Complementary feeding practices among children aged 6–23 months in Aligarh, Uttar Pradesh

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Abstract

Context: Complementary feeding practices play an important role in the growth and development of the children. Aims: The aim of this study is to determine the prevalence of complementary feeding practices among children aged 6–23 months and its association with various sociodemographic factors. Settings and Design: The study was a community-based, cross-sectional study conducted at field practice area of Urban Health Training Centre and Rural Health Training Centre, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. Materials and Methods: Mothers of children aged 6–23 months of age interviewed using the infant and young child feeding questionnaire for complimentary feeding indicators, namely, minimum dietary diversity (MDD), minimum meal frequency (MMF), and minimum acceptable diet (MAD). The sample size drawn was 326 using systematic random sampling with probability proportionate to size. Statistical Analysis Used: Wald’s statistics, bivariate and multivariate logistic regression. Results: MDD was adequate in 42.6% children, MMF in 50.9% children, and MAD in 35.6% children. MDD was significantly associated with area of residence, birth order of child, and Standard of living index (SLI); MMF was significantly associated with area of residence, sex of child, and literacy status of mother; MAD was significantly associated with area of residence, sex of child, birth order of child, and SLI. Conclusion: The study revealed that approximately 50% of mothers practiced inadequate complementary feeding. The feeding practices were found to be significantly associated with various sociodemographic factors highlighting the importance of addressing these factors if we aim an improvement in feeding practices.

Keywords: Complementary feeding, infant and young child feeding, minimum acceptable diet, minimum dietary diversity, minimum meal frequency

Introduction

The first 2 years of life involve rapid physical, cognitive, and social development that requires optimal nutrition. Adequate infant and young child feeding (IYCF) practices are needed to support this development and provide protection from the risk of morbidity and mortality in low-resource environments. The WHO and United Nations International Children's Emergency Fund's global recommendations for optimal infant feeding as set out in the global strategy are exclusive breastfeeding for 6 months (180 days) and nutritionally adequate and safe complementary feeding starting from the age of 6 months with continued breastfeeding up to 2 years of age or beyond.³

Insufficient quantities and inadequate quality of complementary foods, poor child feeding practices, and high rates of infections have a detrimental effect on health and growth in children <2 years of age. Even with optimum breastfeeding, children will become stunted if they do not receive sufficient dietary diversity and meal frequency after 6 months of age.³,⁴

Almost one-fifth of overall under-five mortality can be averted if 90% of infants are covered with a package of intervention to protect, promote, and support the optimal IYCF practices.⁴

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In the Indian context, most of the reports in the literature have focused on specific feeding behaviors such as breastfeeding and age at the introduction of complementary foods. However, all these studies have not captured the multidimensionality of feeding practices including dietary diversity, frequency, and acceptable diet and have not examined their influence on child nutritional status. Therefore, this study was conducted to determine the prevalence of complementary feeding practices among children aged 6–23 months and its association with various sociodemographic factors.

Materials and Methods

This community-based cross-sectional study was conducted in the field practice areas of the Urban Health Training Centre (UHTC) and Rural Health Training Centre (RHTC), Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh for 1 year from July 2014 to June 2015. The mothers of children aged 6–23 months were interviewed using the IYCF questionnaire for complementary feeding indicators, namely, minimum dietary diversity (MDD), minimum meal frequency (MMF), and minimum acceptable diet (MAD).14

Definitions

Minimum dietary diversity
The proportion of children 6–23 months of age who receive foods from four or more food groups.

Minimum meal frequency
Proportion of breastfed and nonbreastfed children 6–23 months of age, who receive solid, semi-solid, or soft foods (but also including milk feeds for nonbreastfed children) the minimum number of times or more.

Minimum acceptable diet
The proportion of children 6–23 months of age who receive a MAD (apart from breast milk).

The mothers of children aged 6–23 months registered under UHTC and RHTC and who gave consent to be part of the study were included in the study. The mothers who had a child with chronic illness, twins, congenital malformation, did not give consent and whose child was aged 2 years and above were excluded from the study. The sample size was calculated considering the prevalence of at least 3 IYCF practices in Uttar Pradesh to be 17.4% and absolute precision (L) = 5%.17 There are four areas registered under UHTC and six areas under RHTC. The sample was drawn using systematic random sampling with probability proportionate to size technique. Households were selected using systematic random sampling. Sampling interval was calculated. The lanes in each area and village were identified and numbered serially. After randomly selecting the first household, every kth household was selected. If the household had no child aged 0–23 months or house was locked, then the immediate next household was taken up for the study. If more than one child of age 0–23 month was present in the family, every eligible child was included in the study. Out of 510 children of age group 0–23 months, 326 children belonging to the age group 6–23 months were included for data analysis of complementary feeding indicators including MDD, MMF, and MAD. The mothers were interviewed after taking informed verbal consent after informing them about the nature and consequences of the study and ensuring that confidentiality would be maintained. The study design was passed by the Institutional Ethics Committee. After the interview, all the mothers were educated and counseled regarding the benefits of MDD, MMF, and MAD. Apart from this, if any child was found to have some medical illness or diet related problem, adequate treatment was given to the child and if required, referral to Jawaharlal Nehru Medical College and Hospital was arranged. Data were entered and analyzed using SPSS 20 (IBM SPSS Statistics for Windows, Version 20.0. IBM Corp., Armonk, NY). The prevalence with confidence interval (CI) was derived using Wald's statistics. Bivariate and multivariate logistic regression was used to test association. P < 0.05 was considered as statistically significant.

Results

Prevalence of complementary feeding practices

Figure 1 depicts the prevalence of complementary feeding practices indicators. MDD was found to be adequate in 42.6% (95% CI = 37.4%–48.1%) children, MMF in 50.9% (95% CI = 45.5%–56.3%) children and MAD in 35.6% (95% CI = 30.6%–40.9%) children.

Association of complementary feeding practices with sociodemographic factors

Association of minimum dietary diversity among children aged 6–23 months with sociodemographic factors

Table 1 depicts the sociodemographic factors associated with MDD. Children residing in rural area had significantly lower odds of having adequate MDD (adjusted odds ratio [AOR] = 0.61; 95% CI = 0.38, 0.98) as compared to urban area. Children with birth order third and above had significantly lower odds of having adequate MDD (AOR = 0.54; 95% CI = 0.31, 0.97) as compared to the children with birth order one. Children born...
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Association of minimum meal frequency among children aged 6–23 months with sociodemographic factors

Table 2 depicts the sociodemographic factors associated MMF. Children residing in rural area had significantly lower odds of having adequate MMF (AOR = 0.36; 95% CI = 0.18, 0.74) as compared to urban area. Male child had significantly higher odds of having adequate MMF (AOR = 1.8; 95% CI = 1.10, 2.93) as compared to female child. Children born to literate mothers had significantly higher odds of having adequate MMF (AOR = 2.04; 95% CI = 1.18, 3.53) as compared to illiterate mothers.

Association of minimum acceptable diet among children aged 6–23 months with sociodemographic factors

Table 3 depicts the sociodemographic factors associated MAD. Children residing in rural area had significantly lower odds of having adequate MAD (AOR = 0.58; 95% CI = 0.35, 0.98) as compared to urban area. The male child had significantly higher odds of having adequate MAD (AOR = 1.94; 95% CI = 1.16, 3.24) as compared to female child. Children with birth order third and above had significantly lower odds of having adequate MAD (AOR = 0.46; 95% CI = 0.25, 0.86) as compared to the children with birth order one. Children born to mothers belonging to high SLI had significantly higher odds of having adequate MAD (AOR = 3.61; 95% CI = 1.26, 10.31) as compared to low SLI.

Discussion

In the present study, the prevalence of MDD among children 6–23 months was 42.6%. Similar prevalence was observed by Dasgupta et al. (46%) and Reinbott et al. (44%). However, the prevalence lower than the current study was reported by Khan et al. (32.6%), Mukhopadhyay et al. (24.4%), Mondal et al. (30.85%), Parashar et al. (29.6%), and Bentley et al. (13%).

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Table 1: Association of minimum dietary diversity among children aged 6‑23 months with sociodemographic factors

| Factors                        | Minimum dietary diversity | COR (CI) | P      | AOR (CI) | P      |
|--------------------------------|---------------------------|----------|--------|----------|--------|
|                                | Adequate, n (%)           | Inadequate, n (%) |       |          |        |
| Area of residence              |                           |          |        |          |        |
| Rural                          | 53 (36.1)                 | 94 (63.9) | 0.61 (0.39-0.95) | 0.03   | 0.61 (0.38-0.98) | 0.04   |
| Urban                          | 86 (48)                   | 93 (52)  | 1      |          | 1      |
| Sex of child                   |                           |          |        |          |        |
| Male                           | 76 (46.1)                 | 89 (53.9) | 1.33 (0.86-2.06) | 0.21   | -      | -      |
| Female                         | 63 (39.1)                 | 98 (60.9) | 1      |          |        |
| Birth order of child           |                           |          |        |          |        |
| First                          | 56 (53.8)                 | 48 (46.2) | 1      |          | 1      |
| Second                         | 36 (48)                   | 39 (52)  | 0.79 (0.44-1.43) | 0.440  | 1.06 (0.56-2.00) | 0.87   |
| Third and above                | 47 (32)                   | 100 (68) | 0.40 (0.24-0.68) | 0.001  | 0.54 (0.31-0.97) | 0.04   |
| Place of delivery              |                           |          |        |          |        |
| Home                           | 33 (38.8)                 | 52 (61.2) | 1      |          | 0.41   | -      | -      |
| Institutional                  | 106 (44)                  | 135 (56) | 1.24 (0.75-2.05) |        |        |
| Type of delivery               |                           |          |        |          |        |
| Normal                         | 111 (38.9)                | 174 (61.1) | 1      |          | 0.001  | 1      | 0.08   |
| Cesarean                       | 28 (31.7)                 | 13 (68.3) | 3.38 (1.68-6.80) | 2.00   | 0.93-4.31 |
| Mother's age (years)           |                           |          |        |          |        |
| <20                            | 5 (62.5)                  | 3 (37.5)  | 1      |          |        |
| 21-30                          | 106 (43.4)                | 138 (56.6) | 0.46 (0.11-1.97) | 0.30   |        |
| 31-40                          | 28 (37.8)                 | 46 (62.2) | 0.36 (0.08-1.65) | 0.19   |        |
| Literacy status of mother      |                           |          |        |          |        |
| Illiterate                     | 56 (33.9)                 | 109 (66.1) | 1      |          | 0.001  | 1      | 0.70   |
| Literate                       | 83 (51.6)                 | 78 (48.4) | 2.07 (1.32-3.24) | 1.11   | 0.65-1.89 |
| Religion                       |                           |          |        |          |        |
| Hindu                          | 47 (38.5)                 | 75 (61.5) | 0.76 (0.48-1.21) | 0.25   | -      | -      |
| Muslim                         | 92 (45.1)                 | 112 (54.9) | 1      |          |        |
| Antenatal care                 |                           |          |        |          |        |
| Received                       | 124 (47.0)                | 140 (53.0) | 2.78 (1.48-5.21) | 0.001  | 1.8 (0.89-3.62) | 0.10   |
| Not received                   | 15 (24.2)                 | 47 (75.8) | 1      |          | 1      |
| SLI                            |                           |          |        |          |        |
| Low                            | 10 (24.4)                 | 31 (75.6) | 1      |          | 1      |
| Medium                         | 88 (40)                   | 132 (60.0) | 2.07 (0.96-4.43) | 0.062  | 1.54 (0.68-3.47) | 0.30   |
| High                           | 41 (63.1)                 | 24 (36.9) | 5.30 (2.21-12.68) | <0.001 | 3.27 (1.26-8.52) | 0.02   |

CI: Confidence interval; COR: Crude odds ratio; SLI: Standard of living index; AOR: Adjusted odds ratio

to mothers belonging to high SLI had significantly higher odds of having adequate MDD (AOR = 3.27; 95% CI = 1.26, 8.52) as compared to low SLI.
Singhal et al. noted a higher prevalence of MDD (79.6%) in their study.\[8,9\]

In the present study, the prevalence of minimal meal frequency in 6–23 months’ children was 50.9%. Similar prevalence was reported by Khan et al. (48.6%).\[10\] However, Mondal et al., Bentley et al., Singhal et al., and Aemro et al., Rao et al. found a lower prevalence of MMF at 41.49%, 43%, 43.4%, 44.7%, and 32%, respectively.\[11,13-16\] On the other hand, Reinbott et al., Mukhopadhyay et al., and Parashar et al. reported higher prevalence of MMF at 70%, 67.0%, and 77.8%–78.5%, respectively.\[8,10,12\]

The prevalence of MAD among 6–23 month children in the current study was 35.6%. Similar observations were made by other researchers such as Mukhopadhyay et al. (31.5%), Singhal et al. (37.7%).\[10,14\] However, Reinbott et al., Khan et al., and Bentley et al. found a lower prevalence of MAD among children 6–23 months than the current study at 28%, 19.7%, 5%, respectively.\[8,3,18\] On the other hand, Khanna et al. reported higher prevalence of MAD (65.95%) than the current study.\[17\]

The prevalence of MDD was significantly associated with area of residence, birth order of child, and SLI in the present study. Dasgupta et al. observed a significant association between MDD and sex of child.\[15\] Parashar et al. in their study observed that minimum diversity was significantly associated with the area of residence.\[18\] Aemro et al. in their study found that significant association exists between MDD and birth order, mother’s education, and area of residence socioeconomic status.\[18\] Khanal et al. reported a significant association of MDD with birth order, place of delivery, mode of delivery, mother’s education, area of residence, religion, socioeconomic status, and antenatal care.\[18\]

The current study shows that the prevalence of MMF was significantly associated with area of residence, sex of child, and literacy status of mother. Dasgupta et al. in their study found that the prevalence of MMF was significantly associated with the literacy status of mother.\[15\] Parashar et al. found that the prevalence of MMF was significantly associated with area of residence.\[15\] Aemro et al. revealed that the prevalence of MMF was significantly related with the birth order of child, mother’s

### Table 2: Association of minimum meal frequency among children aged 6-23 months with sociodemographic factors

| Factors                        | Minimum meal frequency | COR (CI)     | P     | AOR (CI)     | P     |
|--------------------------------|------------------------|--------------|-------|--------------|-------|
| Area of residence              |                        |              |       |              |       |
| Rural                          | 56 (38.1)              | 0.37 (0.25-0.61) | <0.001 | 0.36 (0.18-0.74) | 0.006 |
| Urban                          | 110 (61.5)             | 1            |       | 1            |       |
| Sex of child                   |                        |              |       |              |       |
| Male                           | 94 (57.0)              | 1.64 (1.06-2.54) | 0.03  | 1.8 (1.10-2.93) | 0.02  |
| Female                         | 72 (44.7)              | 1            |       | 1            |       |
| Birth order of child           |                        |              |       |              |       |
| First                          | 61 (58.7)              | 1            |       | 1            |       |
| Second                         | 47 (62.7)              | 1.16 (0.59-2.28) | 0.13  | 1.18 (0.64-2.18) | 0.08  |
| Third and above                | 58 (39.5)              | 0.46 (0.28-0.77) | 0.003 | 0.59 (0.32-1.06) | 0.08  |
| Place of delivery              |                        |              |       |              |       |
| Home                           | 43 (50.6)              | 1            |       | 1            |       |
| Institutional                  | 123 (51.0)             | 1.02 (0.62-1.67) |       | -            |       |
| Type of delivery               |                        |              |       |              |       |
| Normal                         | 135 (47.4)             | 1            |       | 1            |       |
| Cesarean                       | 31 (75.6)              | 3.44 (1.63-7.29) | 1.93  | 0.83-4.48    |       |
| Mother’s age (years)           |                        |              |       |              |       |
| <20                            | 7 (87.5)               | 1            |       | 1            |       |
| 21-30                          | 125 (51.2)             | 0.15 (0.02-1.24) | 0.08  | -            | -     |
| 31-40                          | 34 (45.9)              | 0.12 (0.01-1.04) | 0.05  | -            | -     |
| Literacy status of mother      |                        |              |       |              |       |
| Illiterate                     | 63 (38.2)              | 1            |       | <0.001       | 1     |
| Literate                       | 103 (64.0)             | 2.88 (1.83-4.51) | 2.04  | 1.18-3.53    |       |
| Religion                       |                        |              |       |              |       |
| Hindu                          | 51 (41.8)              | 0.56 (0.35-0.88) | 0.01  | 0.99 (0.48-2.05) | 0.97  |
| Muslim                         | 115 (56.4)             | 1            |       | 1            |       |
| Antenatal care                 |                        |              |       |              |       |
| Received                       | 144 (54.5)             | 2.18 (1.23-3.87) | 0.008 | 1.16 (0.59-2.28) | 0.67  |
| Not received                   | 22 (35.5)              | 1            |       | 1            |       |
| SLI                            |                        |              |       |              |       |
| Low                            | 16 (39.0)              | 1            |       | 1            |       |
| Medium                         | 105 (47.7)             | 1.43 (0.72-2.82) | 0.31  | 1.00 (0.47-2.16) | 1.00  |
| High                           | 45 (69.2)              | 3.52 (1.55-7.98) | 0.003 | 2.14 (0.83-5.55) | 0.12  |

CI: Confidence interval; COR: Crude odds ratio; SLI: Standard of living index; AOR: Adjusted odds ratio
education, socioeconomic status, and antenatal care. In a study done by Khanal et al., it was observed that significant association exists between the prevalence of MMF and maternal education, antenatal care.

The prevalence of MAD was significantly associated with area of residence, sex of child, birth order of child, and SLI. Dasgupta et al. found that the prevalence of MAD was significantly associated with sex of child. The study done by Khanal et al. found that there was significant association between MAD and place and mode of delivery, mother's age, and education.

**Conclusion**

The study concluded that inadequate complementary feeding practices were present among approximately half of the study population. The study also showed that various sociodemographic factors play an important role in complementary feeding practices. Therefore, these factors need to be addressed to ensure optimal feeding practices among the study population.

**What is already known?**

It is already known that the adequate complementary feeding practices are necessary for optimal growth of children.

**What this study adds?**

This study highlights that certain sociodemographic factor plays a significant role in adequate complementary feeding practices.

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**Conflicts of interest**

There are no conflicts of interest.
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