Original Article

Complementary feeding practices in children aged 6–23 months: An institution-based observational study

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ABSTRACT

Background: Inappropriate complementary feeding practices in children may lead to adverse consequences ranging from growth failure to mortality. Intervention programs intending to optimize the practices should be based on identification of the lacunae and on the assessment of the magnitude of the problem. **Aim:** The aim of the study was to determine appropriateness and adequacy of complementary feeding given to children aged 6–23 months. **Materials and Methods:** Data regarding demographic profile, maternal education, source of information for feeding, and details of complementary feeding provided in the last 24 h were obtained from caregivers, using the standard WHO questionnaire. Chi-square test was used for determining the association between optimal feeding practices and continued breastfeeding, age-group, maternal education, and source of information. **Results:** The study enrolled 480 children (mean age: 12.9+5.1 month; male: female=1.22:1). 225 children (46.87%) had minimum meal frequency and 66 (13.8%) had minimum dietary diversity, 41 (11.08%) were receiving minimum acceptable diet. Only 103 mothers (21.5%) obtained the information regarding recommended complementary feeding practices from health professionals. There was a significant association between health professional being the source of information and presence of adequate dietary diversity ($p<0.01$) and minimum acceptable diet ($p<0.01$). **Conclusion:** Complimentary feeding practices are inadequate and thus, require an intervention of healthcare providers with better involvement.

Key words: Infant nutrition physiology, Nutrition survey, Child, India

Improper complementary feeding practices result in malnutrition and sub-optimal growth in children and mortality and morbidity in elder age groups below 5 years [1-5]. Surveys have indicated that infant feeding practices are far from ideal [6-11]. Although, community and societal level initiatives are important, it is necessary to supplement them with institutional-level interventions that can be implemented during visits for treatment, growth monitoring, and immunization. Appropriate interventions can only be selected after obtaining data regarding the magnitude and nature of sub-optimal complementary feeding practices to enable practitioners to choose an appropriate intervention. Current study aimed to determine the proportion of children receiving optimal complementary feeding.

MATERIALS AND METHODS

This cross-sectional observational questionnaire-based study was performed for a period of 18 months in a tertiary care public hospital affiliated to a medical college in a metropolitan city after obtaining approval from the Institutional Ethics Committee. Children aged 6–23 months attending the general pediatric outpatient department were enrolled in the study after obtaining written consent from a parent or guardian. Children with illness or symptoms that altered routine dietary intake were not eligible for enrollment. The "24-h free recall" method was used for collecting dietary intake data [12]. Information regarding time of introduction of complementary feeds, their frequency and diversity were obtained using a predesigned and validated questionnaire from the World Health Organization (WHO) [13]. The data obtained were analyzed to determine adequacy and appropriateness of complementary feeding using WHO Infant and Young Child Feeding (IYCF) indicators, namely, minimum meal frequency (MMF), minimum dietary diversity (MDD), and minimum acceptable diet (MAD) [14]. If a child was noted to be receiving diet with inadequate dietary diversity, the accompanying parent was requested to cite the probable reasons for the same. Following are few definitions for IYCF indicators:

1. Introduction of solid, semi-solid, or soft foods: Proportion of infants (Age: 6–8 months) who receive solid, semi-solid, or soft foods.

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2. MDD: Proportion of children (Age: 6–23 months) who receive foods from 4 or more food groups [grains, roots and tubers, legumes and nuts, dairy products (milk, yogurt, and cheese), flesh foods (meat, fish, poultry, and liver/organ meats), eggs, Vitamin-A rich fruits and vegetables, other fruits, and vegetables]
3. MMF: Proportion of breastfed and non-breastfed children (Age: 6–23 months) who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. Minimum is defined as: 2 times for breastfed infants (Age: 6–8 months), 3 times for breastfed children (Age: 9–23 months), and 4 times for non-breastfed children (Age: 6–23 months).
4. Proportion of children (Age: 6–23 months) who had at least the MDD and the MMF during the previous day.

A sample size of 480 children was decided on the basis of estimate of children satisfying the eligibility criteria who could be enrolled during the study period of 12 months. The demographic parameters were expressed in terms of mean±Standard Deviation (SD) and median, IQR and percentages, as appropriate. Chi-square test was used for determining the associations of categorical variables and Exact test was used when the expected frequency was <5. Probability value (p) less than 0.05 was considered statistically significant. All statistical calculations were done using Microsoft Excel 2007 (Microsoft Corporation, NY, and USA) and SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 17.

RESULTS

The study enrolled 480 eligible children (264 boys). The maximum number of participants (254, 52.92%) was in the age-group of >12 months. The proportion of participants not receiving breastfeeds increased progressively with increasing age. It was noteworthy that even at 1−2 years of age, 223 children (87.8%) were breastfeeding. Among the total enrolled cases, 37 mothers(7.7%) were uneducated, 233(48.5%) had education up to fourth standard, 186 (38.8%) had studied beyond primary but up to ninth standard, and 24 (5%) were educated up to tenth standard or above. 95 infants (87.2%) aged 6−8 months were receiving pasty or semi-solid feeds.

The proportion of children having appropriate MMF was higher in breastfed children as compared to non-breastfeeds (p=0.59). The trend of higher proportion of breastfed babies receiving complementary feeding at MMF was noted in every age-group; however, the differences were not statistically significant. Only 2% infants of age: 6−<9 months and 8% infants of 9−<12 months were receiving feeds with desirable diversity.

Although, the proportion improved in the post-infancy population, even in this age-group almost four out of five children did not have the MDD in their meals. The difference in the proportion of children having MDD as well as MAD in the meals among breastfed and non-breastfed children was statistically significant (p=0.018) (Table 1).

Grains, roots, and tubers are the most commonly consumed complementary foods across the different age-groups of the study population (96.25%). The proportion of children consuming eggs, flesh, and Vitamin A-rich fruits and vegetables was quite low (9.17%, 6.04%, and 8.75%, respectively). Dietary pattern is considered adequate if the MMF and MDD are appropriate. Since the proportion of children with appropriate MMF and MDD was low, the proportion of children with MAD was also low (Table 1).

In our study, diet of 414 infants did not have the MDD. Their mothers, when asked about the reasons for this deficiency in the diet, 267 (64.49%) stated lack of awareness about optimum complementary feeding practices. The other reasons cited were child not ready to take certain food groups (20, 4.83%), child refusing to eat the offered food (55, 13.28%), fear of certain foods harming the child (26, 6.28%), possibility of solid food causing choking (10, 2.41%), and belief that milk is sufficient (28, 6.76%). Thirty-five mothers (8.45%) claimed adequate knowledge, but were still non-compliant. Only 103 mothers (21.46%) had obtained the information regarding complementary feeding from health professional, the rest got it from family members, friends, and community. It was shown that the level of maternal education had no association with MMF, MDD, and MAD. However, there was a significant association between source of information and MDD and MAD (p<0.01) (Table 2)

DISCUSSION

The findings from current study paint a dismal picture of complementary feeding practices in the children aged 6−23 months. Only 46% of the enrolled children had MMF, 14% children diet demonstrated MDD and <9% children were receiving MAD. Eggs, fish, and Vitamin A rich fruits and vegetables hardly made it to the children's plate (<10%). The only silver-lining was relatively higher rates of breastfeeding (89%) noted in the study population. Only 21% of mothers received information regarding complementary feeding from health personnel and they cited lack of awareness as the main reason for the child not receiving MAD. There was a significant association between source of information and minimum dietary diversity and minimum acceptable diet.

Such low figures related to MMF, MDD, and MAD have been reported in several institution- and community-based studies and surveys in India [6-11]. Although, association of appropriate complementary feeding practices with factors such as health-care access, food security status, maternal education, number of ANC visits, maternal age, and birth order have been described [15-16]. Our findings suggested that the maternal educational status did not have a significant association with optimal complimentary feeding practices, while source of information (healthcare provider) was associated with achieving MDD and MAD. However, in our study, the percentage of educated mothers was low; hence, this finding will have to be confirmed in studies with larger population. The study reports an important finding that the proportions of children with optimal MDD and MAD were significantly higher in non-breastfed babies. Similar finding was noted in a subset of infants in a study carried out in Nepal [17].

Table 1: Status of MMF, MDD, and MAD in breastfed and non-breastfed children

Age group	All values (percentage)	Receiving breast feeds [n=427 (88.96%)]	Not receiving breast feeds [n=53 (11.04%)]	Significance
	MMF appropriate			
6−<24 months, (*n*=480)	225 (46.88)	202 (47.31)	23 (43.40)	χ^2= 0.2895, df= 1, p=0.59
	MDD appropriate			
	66 (13.75)	52 (12.18)	14 (26.41)	χ^2=8.0583, df=1, p=0.004*
	MAD appropriate			
	41 (8.54)	30 (7.02)	11 (20.75)	χ^2=11.37, df=1, p=0.0007*

χ^2: Chi-square, df: Degrees of freedom

Table 2: Association of MMF, MDD, and MAD with educational status and source of information

Maternal Education	MMF		MDD		MAD	
	Yes	No	Yes	No	Yes	No
Uneducated (n=37)	16	21	2	35	2	35
≤4th Standard (n=233)	104	129	33	200	18	215
>4th-9th Standard (n=186)	96	90	25	161	17	169
≥10th standard (n=24)	9	15	6	18	4	20
Statistics	χ^2=3.19, df=3, p= 0.36		χ^2=4.78; df=3; p=0.188		χ^2=2.78; df=3; p=0.427	
Information source	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Health professional	54	49	29	74	22	81
Other	171	206	37	340	19	358
Statistics	χ^2=1.62; df=1; p=0.221		χ^2=23.42; df=1; p=0.0001*		χ^2=27.58; df=1; p=−0.001*	

However, this factor has not been studied extensively and hence could be an area of further research. Our study could not uncover the reasons for this phenomenon. However, it would be interesting to determine if this is related to a "sense of security" felt by breastfeeding mothers. If so, it would be worthwhile emphasizing the fact that breast milk alone cannot be depended on to provide all the nutrients required for the infant during the dietary counseling sessions.

The study is noteworthy for a greater number of participants enrolled than in several other institution-based studies [18-21]. Although community-based surveys are considered more representative, the importance of institution-based studies cannot be undermined, as they help in identification of priorities requiring action and also provide clues for the required interventions.

The present study helps to identify certain action points such as health-care providers need to provide great support to families in matters related to complementary feeding in line with earlier reports [10,22]. The breastfeeding rates reported in the study are quite adequate. This dichotomy of satisfactory breastfeeding rates and poor and sub-optimal status of complementary feedings has also been noted earlier [23]. The reasons for this variation could be related to less emphasis given on training of health-care providers for complementary feeding advice during counseling of mothers. It is also true that information about complementary feeding is more technical and that the provider needs to be acquainted with local foods consumed by the community and with the type of foodstuffs consumed by the family (depending on culture and customs) and is required to alter the feeding advice to suit the family's beliefs and economic status [24]. Another action point is to impart training in mother-craft (e.g. preparation of complementary food, and coaxing an infant to consume the food offered). It is necessary to equip the health-care providers with this knowledge and skills, so that they can provide the necessary support. Health-care providers in public hospitals are hard-pressed for time due to heavy patient load. However, they can gainfully engage mothers during the waiting time to impart knowledge and skills. In the long-run, it may be advisable to train a group of local women in providing counseling regarding complimentary feeding, who can in turn counsel mothers attending the hospital or those in the community [25]. Such support groups have been effectively used for promotion of breastfeeding.

Another issue that needs to be addressed is the infrequent consumption of milk, flesh, eggs, and Vitamin-A rich fruits and vegetables. Although, this could be due to ignorance, cultural reasons and child's refusal; a part of it may also be related to inability to afford these food-groups [11]. Hence, the health-care providers should also take efforts to inform mothers about the government supported program centers and schemes that offer supplementation to pregnant mothers and under-five children. The study has helped to identify the content for the awareness-cum-training program for mothers: Optimal dietary frequency and with greater emphasis on dietary diversity. It is also necessary to have conversation with individual mothers to find out what are the barriers in implementing optimum practices. If the household members are reluctant to implement appropriate practices due to taboos and misplaced beliefs, they can also be included in the awareness program. We believe that this defined content and strategies, will also be appropriate for other public institutions. It is also necessary that pre- and post-intervention data are collected and disseminated, so that successful interventions can be widely implemented.

CONCLUSION

Taken together, current study reported that majority of the children from 6 to 23 months of age, whether under breastfeeding or not, do not meet adequate MMF, MDD, and MAD. Lack of awareness regarding complementary feeding practices among the mothers was identified as the main reason for the same. We suggested that interaction of health-care professionals with the mothers regarding proper complementary feeding practices would help to improve the situation.

However, the current study, being carried out within a single institution, could not generalize the results for the entire community. The survey did not include confounding factor control. Other factors such as nutritional status of children studied, impact of socio-economic status of family, and working nature of mother on feeding practices were not taken into account. We limited our study to analyze four out of nine IYCF complementary feeding indicators.

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