A study on parental awareness of feeding practices in children in the age-group 12-24 months

SWATHI GANESAN1, JAIIPREETHA JAYAraj1, SANGEETHA GEMINGAGANESAN2, MAHALAKSHMI RAJAN3
1 Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai, Tamil Nadu, India; 2 Department of Pediatric Nephrology, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai, Tamil Nadu, India; 3 Department of Pediatrics, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai, Tamil Nadu, India

Keywords
Breastfeeding • Colostrum • Complementary feeding • Malnutrition

Introduction. Nutrition plays an integral part in growth and development of a child. Age-appropriate feeding is known to improve the child’s well-being and reduce the risk of specific diseases. The present study aimed to assess the awareness of parents regarding breastfeeding and complementary feeding practices.

Methodology. This health-based prospective observational study was conducted in a tertiary care hospital enrolling 93 parents with children in the age group 1-2 years. The data was analyzed using SPSS version 26 and Microsoft excel.

Results. In the present study, the prevalence of exclusive breastfeeding was 73.68%. Eighty-six (90.53%) parents initiated complementary feeds at 6 months. However, only 45.26% of children were consuming adequate quantity of complementary foods. The association of child’s calorie consumption with maternal age and occupation was found to be statistically significant.

Conclusion. Adequate nutrition during childhood and infancy is a key factor influencing growth and development. In the present study, the overall breastfeeding and complimentary feeding practices were satisfactory. However, the quantity of complementary feeding was inadequate. Counselling the mothers on appropriate breastfeeding and complementary feeding practices during antenatal and postnatal visits may have a positive impact on infant feeding practices.

Introduction
At the fundamental level for supporting health and development, the right balance of nutrients along with taste and texture are necessary in appropriate quantities to cater the needs of the growing infant. Adequate nutrition is essential during infancy and early childhood to ensure optimal health, growth and development [1]. Across the developing countries with high population growth rate and low per capita income, triple burden of malnutrition (undernutrition, micronutrient deficiency and overnutrition) is becoming a major issue of concern [2]. The triple burden of malnutrition is a great threat for the development of the economy and nation [3]. The World Health Organization (WHO) and United Nations Children’s Fund (UNICEF) jointly developed the global strategy for infant and young child feeding practices (IYCF). This strategy recommends initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first 6 months of life, with the addition of nutritiously appropriate complementary feeds at 6 months with continued breastfeeding at least until 2 years of age. Adherence to these recommended practices has proven to reduce the risk of undernutrition and overnutrition with added long-term physical and psychological health benefits [4]. According to National Family Health Survey 4 (NFHS 4), only 42% of Indian newborns are fed with breastmilk within 1 hour of birth and only 55% of children under 6 months of age are exclusively breastfed, as recommended [5]. Infants and young children are at increased risk of malnutrition during the period of changeover of baby’s diet from breastmilk to solid food, i.e,6 months to 2 years of age. Introducing complementary feeds earlier or later than recommended can lead to malnutrition. Almost, 2 in 3 children between 6 months and 2 years of age across the globe are not fed food that supports their rapidly growing brain and body [6]. Inadequate complementary feeding practices drive malnutrition in early childhood leading to weight loss, muscle wasting, stunting, difficulty concentration in the initial phase, which gradually progresses to kwashiorkor, marasmus, poor brain development, reduced learning ability, increased risk of infections due to poor immunity and in many cases death. Studies and reported evidences have shown that meticulous compliance to the recommended feeding practices (IYCF) can reduce infant mortalities up to 19% in developing countries like India [7-9]. Therefore, optimal IYCF practices can have the most significant impact on child mortality among all preventive interventions. In India, food consumption patterns reveal that child diets are largely starved of proteins and essential micronutrients, and are influenced by adult (family) food choices. Around 38% and 21% of children under the age of 5 still suffer from stunting and wasting, respectively [6]. This is attributed mainly to inadequate knowledge about appropriate feeding practices among parents rather than the lack of food due to poverty [9-12].
The co-occurrence of undernutrition and obesity is often perceived as paradoxical, but there are a few elucidations for this paradox. Due to existence of household food insecurities, children tend to consume unhealthy and highly energy-dense foods, such choices lead to the coexistence of overweight and undernutrition at the same time. Overnutrition is also a form of malnutrition arising from excessive intake of imbalanced nutrients leading to impairment of physical and psychosocial functioning of the child. Overweight and obesity can cause long-term health consequences such as diabetes mellitus, hypertension, fatty liver disease, kidney disease, cardiovascular diseases, stroke and orthopedic morbidities. India has the second highest number of obese children in the world, translating to 14.4 million in the year 2015 [13]. There are only a few studies in South India to assess the feeding practices of young children. It is necessary that parents are aware of the proper feeding practices for the benefit of their child’s health status and immunity. Thus, time to time assessment should be done to find out the awareness of the parents at the given time and scenario so that necessary interventions can be carried out to educate the parents regarding healthy feeding practices. The present study aims to gain information about the feeding practices currently undertaken by the parents of children aged 12 to 24 months and therefore help health professionals gain an understanding of the child’s food habits and any related risk factors to suggest modifications to the parents in their feeding practices. Malnutrition is a multi-dimensional problem encompassing social, cultural, economic, educational and nutritional aspects, in India. Children and adolescents form the backbone of the nation’s future, and their nutrition and health play a critical role in human resource development of the country. Thus, meeting the nutritional needs of the younger generations is essential to bridge the gap in the nation’s growth milestones.

Aims and objectives

- To find out the feeding practices undertaken by the parents with children in the age group 12 to 24 months, taking into consideration the breastfeeding and complementary feedings.
- To find out the relationship between the feeding habits of the child and the sociodemographic characteristics of the family.

Materials and methods

This is a prospective health-based observational study. It was conducted in an urban based tertiary care hospital in South India. The study was carried out after approval from Institutional Ethics Committee (CSP/20/ FEB/84/88). Parents of children in the age group of 12 - 24 months attending out-patient pediatric department or admitted in this center were the participants of this study. This study was conducted over a period of 2 months (1st October 2020-30th November 2020) with the study population of 95 parents. The simple random sampling technique was adopted to determine the participants of the study. Questionnaires were employed to collect information from the participants. The questionnaire has been validated by three expert Pediatricians to enhance its clarity and comprehension. Questionnaire was translated into the regional language which was reviewed and back translated by Pediatrician to check the accuracy of the terms used. Any discrepancies in the translated version were resolved. Final version was prepared after a pilot study. Written informed consent form was obtained from the parents who gave consent to participate after explaining to them the objectives of this study in the participant’s own language. Parents who did not give consent to participate and parents of children with co-morbidities such as congenital abnormalities, metabolic and endocrine disorders and chronic disease involving cardiac, kidney, gastro-intestinal, neurological and blood related disorders were excluded from the study. Predesigned and pretested questionnaires were used to collect the data on socio-demographic profile (age, residence, educational qualification, occupation and income) and initiation of breastfeeding, exclusive breastfeeding and complementary feeding practices. Data entry and statistical analysis was carried out using SPSS software version 26 and Microsoft excel. Descriptive statistics like mean, standard deviation and frequency were calculated, where necessary. In addition, bivariate and multivariate logistic regression along with chi-square test was also carried out to see the associations. Crude and Adjusted Odds ratios (COR, AOR) were computed for each explanatory variable to determine the degree of association and to control the confounders. Statistical test of significance is defined as confidence interval of 95% and p value less than 0.05. All results were expressed as percentage and numbers. According to WHO, the following terms were used in this study to describe infant feeding practices [1]:

- *Early initiation of breastfeeding*: infants should be breastfed within the first hour of birth
- *Exclusive breastfeeding*: breastfeeding the infant for first 6 months of life – meaning no other foods or liquids are provided, including water
- *Optimal complementary feeding*: complementary food should be introduced at six months of age (180 days) while continuing to breastfeed up to 2 years. The food should contain all macronutrients and micronutrients in the right proportion
- *Minimum meal frequency*: feeding solid/semisolid foods 2 times per day for breastfed infants aged 6–8 months, 3 times per day for breastfed children aged 9–24 months and 4 times per day for non-breastfed children aged 6-24 months
- *Minimum dietary diversity*: dietary diversity is present when the diet contains four or more of the following seven food groups - grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin A-rich fruits and vegetables, other fruits and vegetables.
Results

Among 95 participants, the mean age of children, mothers and fathers were 17.90 (± 3.10 Standard Deviation [SD]) months, 27.88 (± 4.19 SD) years and 33.09 (± 4.98 SD) years, respectively. Of the 95 children, 55 (57.89%) were males and 40 (42.12%) were females. More than half, 68 (71.58%) children lived in urban households. Most of the mothers, i.e., 84 (88.42%) were housewives. Majority of the fathers (95.79%) were employed, among which 67.37% were professional workers. Table I shows the socio-demographic characteristics of the study population.

| Variable                        | Frequency (N = 95) | Percentage (%) |
|---------------------------------|-------------------|----------------|
| **Characteristics of the child** |                   |                |
| Age of child (mean ± SD)        | 17.903 ± 3.100    |                |
| Gender of the child             |                   |                |
| Female                          | 55                | 57.89%         |
| Male                            | 40                | 42.12%         |
| Birth weight                    |                   |                |
| Low birth weight (< 2.5 kg)     | 23                | 24.21%         |
| Normal weight (≥2.5 kg)         | 72                | 75.78%         |
| **Period of gestation**         |                   |                |
| Preterm                         | 16                | 16.84%         |
| Term                            | 79                | 83.16%         |
| Birth defects                   |                   |                |
| Yes                             | 13                | 13.68%         |
| No                              | 82                | 86.32%         |
| Sibling                         |                   |                |
| Yes                             | 46                | 48.42%         |
| No                              | 54                | 51.58%         |
| **Characteristics of the family**|                   |                |
| Residence                       |                   |                |
| Urban                           | 68                | 71.58%         |
| Rural                           | 32                | 28.42%         |
| Age of mother (mean ± SD)       | 27.88±21 ± 4.187  |                |
| Maternal education              |                   |                |
| Primary                         | 4                 | 4.21%          |
| Secondary                       | 26                | 27.36%         |
| Graduate                        | 65                | 68.42%         |
| Maternal occupation             |                   |                |
| Housewife                       | 84                | 88.42%         |
| Employed                        | 11                | 11.58%         |
| Age of father (mean ± SD)       | 33.094 ± 4.976    |                |
| Paternal education              |                   |                |
| Primary                         | 14                | 14.74%         |
| Secondary                       | 19                | 20%            |
| Graduate                        | 62                | 65.26%         |
| Paternal occupation             |                   |                |
| Unskilled                       | 4                 | 4.21%          |
| Skilled                         | 27                | 28.42%         |
| Professional                    | 64                | 67.37%         |
| Type of family                  |                   |                |
| Nuclear                         | 47                | 49.47%         |
| Joint                           | 48                | 50.53%         |
| Socio-economic class            |                   |                |
| Upper                           | 20                | 21.05%         |
| Upper-middle                    | 45                | 47.37%         |
| Lower-middle                    | 22                | 23.16%         |
| Upper-lower                     | 8                 | 8.42%          |
| Lower-lower                     | 0                 | 0%             |
Breastfeeding practices
From the total of 95 children, 64 (67.37%) were initiated on breastfeeding within 1 hour of birth, 70 (73.68%) were exclusively breastfed until 6 months of age and 70 (73.68%) had continued breastfeeding until 1 year of age (Tab. II). At the time of interview, 42 (44.21%) mothers were breastfeeding their children, among which 35 (59.32%) children were in the age group 12-18 months and 7 (19.44%) children were in the age group 18-24 months. The most common reasons given by mothers for stopping breastfeeding were “trouble in milk flow to start” in 31 (60.78%) and “mother became pregnant” in 11 (21.57%). Other reasons for stoppage of breastfeeding are mentioned in Table III.
The timely initiation of breastfeeding significantly correlated to maternal age at marriage (p = 0.048), birth weight of the child (p = 0.046), mode of delivery (p = 0.04), birth defects (p = 0.0002) and period of gestation (0.027), but not with maternal education, maternal occupation and socioeconomic status of the family. Common birth defects observed in this study population were cleft lip/palate (6 out of 13 children) and imperforate anus (4 out of 13 children). Univariate analysis using chi square also revealed that practice of exclusive breastfeeding feeding did not vary significantly with residence, type of family, educational status, occupation and age of parents, birth order or weight of the child (p > 0.05) (Tab. IV). Using fisher’s exact test, the practice of expressed breastmilk was found to have a significant association with birth weight of the child (p = 0.019), period of gestation (p = 0.045) and birth defects (p = 0.034).

Table II. Breastfeeding and complementary feeding practices of participants (N = 95).

| Variable                                      | Frequency (N = 95) | Percentage (%) |
|-----------------------------------------------|--------------------|----------------|
| Initiation of breastfeeding within 1 hour     | Yes 64             | 67.37%         |
|                                               | No 31              | 32.63%         |
| Exclusive breastfeeding for 6 months          | Yes 70             | 75.68%         |
|                                               | No 25              | 24.32%         |
| Continued breastfeeding at 1 year             | Yes 70             | 75.68%         |
|                                               | No 25              | 24.32%         |
| Initiation of complementary feed at 6 months  | Yes 86             | 90.53%         |
|                                               | No 9               | 9.47%          |
| Supplements                                   | Yes 29             | 30.53%         |
|                                               | No 66              | 69.47%         |
| Salt in complementary feeds                   | Yes 89             | 93.68%         |
|                                               | No 6               | 6.32%          |
| Sugar in complementary feeds                  | Yes 77             | 81.05%         |
|                                               | No 18              | 18.95%         |
| Expressed breast milk                          | Yes 11             | 11.58%         |
|                                               | No 84              | 88.42%         |
| Formula feeding                               | Yes 26             | 27.37%         |
|                                               | No 69              | 72.63%         |
| Cow milk                                      | Yes 68             | 71.58%         |
|                                               | No 27              | 28.42%         |

Complementary feeding practices
Overall, 86 (90.43%) mothers had initiated timely complementary feeds as per the pediatrician’s advice (Tabs. II, V). In addition, all children received the minimum meal frequency and the majority (97.8%) met the criteria of minimum dietary diversity (Fig. 1). However, only 43 (45.26%) children consumed adequate quantity of complementary feeds (Fig 2). The bivariate logistic regression analysis showed that present weight of the child, birth order, type of family and socioeconomic status were statistically associated with appropriate complementary feeding practice. In the multivariate logistic regression analysis, present weight of the child, educational status of the mother and father, type of family and socioeconomic status were independent predictors for appropriate complementary feeding practice. Univariate analysis using chi square found that the optimal complementary feeding was significantly associated with maternal age (p = 0.029) and maternal employment status (p = 0.049) but not with gender of

Figure 1. Feeding characteristics of the children (N = 95).
Tab. IV. Bivariate and multivariate logistic regression for the predictors associated with exclusive breastfeeding (N = 95).

| Population characteristics | Exclusively breastfed (N = 70) | Not exclusively breastfed (N = 25) | Crude odds ratio | Adjusted odds ratio | 95% CI | p-value |
|----------------------------|-------------------------------|-----------------------------------|-----------------|---------------------|--------|---------|
| Age                        |                               |                                   |                 |                     |        |         |
| < 18 months                | 14 (93.33%)                   | 1 (6.67%)                         | 1.022           | 0.891               | 0.293 – 3.559 | 0.047   |
| ≥18 months                 | 56 (70%)                      | 24 (30%)                          |                 |                     |        |         |
| Gender                     |                               |                                   |                 |                     |        |         |
| Female                     | 27 (67.50%)                   | 13 (32.50%)                       | 0.889           | 1.013               | 0.351 – 2.252 | 0.243   |
| Male                       | 43 (78.18%)                   | 12 (21.82%)                       | 1.833           | 2.360               | 0.609 – 5.520 | 0.644   |
| Place                      |                               |                                   |                 |                     |        |         |
| Urban                      | 51 (75%)                      | 17 (25%)                          | 1.833           | 2.360               | 0.609 – 5.520 | 0.644   |
| Rural                      | 19 (70.37%)                   | 8 (29.63%)                        |                 |                     |        |         |
| Sibling                    |                               |                                   |                 |                     |        |         |
| Yes                        | 33 (71.74%)                   | 13 (28.26%)                       | 0.958           | 0.414               | 0.346 – 2.656 | 0.677   |
| No                         | 37 (75.51%)                   | 12 (24.49%)                       |                 |                     |        |         |
| Present weight             |                               |                                   |                 |                     |        |         |
| Normal                     | 52 (75.36%)                   | 17 (24.64%)                       | 0.650           | 1.158               | 0.249 – 1.592 | 0.366   |
| Underweight                | 18 (69.23%)                   | 8 (30.77%)                        |                 |                     |        |         |
| Mother’s age               |                               |                                   |                 |                     |        |         |
| < 30 years                 | 50 (78.13%)                   | 14 (21.88%)                       | 4.889           | 4.471               | 1.336 – 17.896 | 0.158   |
| ≥30 years                  | 20 (64.52%)                   | 11 (35.48%)                       |                 |                     |        |         |
| Mother’s education         |                               |                                   |                 |                     |        |         |
| Primary                    | 3 (75%)                       | 1 (25%)                           | 0.845           | 1.501               | 0.364 – 1.960 | 0.528   |
| Secondary                  | 17 (65.38%)                   | 9 (34.62%)                        |                 |                     |        |         |
| Graduate                   | 50 (76.92%)                   | 15 (23.08%)                       |                 |                     |        |         |
| Mother’s occupation        |                               |                                   |                 |                     |        |         |
| Housewife                  | 62 (75.61%)                   | 20 (24.39%)                       | 0.516           | 0.452               | 0.152 – 1.758 | 0.284   |
| Employed                   | 8 (61.54%)                    | 5 (38.46%)                        |                 |                     |        |         |
| Father’s age               |                               |                                   |                 |                     |        |         |
| < 35 years                 | 48 (76.19%)                   | 15 (23.81%)                       | 3.5             | 1.359               | 1.085 – 11.292 | 0.436   |
| ≥35 years                  | 22 (68.75%)                   | 10 (31.25%)                       |                 |                     |        |         |
| Father’s education         |                               |                                   |                 |                     |        |         |
| Primary                    | 9 (64.29%)                    | 5 (35.71%)                        | 0.611           | 0.542               | 0.300 – 1.246 | 0.508   |
| Secondary                  | 13 (68.42%)                   | 6 (31.58%)                        |                 |                     |        |         |
| Graduate                   | 48 (77.42%)                   | 14 (22.58%)                       |                 |                     |        |         |
| Father’s occupation        |                               |                                   |                 |                     |        |         |
| Unskilled                  | 2 (50%)                       | 2 (50%)                           | 0.664           | 1.470               | 0.274 – 1.607 | 0.287   |
| Skilled                    | 18 (66.67%)                   | 9 (33.33%)                        |                 |                     |        |         |
| Professional               | 50 (78.13%)                   | 14 (21.88%)                       |                 |                     |        |         |
| Type of family             |                               |                                   |                 |                     |        |         |
| Nuclear                    | 32 (68.09%)                   | 15 (31.91%)                       | 0.473           | 0.380               | 0.185 – 1.215 | 0.220   |
| Joint                      | 38 (79.17%)                   | 10 (20.83%)                       |                 |                     |        |         |
| Socioeconomic class        |                               |                                   |                 |                     |        |         |
| Upper-middle               | 21 (46.67%)                   | 24 (53.33%)                       | 1.562           | 1.596               | 0.882 – 2.766 | 0.588   |
| Upper-lower                | 4 (50%)                       | 4 (50%)                           |                 |                     |        |         |
| Lower-lower                | 0 (0%)                        | 0 (0%)                            |                 |                     |        |         |

Fig. 2. Quantity of complementary feeds among the children (N = 95).

Tab. V. Reasons for starting complementary feeds.

| Reasons for starting complementary feeds       | Response |
|------------------------------------------------|----------|
| Baby started consuming too much milk           | 16.48% (16) |
| Baby was hungry most of the time               | 38.94% (37) |
| Mother did not have enough milk                | 37.89% (36) |
| Baby not gaining weight                        | 23.16% (22) |
| Mother wanted to feed something in addition to milk | 63.16% (60) |
| Baby sleeps well at night                      | 44.21% (42) |
| Baby was old enough to take solid food         | 72.63% (69) |
| Doctor recommended to give                     | 78.95% (75) |
| Family members asked to give                   | 72.63% (69) |
the child, birth order, residence, maternal education, socioeconomic status, type of family, paternal age, paternal education and paternal occupation (Tab. VI).

Discussion

Breastmilk is the most nutrient-rich and safest food for infants up to 6 months of age. It is easily digested and thereby reducing the risk of constipation, upset stomach or diarrhea. Optimal feeding practices during the first 24 months of life is of utmost importance, as this time-period is the “critical window” for the promotion of good growth, health, cognitive and behavioral development. In addition, breastfeeding protects the neonate from common childhood illnesses like pneumonia, and also offers long-term health benefits, such as minimizing the risk of obesity in childhood and adolescence [14]. Feeding the mother’s breastmilk to infants within 1 hour of birth is termed as “early initiation of breastfeeding” and this ensures that the baby receives the colostrum, which is abundant in protective factors. In the present study, 64 (67.37%) mothers had initiated breastfeeding within 1 hour of birth. A similar finding was found in the study conducted by Liaquatuali et al. in which only 44% infants were initiated breastfeeding within 1 hour of birth [15]. Reddy et al. and Asare et al. reported that 59% and 60.5% of children were initiated breastfeeding within 1 hour of birth, respectively which were coherent with the present study [16, 17]. In our study, we were able to find significant association between timely initiation of breastfeeding and birth weight of the child (p = 0.046), mode of delivery (p = 0.04), period of gestation (p = 0.027) and birth defects (p = 0.0002). Data from this study showed that rates of timely initiation of breastfeeding were lower among babies delivered through caesarean section. Similar findings were highlighted in a systematic review and meta-analysis, which showed that rates of early initiation of breastfeeding following caesarean deliveries were significantly lower compared to vaginal deliveries [18]. In addition, pre-mature infants with low birth weight and children with birth defects

| Population characteristics               | Sufficient calories (N = 43) | Deficient calories (N = 52) | Crude odds ratio | Adjusted odds ratio | 95% Confidence interval | p-value |
|------------------------------------------|------------------------------|-----------------------------|------------------|---------------------|------------------------|---------|
| Child’s age                              |                              |                             |                  |                     |                        |         |
| < 18 months                              | 5 (53.33%)                   | 10 (66.67%)                 | 0.553            | 0.445               | 0.173 - 1.762          | 0.312   |
| ≥18 months                               | 38 (47.50%)                  | 42 (52.50%)                 |                  |                     |                        |         |
| Gender of the child                      |                              |                             |                  |                     |                        |         |
| Female                                   | 16 (40%)                     | 24 (60%)                    | 0.691            | 0.730               | 0.303 - 1.577          | 0.379   |
| Male                                     | 27 (49.09%)                  | 28 (50.91%)                 |                  |                     |                        |         |
| Residence                                |                              |                             |                  |                     |                        |         |
| Urban                                    | 30 (44.12%)                  | 38 (55.88%)                 | 0.850            | 0.643               | 0.548 - 2.078          | 0.722   |
| Rural                                    | 13 (48.15%)                  | 14 (51.85%)                 |                  |                     |                        |         |
| Present weight                           |                              |                             |                  |                     |                        |         |
| Normal                                   | 32 (46.58%)                  | 37 (53.62%)                 | 1.179            | 1.333               | 0.474 - 2.932          | 0.722   |
| Malnourished                             | 11 (42.31%)                  | 15 (57.69%)                 |                  |                     |                        |         |
| Sibling                                  |                              |                             |                  |                     |                        |         |
| Yes                                      | 21 (45.65%)                  | 25 (54.35%)                 | 1.051            | 0.944               | 0.459 - 2.314          | 0.941   |
| No                                       | 22 (44.30%)                  | 27 (55.70%)                 |                  |                     |                        |         |
| Mother’s age                             |                              |                             |                  |                     |                        |         |
| < 30 years                               | 24 (57.50%)                  | 40 (62.50%)                 | 0.379            | 0.389               | 0.157 - 0.916          | 0.029   |
| ≥30 years                                | 19 (41.29%)                  | 12 (28.71%)                 |                  |                     |                        |         |
| Mother’s education                       |                              |                             |                  |                     |                        |         |
| Primary                                  | 1 (25%)                      | 3 (75%)                     | 0.827            | 1.735               | 0.399 - 1.715          | 0.707   |
| Secondary                                | 12 (46.15%)                  | 14 (53.85%)                 |                  |                     |                        |         |
| Graduate                                 | 30 (46.15%)                  | 35 (53.85%)                 |                  |                     |                        |         |
| Mother’s occupation                      |                              |                             |                  |                     |                        |         |
| Housewife                                | 34 (41.46%)                  | 48 (58.54%)                 | 0.315            | 0.298               | 0.090 - 1.107          | 0.049   |
| Employed                                 | 9 (69.23%)                   | 4 (30.77%)                  |                  |                     |                        |         |
| Father’s age                             |                              |                             |                  |                     |                        |         |
| < 35 years                               | 25 (39.68%)                  | 38 (60.32%)                 | 0.512            | 0.710               | 0.216 - 1.211          | 0.125   |
| ≥35 years                                | 18 (56.25%)                  | 14 (43.75%)                 |                  |                     |                        |         |
| Father’s education                       |                              |                             |                  |                     |                        |         |
| Primary                                  | 6 (42.86%)                   | 8 (57.14%)                  | 0.771            | 1.115               | 0.440 - 1.350          | 0.362   |
| Secondary                                | 6 (31.58%)                   | 13 (68.42%)                 |                  |                     |                        |         |
| Graduate                                 | 31 (50%)                     | 31 (50%)                    |                  |                     |                        |         |
| Father’s occupation                      |                              |                             |                  |                     |                        |         |
| Unskilled                                | 2 (50%)                      | 2 (50%)                     | 0.676            | 0.619               | 0.322 - 1.420          | 0.338   |
| Skilled                                  | 9 (33.33%)                   | 18 (66.67%)                 |                  |                     |                        |         |
| Professional                             | 32 (50%)                     | 32 (50%)                    |                  |                     |                        |         |
| Type of family                           |                              |                             |                  |                     |                        |         |
| Nuclear                                  | 25 (53.19%)                  | 22 (46.81%)                 | 1.894            | 1.454               | 0.856 - 4.293          | 0.124   |
| Joint                                    | 18 (37.50%)                  | 30 (62.50%)                 |                  |                     |                        |         |
| Socioeconomic class                      |                              |                             |                  |                     |                        |         |
| Upper                                    | 12 (60%)                     | 8 (40%)                     | 1.434            | 1.356               | 0.882 - 2.332          | 0.192   |
| Upper-middle                             | 21 (46.67%)                  | 24 (53.33%)                 |                  |                     |                        |         |
| Lower-middle                             | 6 (27.27%)                   | 16 (72.73%)                 |                  |                     |                        |         |
| Upper-lower                              | 4 (50%)                      | 4 (50%)                     |                  |                     |                        |         |
| Lower-lower                              | 0 (0%)                       | 0 (0%)                      |                  |                     |                        |         |
also had delayed initiation of breastfeeding which can be attributed to the need for Neonatal Intensive Care Unit (NICU) admission and/or difficulty breastfeeding in these children.

Seventy (73.68%) mothers continued to exclusively breastfeed their children until 6 months of age, which was comparable to 70.2% reported in the study by Kulkarni et al. [19]. However, in the study conducted by Karmee et al. only 44.35% infants were exclusively breastfed until 6 months of age. Continuance of breastfeeding among children (12-24 months) were seen in 44.21%, which was lower compared to 72.36% reported by Karmee et al. [14]. This variance in breastfeeding practices among young infants may be explained by the literacy rate of the respondents, and diverse cultural and traditional practices prevalent in different topographical areas. In our study population, expressed breastmilk (EBM) was given only to 11 (11.58%) children, which was markedly lower compared to studies from developed countries [20].

There was a significant relationship (p < 0.05) between EBM and the period of gestation, birth weight, and birth defects of the child in the present study. Five out of 13 working mothers were not able to exclusively breastfeed their children for 6 months. If the duration of exclusive breastfeeding is to be extended among working women in the era of increasing employment of mothers, practice of expressed breastmilk has a crucial role to play [21]. In our study, duration of breastfeeding had a positive impact on the nutritional status of the child (Figs. 3, 4).

When exclusive breastfeeding is no longer adequate to meet the nutritional needs of the growing infant, complementary foods must be added to the diet of the child. Complementary feeding ought to be timely, meaning that all children should be initiated on solid/semi-solid foods in addition to breastmilk from 6 months of age. It should also be adequate, meaning that the weaning foods must be given in recommended frequency, quantity and consistency to meet the nutritional needs of the growing infant while continuing breastfeeding [1, 9]. Eighty-six (90.53%) children were introduced complementary feeds at 6 months of age, which was comparable to the results of a study conducted in Ethiopia [22]. Studies conducted by Sethi et al. and Aggarwal et al. reported that only 16.5% and 17.5% children were initiated on timely complementary feeds, which were significantly lower compared to the present study [23, 24]. In the present study, almost all (100%) children consumed cereal-based foods, 94.74% children consumed fruits and vegetables, and 90.53% children consumed dairy products as a part of their daily diet. However, percentage of children consuming nuts, and flesh foods like meat, fish and eggs were comparatively lower in our study population (Fig. 5).

Overall, all children received minimum meal frequency and majority (97.8%) satisfied the criteria of minimum dietary diversity. High rates of timely initiation of complementary feeds and optimal complementary feeding practices may be attributed to high maternal literacy rates and better socioeconomic status of the study population (Fig. 6). Although most of the children satisfied minimum meal frequency and minimum dietary diversity, only 43 (45.26%) consumed adequate quantity of complementary feeds (i.e, 1000-1100 kcal). This was similar to the finding of Rao et al, where only 32% mothers fed their children with adequate quantity of complementary feeds (8). In the present study, the quantity of complementary feeds significantly correlated with the maternal age (p = 0.029) and maternal occupation (p = 0.049). Higher knowledge...
on adequate feeding was seen in older mothers, this may be ascribed to the fact that most of these children were 2nd born. Higher proportion of children (69.23%) of working mothers consumed adequate quantity of complementary feeds which could be explained by the financial self-reliance of the mother. Using validated questionnaires and direct interview of the caregivers by the investigators could be stated as the strengths; however, the recall method could result in overestimation or underestimation of the measure of the child’s dietary consumption due to recall and social desirability biases, which may be the limitations of this study. As this was a hospital-based prospective study, selection bias might have also affected the result. Community-based studies are required to represent the values in the general population. Another limitation of this study was the short timescale over which the study was undertaken.

**Conclusion**

Age-appropriate complementary feeding ensuring growing infants are fed nutritionally rich complementary foods is a major challenge in developing countries like India. Studies conducted in India have shown that proper utilization of existing health services can bring about drastic improvements in infant and young child feeding practices. Attention should be directed towards socio-economic empowerment especially education of female children, regular health-care visits and access to a community-based IYCF counselling support system to implement knowledge about optimal feeding practices. It is also imperative to create public awareness to stop the spread of misconceptions and to provide authentic information about appropriate infant feeding practices.

**Acknowledgement**

We acknowledge the pediatric staff nurses in the out patient and in patient department.

**Funding:** the authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Conflict of interest statement**

The authors declare no conflict of interest.

**Authors’ contributions**

Study concept and design: SG, JJ, SG and MR. Analysis and interpretation of data SG, JJ, SG; drafting the manuscript: SG, JJ and SG; critical revision of the manuscript for important intellectual content: SG and SG.

**Patient consent for publication**

Parental/guardian consent obtained.

**References**

[1] Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals. Geneva: World Health Organization 2009.

[2] Jain A, Agnihotri SB. Assessing inequalities and regional disparities in child nutrition outcomes in India using MANUSH - a more sensitive yardstick. Int J Equity Health 2020;19:138. https://doi.org/10.1186/s12939-020-01249-6

[3] Dukhi N (April 5th 2020). Global Prevalence of Malnutrition: Evidence from Literature. In: Imran M, Imran A, eds. Malnutrition. London: IntechOpen. https://doi.org/10.5772/intechopen.92006

[4] Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, Murch S, Sankar MJ, Walker N, Rollins NC; Lancet Breastfeeding Series Group. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. Lancet 2016;387:475-90. https://doi.org/10.1016/S0140-6736(15)01247-7

[5] Paswan K, Singh SK, Lhungdim H, Shekhar C, Arnold F, Kishor K, Singh A, Bansod DW, Alagarajan M, Dwivedi LK, Pedgaonkar S, Pradhan MR. National Family Health Survey (NFHS-4) 2015-16. Available at http://rchiips.org/nfhs/NFHS-4Reports/India.pdf (Accessed on: 01/07/2021).

[6] The State of the World’s Children 2019: Children, food and nutrition. UNICEF DATA 2019. Available at https://data.unicef.org/resources/state-of-the-worlds-children-2019 (Accessed on: 30/06/2021).

[7] Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS; Bellagio Child Survival Study Group. How many child deaths can we prevent this year? Lancet 2003;362:65-71. https://doi.org/10.1016/S0140-6736(03)13811-1

[8] Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, Webb P, Larrey A, Black RE; Lancet Nutrition Interven- tions Review Group, the Maternal and Child Nutrition Study Group. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet 2013;382:452-77. https://doi.org/10.1016/ S0140-6736(13)60996-4

[9] Rao S, Swathi P, Unnikrishnan B, Hegde A. Study of complement- ary feeding practices among mothers of children aged six months to two years - A study from coastal south India. Australas Med J 2011;4:252-7. https://doi.org/10.4066/AMJ.2011.607

[10] Kabir A, Maitrot MRL. Factors influencing feeding practic-es of extreme poor infants and young children in families of...
PARENTAL AWARENESS ABOUT FEEDING PRACTICES

Karmee N, Satapathy SP, Tripathy RM. Infant and young child feeding practices among mothers attending an Urban Health Training Centre (UHTC): a cross-sectional (mixed methodology) study in Berhampur, South Odisha, India. Int J Contemp Pediatrics 2018;5:161-8. http://dx.doi.org/10.18203/2349-3291.ijcp20175579

Liaquathali F, Maruthupandian J, Govindasamy R. An assessment of age-appropriate infant and young child feeding practices among children in Kancheepuram district, Tamil Nadu, India. J Family Med Prim Care 2020;9:4692-8. https://doi.org/10.4103/jfmpc.jfmpc_668_20

Reddy S, Natarajan KS, Ramamujan K, Bose A, Kang G, Mohan VR. Exclusive breastfeeding practices in an urban settlement of Vellore, southern India: findings from the MAL-ED birth cohort. Int Breastfeed J 2019;14:29. https://doi.org/10.1186/s13006-019-0222-0

Asare BY, Preko JV, Baafi D, Dwumfour-Asare B. Breastfeeding practices and determinants of exclusive breastfeeding in a cross-sectional study at a child welfare clinic in TemaManhean, Ghana. Int Breastfeed J 2018;13:12. https://doi.org/10.1186/s13006-018-0156-y

Prior E, Santhakumaran S, Gale C, Philips LH, Modi N, Hyde MJ. Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. Am J Clin Nutr 2012;95:1113-35. https://doi.org/10.3945/ajcn.111.030254

Rn K, Anjenaya S, Gujar R. Breast feeding practices in an urban community of Kalamboli Navi Mumbai. Indian J Community Med 2004;29:179.

Win NN, Birns CW, Zhao Y, Scott JA, Oddy WH. Breastfeeding duration in mothers who express breast milk: a cohort study. Int Breastfeed J 2006;1:28. https://doi.org/10.1186/1746-4358-1-28

Okonya JN, Nabimba R, Richard M, Omeba EA. Perceptions of breast milk expression practices among working mothers. African Journal of Midwifery and Women’s Health 2017;11:169-175. https://doi.org/10.12968/ajmw.2017.11.4.169

Deminiew YM, Tafere TE, Abitew DB. Infant and young child feeding practice among mothers with 0-24 months old children in Slum areas of Bahir Dar City, Ethiopia. Int Breastfeed J 2012;7:26. https://doi.org/10.1186/1746-4358-7-26

Sethi V, Kashyap S, Seth V. Effect of nutrition education of mothers on infant feeding practices. Indian J Pediatr 2003;70:463-6.

Reddy K, Ganesan S, Jayaraj J, Geminiganesan S, Rajan M. A study on parental awareness of feeding practices in children in the age-group 12-24 months. J Prev Med Hyg 2021;62:E909-E917. https://doi.org/10.15167/2421-4248/jpmh2021.62.4.2287