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*Research Article*

## **Knowledge of Mothers on complementary feeding and Association of feeding practices with anthropometry of children between 6 months to 2 years in a tertiary care hospital in eastern India**

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### **Abstract**

**Background:** Infant and young child feeding (IYCF) practices have a straight impact on the nutritive status of children under two years of age and influence an individual's whole life. The feeding practices do differ in different parts of the world, based on socio-demographic conditions.

**Objectives:** The objective of our study is to find knowledge of mothers about various complementary feeding practices and to correlate the complementary feeding practices with the anthropometric parameters of the children in eastern India.

**Methods:** This was a cross-sectional study including all the mothers or caregivers of kids aged 6 months to 2 years attending IPD or OPD of the Department of Pediatrics, IMS and SUM Hospital, Bhubaneswar.

**Results:** Seventy-three percent of the total 300 participants recognized that complementary feeding (CF) is the beginning of semi-solid or solid food with continued breastfeeding. 176 mothers thought that CF should be started after teething in a child. 2/3<sup>rd</sup> of the mothers believed that packaged food is more nutritious than homemade food. The overall prevalence of wasted and stunted children in our study was 38 per 100 children and 31 children per 100 children respectively. It was found that Weight meant for Age was significantly related to the minimum dietary variety, minimum meal occurrence, and minimum suitable diet.

**Conclusion:** Augmented consideration towards breastfeeding persistence and dietary diversity enhancement consuming locally available and reasonable foodstuffs is required.

**Keywords:** Complementary feeding, children, stunting, wasting, underweight

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## **Introduction**

Interpreting the World Health Organization's (WHO) statement of the year 2020, in low- and middle-income nations, under-nourishment was associated with 45 % of mortality among children under 5 years of age. In a similar year, 47 million children under 5 years of age are wasted, 14.3 million are sternly wasted, and 144 million are underdeveloped.<sup>[1]</sup> Over one-third of the world's child-wasting population is in India. In India, less than 25% of neonates are lactated within an hour after birth. Malnutrition has a substantial social and economic impact since it is associated with chronic illness, delayed cognitive development, and decreased future earnings reported.<sup>[2]</sup> The health outcomes of children depend on their feeding habits, which are reliant on the knowledge and practices of the caregivers. The amount and quality of food, the timing and frequency of feedings, food sterility, and feeding all through or after sickness are important during an appropriate supplemental feeding program described by Jones et al.<sup>[3]</sup> The first two years of a child's lifespan are very important to safeguard proper growth and progress. Undernutrition through this time leads to poor weight gain and stunting, leading to the incapability of achieving proper height in adulthood and decreased ability for physical work, which eventually inferences for national growth. Foods except breast milk or infant formula should be familiarized to the infants after six months of life to deliver them proper nutrition. This feeding is called complementary feeding and is defined by the World Health Organization (WHO) as the process of starting other food and liquids that are needed along with breast milk when breast milk is no longer sufficient to meet the baby's nutritional needs. Nutritional adequate complementary feeding prevents malnutrition, overweight, and mortality in infants.<sup>[4]</sup> It necessitates multilevel support from the family, mother, household, community, food practices, care practices, cleanliness practices, and social networking. Previous observations in Nepal by Karmacharya et al. found maternal employment, education, age, and media exposure as determining factors of complementary feeding practices. Socio-cultural factors and regional differences do influence the knowledge, attitude, and practices (KAP) of mothers about complementary feeding.<sup>[5]</sup> Hence, this study is undertaken to study the KAP of mothers of children below two years of age about complementary feeding and the association of IYCF (Infant and Young Child Feeding) indicators with anthropometric parameters in children in eastern India.

## **Materials and methods**

### **Study Design and Population-**

This was a cross-sectional study with study participants being all the mothers or caregivers of children aged 6 months to 2 years attending IPD or OPD of the Department of Pediatrics, IMS and SUM Hospital, Bhubaneswar.

### **Sample size-**

The prevalence of correct complementary feeding practices was found to be 38.4% among mothers of infants, and 88.4% of the mothers had adequate knowledge of complementary feeding, according to a study performed by Berisha et al.<sup>[6]</sup> Assuming the population of mothers of children aged between 6-24 months coming to the Pediatrics department ( IPD, OPD) in the study period to be 2000, frequency of 42%, confidence limit or absolute error as 5%, and design effect of 1, the sample size was designed to be 316 for 95% confidence interval using OpenEpi, Version 3, open-source calculator. Finally, the study was conducted among 300 participants.

### **Data collection-**

Data was collected over a period of 1 year using a predesigned pretested structured questionnaire after taking informed consent and anthropometric assessments were conducted. The questionnaire included demographic profile, knowledge of caregivers regarding correct feeding practices after 6 months of age, source of information, education, occupation (working or homemakers), feeding practices during health and illness, hand hygiene, and some IYCF practices. The indicators of nutritional status of the children were Weight for Age (WFA) and Length for Age (LFA)

As per WHO approvals,<sup>[7]</sup> the succeeding operative definitions were used

#### *Complementary feeding-*

Complementary feeding can be well-defined as the method of familiarizing other diets and liquids along with breast milk whenever breast milk is inadequate to meet the nutritive needs of infants. Suggested time of commencement of complementary feed: Familiarize complementary food at six months of age (180 days) with continuation to breastfeeding.

#### *Recommended frequency of Meals-*

The proper frequency of balancing foods should be given 2–3 times for each day at 6–8 months of age and 3–4 times for each day at 9–11 and 12–24 months of age. The time of the beginning of complementary feed was compared with the endorsed time of six months to choose if the feed for the child was earlier or delayed. The adequate quantity of the feed was grounded on the extent of complementary feed the child got and the occurrence of meals.

Anthropometric constraints like weight and length were attained in children involved in the study. The weight and length extents and weight-for-age, length-for-age, and weight-for-length were documented.

Rendering WHO criteria, based on standard deviation (SD) units (termed as Z scores), children who were above two standard deviations lower the reference median based on weight-for-age, length-for-age, and weight-for-length indices were measured respectively to be underweight, stunted, and wasted

Definitions of some IYCF practices described by WHO-  
1) Introduction of solid, semi-solid, or soft foods or Complementary feeding (CF) - Percentage of infants 6–8 months of age who obtain solid, semi-solid, or soft foods.

2) Minimum dietary diversity (MDD) - Percentage of children who receive foods from 4 or more food groups.

3) Minimum meal frequency (MMF) - Percentage of breastfed and non-breastfed children 6–23 months of age who obtain solid, semi-solid, or soft foods (but also counting milk feeds for non-breastfed children) the minimum figure of times or more.

4) Minimum acceptable diet (MAD) - Percentage of children 6–23 months of age who accept a minimum tolerable diet (apart from breast milk).

#### **Data Analysis-**

Data compiled on Microsoft Excel worksheet. Data was encoded and analysed by SPSS version 21 with Chi-Square Tests. P value was found to be significant if less than 0.05. The fractional variables were analyzed by

proportions, whereas the constant ones were by means and standard deviations. Categorical characteristics were compared between groups with the use of the Chi-square test. The Z scores for anthropometry were obtained using the WHO Anthro software, which is constructed on the NCHS/WHO international growth reference curves.

#### **Results**

##### **Demographic factors-**

A total of 300 mothers from all three paediatric wards of IMS and SUM Hospital participated in the study. Socio-demographic details are mentioned in Table 1. Our study found a male preponderance with 174 boys (57.9%) and 126 girls (42.1%), with a greater quantity of children in the age group of 18 to 24 accomplished months (37%). Most of the mothers were graduates and homemakers. Most of them had family income ranging from Rs 10000-20000 per month with one child in the family.

**Table 1. Socio-demographic profile of the contestants involved in the study**

<b>Socio-Demographic Factors</b>	<b>Frequency (Percentage)</b>
<b>Gender</b>	
Male	174 (57.9%)
Female	126 (42.1)
<b>Age in months</b>	
6-11 months	90 (30%)
12-17 months	97 (32%)
18-24 months	113 (37%)
<b>Birth Order</b>	
1	206(68.6%)
2	88 (29.4%)
3	6 (2%)
<b>Mother's Education</b>	
Up to Matriculation	78 (26.1 %)
Intermediate	97 (32.4%)
Graduate	110 (36.5%)
Master's and above	15 (5%)
<b>Mother's Occupation</b>	
Home maker	245 (81.6%)
Employed	55 (18.4%)
<b>Monthly income</b>	
Up to 10,000 INR	90 (30.1%)
10,000-20,000 INR	107 (35.5%)
Above 20,000 INR	103 (34.4%)
<b>No. of children in a family</b>	
1	203 (67.6%)
2	91 (30.4%)
3	6 (2%)
<b>Type of family</b>	
Joint family	84 (28%)
Nuclear family	216 (72%)

#### **Knowledge of complementary foods-**

Of 300 participants, 60% knew that complementary feeding should be started at 6 months. 73 % of mothers

knew complementary feeding (CF) is the initiation of solid or semi-solid food along with the continuation of breastfeeding. 154 (51%) approved that CF must be in

thick form at the beginning. Almost one-fourth (n=80) of mothers approved that the well-cooked pounded rice should be the primary complementary food. 93 (31%) had not agreed that food that comprises minor particles can be introduced initially; 66 (22%) had approved familiarizing finger food by about eight to nine months. 54% of mothers believed commercially available food is more nutritious than homemade food. Around one-third, 102 (34%), had decided that the child should take

family foods by one year. 285 (95%) of the caregivers had correct knowledge of hand hygiene, and 213 (71%) knew that the nutritional needs of the child increased during illness. 71% of the mothers agreed child's requirement increases during illness. A significant number of mothers, 198 out of 300, believed artificial milk is essential to meet a child's needs after 6 months of age. 84 out of 300 mothers were sure that cow's milk could be introduced before 1 year of age (Table 2).

**Table 2. Statistical correlation with complementary feeding knowledge and practices**

Knowledge	Agree	Disagree	Not sure
I. Complementary foods should be started at 6 months	180 (60%)	57 (19%)	63 (21%)
II. Complementary foods should continually be in the thick form at the beginning	154 (51%)	140 (46%)	6 (0.02%)
III. Well-cooked mashed rice as the 1st food	80 (26%)	183 (61%)	37 (12%)
IV. Food that contains small particles can be offered initially	197 (65%)	93 (31%)	10 (0.03%)
V. Finger foods can be introduced around 8-9/12	66 (22%)	207 (69%)	27 (9%)
VI. Commercial foods are more nutritious	162 (54%)	96 (32%)	42 (14%)
VII. Child should be able to eat family foods by 1 year	102 (34%)	166 (55%)	32 (10%)
VIII. Caregivers' hands should be properly washed with soap and water before preparing food and feeding the child	285 (95%)	12 (4%)	3 (1%)
IX. Child's nutritional needs increase during illness than normal	213 (71%)	62 (20%)	25 (8%)
X. Artificial milk is essential for child's nutrition after 6 months	198 (66%)	84 (28%)	18 (6%)
XI. Cow's milk can be introduced before 1 year of age	84 (28%)	168 (56%)	48 (16%)

The number of under-weight children was 114 (38%) in our study. Number of stunting children were 93 (31%). The details of the relationship between such anthropometric indicators and the different IYCF

practices are shown in (Table 3). It was found that Weight for Age was significantly related to minimum dietary diversity, minimum meal frequency, and minimum acceptable diet (Table 3).

**Table 3. Relationship between IYCF indicators with weight for age and height for age**

Variables	Practice	Weight for age			P value	Height for age			P value
		Normal	Grade 1	Grade 2		Normal	Grade 1	Grade 2	
I. Timely introduction of complementary feeds (CF)	YES (162)	143	12	7	Chi-square-5.5 P value- 0.06	123	23	11	Chi-square-1.7 P value-0.423
	NO (138)	108	18	12		77	21	10	
II. Minimum dietary diversity (MDD)	YES (98)	92	3	3	Chi-square-25.9 P value-0.000	62	20	16	Chi-square-4.3 P value-0.111
	NO (202)	136	48	18		148	36	18	
III. Minimum meal frequency (MMF)	YES (278)	182	79	17	Chi-square-13.1 P value- 0.001	186	65	27	Chi-square-0.55 P value-0.756
	NO (22)	10	6	6		15	4	3	
IV. Minimum adequate diet (MAD)	YES (110)	102	4	4	Chi-square-22.4 P value- 0.000	63	32	15	Chi-square-3.96 P value- 0.137
	NO (30)	18	9	3		23	4	3	

## Discussion

In a country like India, huge variances exist in socioeconomic status, family construction, maternal qualification, and profession, which can vastly influence infant and young child feeding practices. This study exposed that maximum families fitted to a nuclear family construction (72%), and most of the mothers who were interviewed had studied up to graduation (36.5%) and homemakers 81%. According to Kumar et al. (2022)., most of the mothers (65.33%) have an average

knowledge after that; 28.67% of them have good knowledge where, whereas only 6% had a deprived level of knowledge towards growth and development of their children aged under 5yrs. The findings of Ahmed et al. established that the feeding problems in preschool children are related to parents' and physicians' knowledge and practice somewhat more than additional sociodemographic aspects.<sup>[9]</sup> There was a significant association between the mothers' educational level and their knowledge; the

occupation of the mother also had a significant association with the mothers' knowledge, with a P-value of 0.019.<sup>[9]</sup>

In a similar study by Bhagwat et al., in the case of maternal education, most of the mothers had studied till high school, with a majority of them being homemakers (86.4%).<sup>[8]</sup> In a city, nuclear families are much more prevalent than joint families because of space limitations, housing facilities, and higher living costs. This, in turn, limited the alternate childcare support, such as for cousins or grandparents, which is the instance in nuclear families in lesser socioeconomic groups. Most of the mothers in our study were homemakers who had to look after other household chores apart from taking care of the child. This did not leave them with enough time to prepare food at home for the child. They found it easier to give commercially prepared baby food.

Out of all the mothers, 60% were well versed that CF should be started at 6 months, but only 52% practiced it. Another study by Ahmed et al. showed correct timely introduction to CF in below half (49.7%) of the children.<sup>[9]</sup> The main reason for this was mother was not the sole decision-maker when it came to her child. Her decision was influenced by other members of the family, misconceptions, rituals, and wrong beliefs predominant in the community. Another reason is, a child not accepting different types of CF, making the mother delay it further. It is necessary to make the parents understand that feeding is a gradual process, which requires patience, support, and continuous trial. Nearly 51% of mothers agreed CF should be thick from the beginning. Jabeen et al. found that 68.7 % of mothers offered semisolid food as their first complementary food, while 25.3 % preferred liquid and 6 % preferred solid consistency.<sup>[10]</sup> In one more study by Patel et al. established over half (54.6%) of the children in the 6–8 months age range had obtained solid, semi-solid, or soft foods. 54% of the mothers believed that commercial baby food is more nutritious than homemade food.<sup>[11]</sup> This belief was the main reason which made the mothers choose commercial food. In contrast to Nagar and Talikoti, where only 13 % of mothers preferred commercial food as complementary feeds.<sup>[12]</sup> Also, Shrestha et al found that 55.6% of mothers practice complementary feeding.<sup>[13]</sup> Our study found that 95 % of caregivers hand-washed before preparing food and feeding the child. According to Mekonen et al.,<sup>[14]</sup> 21.2% of mothers washed their hands before feeding their children. Our study showed almost 71 % of mothers believed a child's nutritive requirements increased during illness compared to normal. According to Nagar and Talikoti, 82% of the Mothers approved that the introduction of CF is obligatory for cumulative growth in a study performed in Anganwadi centers of Jaipur.<sup>[12]</sup>

Child feeding ought to fulfill the criteria of MMF and MAD said by Fautsch Mariás and Glasauer.<sup>[15]</sup> The minimum standard of meal frequency in children was  $\geq 2$  times for children aged 6–8 months,  $\geq 3$  times for the age of 9–23 months, and  $\geq 4$  times for those >24 months,

and minimal diversity was at least 4 of out 7 food groups. Our study showed only 98 children out of 300 (32%) had MDD, while 278 (92%) had adequate MMF. Another study by Jones et al., also reported that mothers struggle in preparing the food, thus enhancing the probability of giving readymade food of mere nutritious value with a deficiency of a variety of food items.<sup>[3]</sup> Poor dietary diversity may be because of poor populations as the key complementary diets mainly contained starch-based staples, with fewer animal products and vegetables. A similar study performed by Ahmed et al. revealed that 7 out of 10 children (74.4%) met the recommended MMF.<sup>[9]</sup> In the same way, Aguayo showed a similar result, with 33.0% meeting MDD and 20.5% meeting MAD.<sup>[16]</sup> According to another study done by Chhabra in east Delhi. the pervasiveness of the three complementary feeding indicators, namely MMF, MDD, and MAD, was 60.6%, 15.2%, and 9%, respectively.<sup>[17]</sup>

In our study, the pervasiveness of stunting and wasting were 31 % and 38 %, respectively. The National Family Health Survey – 5 (NFHS-5), India fact sheet (2019-2021) reports 32.1 % wasted and 35.5% stunted in children below five years of age.<sup>[18]</sup> Likewise, statistics from the Odisha fact sheet (2019-2021) display 29.7% wasted and 31% stunted in children below five years of age.<sup>[19]</sup> In this study, minimum dietary diversity, minimum meal frequency, and minimum acceptable diet were positively associated with weight for age. This suggests that children who received a diverse diet from different food groups, had meals at appropriate frequencies, and consumed an adequate diet along with breastfeeding had better weight-for-age status.

### **Conclusion:**

In conclusion, this study highlights the need for improved knowledge and practices regarding complementary feeding among mothers in eastern India. The findings emphasize the importance of timely introduction, dietary diversity, meal frequency, and nutritional adequacy in promoting optimal growth and development in children. This highlights the need for targeted educational interventions to address misconceptions and promote accurate knowledge about the appropriate timing and types of complementary foods. Strategies should focus on promoting a diverse and nutritious diet, ensuring regular and adequate meal frequencies, and emphasizing the timely introduction of complementary foods. Health programs should focus on providing evidence-based information to mothers, emphasizing the importance of locally available and affordable food options for optimal nutrition. This approach can help address the misconception that packaged foods are superior to homemade foods.

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### **Conflict of Interest**

There is no conflict of interest between the authors.

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#### **Approval of Institutional Ethical Committee:**

Ethical clearance was obtained from the Institutional Ethics Committee of IMS and SUM Hospital. Ethical permission was taken with the reference number DMR/IMS.SH/SOA/180132 dated on 4<sup>th</sup> January 2019.

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