Feeding Practices | | | | P-value |
|---|---|---|---|---|---|
| | Appropriate n=55 | | Inappropriate n=218 | | |
| | No | % | No. | % | |
| Consistency food | | | | | |
| Liquid | 31 | 56 | 116 | 53 | 0.95 |
| Semi solid | 12 | 21 | 54 | 24 | |
| Small pieces | 7 | 12 | 30 | 13 | |
| Normal | 5 | 9 | 18 | 8 | |
| Amount of each feeding (main meals) | | | | | |
| 6-8 m (1/2 cup/bati) | 16 | 29 | 56 | 25 | 0.28 |
| 9-11 m | 34 | 61 | 123 | 56 | |
| (1/2 cup/bati) | | | | | |
| 12-23 m | 5 | 9 | 39 | 17 | |
| (1 full cup/bati) | | | | | |
| Feeding technique (by the mother) | | | | | |
| 6-8 m (mother/ caregiver | 37 | 67 | 134 | 61 | 0.72 |
| 9-11 m (by own hand) | 7 | 12 | 40 | 18 | |
| 12-23 m (by own hand) | 5 | 9 | 24 | 11 | |
| Forced feeding | 6 | 10 | | 20 | 9.2 |
| Mother encouragement for child on self-feeding | | | | | |
| Yes | 47 | 85 | 172 | 78 | 0.27 |
| No | 8 | 14 | 46 | 21 | |

Findings of table-3 yielded none of the factors as significantly associated with CF practice, like: food consistency (p=0.95), amount of each feeding (p=0.28), feeding technique (p=0.72) and mother encouragement on child for self-feeding (p=0.27).

**Table-4:** Association of CF practices with junk food taking habit (n=273)

| Parameters | Feeding Practices | | | | p-value |
|---|---|---|---|---|---|
| | Appropriate n=218 | | Inappropriate n=55 | | |
| | No | % | No | % | |
| Junk foods given | 21 | 38 | 111 | 50.9 | 0.09 |
| Junk not given | 34 | 61 | 107 | 49.1 | |
| Total | 55 | 100 | 218 | 100 | |

Table-4 yields that giving junk foods to the children were not significantly associated with child's CF practice (p=0.09).

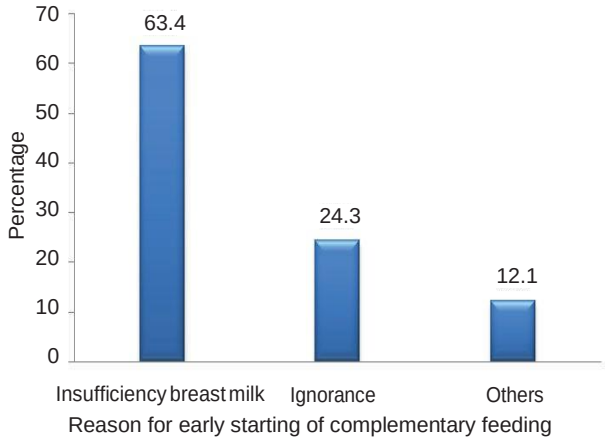


**Figure-2:** Reasons for starting complementary feeding earlier (n=273)

The bar diagram (Fig-2) illustrates that the main reason of introducing early CF to their children were: mother's breast milk being insuflcient (78, 63.4%), followed by mother's ignorance on CF (30, 24.3%) and 15 mothers (12%) said other causes on why they initiated early CF to their children, being forced .

## Discussion

Breast milk alone is suflcient to meet the child's nutritional requirement up to 6 months, but after that period it requires some complementary feeding to the children to ensure supply of adequate micronutrients. As weaning period plays a major role in growth and development of child's life, appropriate weaning practice among mothers should be ensured as a must. The transition from exclusive breastfeeding (EBF) to family foods is considered as complementary feeding (CF) which generally covers the period from 6–23 months of age, along with continued breastfeeding (BF). [13]

Appropriate nutrition that are mandatory during the 1,000-day window period, (between start of a woman's pregnancy upto her child's second birthday) being critical for future health, wellbeing, and success of her child, the CF plays an essential and integral part to child's health and nutrition. [14]

Thus, CF remains the principal milestone in a child's life in terms of health, nutrition and cognition development. We therefore, conducted this cross-sectionally designed study including few analytical methods to identify the determinants of CF practice among children 6 months to 2 years age attending at the Institute of Child and Mother Health (ICMH). We studied 273 children who met the inclusion criteria.

Contrary to Akteruzzaman et al.[3] we found that the appropriate consistency of CF among the study children as 51%. Findings of our study also revealed it as 20% children (55 of 273) whose mothers introduced CF appropriately, against ~80% who received it inappropriately. This findings also remains consisted with other studies from Bangladesh, Ghana and Nepal.[15,16,17]

In rural areas of Bangladesh, most of the mothers knew only thick and dense CF to introduce their children, but they were not aware on semi-solid and soft CF to be given to children's at proper age.

A study rural Indian community (Doiwala block of Dehradun district) Saxena and Kumar[18] reported that 87.3% children of >6 months of age were on CF and they also reported that some mothers gave appropriate CF to them 70.1%.

We, in this study found that various factors influenced the inappropriate CF practices among our mothers. By assessing different factors like children's gender, residence, educational status of parents, occupations of parents, monthly family income our data revealed that female children, educational status of parents, occupation of parents and monthly family income were significantly associated with appropriate CF practice ($p < 0.05$).

Studies from Nigeria[10], Pakistan[19] and India[20] reported a statistically significant association between maternal education and initiation of BF and starting timing of CF practices.[10,19,20] Contrary to a study from Nepal our findings did not yield any significant association between mothers' education and initiation of breast feeding (BF), another findings of this study also showed that i.e. type of family and its size was associated with BF.[21]

Findings of our studies revealed that starting time of CF after 6 months was significantly associated with CF practices correctly. Conversely, CF food, major food groups (e.g. carbohydrate, protein, fat, vegetables, vitamin and food frequency per day) according to child's age group were not significantly associated with CF practices. This finding from our study remain consistent with Demilew et al.[22] and Akteruzzaman et al.[3] who found 7% and 6.4% mothers followed appropriate CF practice that we found in our current study, as well.

Moreover, we found in our study that more than half (60.8%) of mothers fed their children in less than two times, while 14.4% fed >3times a day. This might be well owing to social-norms, cultural difference and variation in educational levels between our and others findings.

Again, Gain et al.[23] observed that 1/4$^{th}$ mothers fed CF to their children appropriately, start CF in <5months of age, though other mothers as they stated don't know start CF properly. These studies reported that mothers stated: "I think appropriate time to start CF is after fulfilling the age of 6 months but I started it from 3rd month for my baby".[24,25]

In this study, factors of CF practices were measured separately. Consistency of food was assessed as appropriate, are: thickness, stayed on the spoon and hold a shape on plate, or thin that flow off the spoon and don't hold shape on the plate. From another study, mothers/caregivers reported that when a child started receiving soft-foods, semi-solids, and solid foods, mothers did not know it properly.

Introduction of solid, semi-solid, or soft foods was further categorized as early CF introduction (grouped as 0–1 month, 2-3 months, 4–5 months), and appropriate age of CF introduction (as 6–8 months of age).[26]

Findings of our study yielded most common reason among 78 (63.4%) mothers who started CF earlier because the mother felt that her breast milk was not suflcient for her child. The 2$^{nd}$ most common reason was ignorance on CF among mothers (n=30, 24.3%) and due to other different causes (n=15, 12.1%) who started CF earlier to their kids.

Another study by Akteruzzaman et al.[3] from Bangladesh reported various reasons for mothers to start early CF to their children. Among all reasons, most common was mothers (87.7%) in starting early CF practices because

they perceived that their children's did not get enough breast milk, which resembles to our findings too. Another reason was elderly members of the family (7.7%) who used to advise them to introduce CF earlier not knowing about the time of initiation of CF (4.6%). Our findings were consistent with another study where receive inappropriate CF (84%) but in other studies from Bangladesh and Ethiopia showing it (49.2%), (30.6%) and (27.5%) respectively.[27,28,29]

## Conclusion

Our study revealed gender, parental education, parental occupation, monthly family income, time of starting of feeding, citrus food and junk foods given were significantly associated with complementary feeding practice. We strongly recommend that further multi-center studies involving larger sample size before refuting or accepting our findings that this study yielded based in one hospital set up only.

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