

Original article

Study of Complementary feeding practices among mothers of infants aged six months to one year.

S.Kavitha, C.Nadhiya, Dr.R.Parimalavalli

Department of Food Science and Nutrition, Periyar University, Salem- 636011, TamilNadu.

Correspondence to Dr.R.Parimalavalli, email id: parimala1996@gmail.com

Abstract

Introduction: Infants and young children are at an increased risk of malnutrition from six months of age onwards, when breast milk alone is no longer sufficient to meet all their nutritional requirements and complementary feeding should be started. Hence this study was undertaken to assess the practices of complementary feeding.

Methods: This hospital-based cross-sectional study was conducted at one private hospital in Salem, Tamil Nadu during the month of December 2013. Fifty mothers of infants between six months and one year attending the paediatric outpatient departments of the above-mentioned hospital were selected for the study by random sampling technique. The study instrument was a closed ended structured questionnaire. Logistic regression was done with feeding practice as dependent and socio demographic factors as independent variables.

Results: In the present study 62% mothers had started complementary feeding before the recommended time of six months. Residence area and education level of mother were significantly related with the use of proper weaning practices. Most of the nursing mothers who were home makers and had family income more than Rs. 10,000 preferred commercial weaning foods.

Conclusion: Use of proper weaning practices among the mother was improper among the majority cases. For the betterment of infant's health, existing motivational and awareness programme

need to be strengthened and widen by the relevant authorities.

Key words: Factors, Complementary feeding, Infants

Introduction

An appropriate diet is critical in the growth and development of children especially in the first two years of life.¹ The World Health Organization (WHO) recommends exclusive breast feeding for the first six months of life, with the addition of complementary feeds at six months with continued breast feeds until at least the age of two.^{2,3} Infants and young children are at an increased risk of malnutrition from six months of age onwards, when breast milk alone is no longer sufficient to meet all their nutritional requirements and complementary feeding should be started. Initiating complementary feeds too early or too late can lead to malnutrition.¹ Complementary feeding as described by WHO refers to the addition of energy and non-energy containing fluids, non-human milk, and semi-solids or solids to children's diet.⁴ Natural weaning occurs as the infant begins to accept increasing amounts and types of complementary feedings while still breastfeeding on demand. When natural weaning is practiced, complete weaning usually takes place between two and four years of age. Planned weaning occurs when the mother decides to wean without receiving signals from the infant that he is ready to stop breastfeeding. Some reasons

commonly given for planned weaning include the following: not enough milk or concerns about the baby's growth, painful feedings or mastitis, returning to work, a new pregnancy etc.⁵

The early introduction of complementary feeds before the age of six months can lead to displacement of breast milk and increased risk of infections such as diarrhoea, which further contributes to weight loss and malnutrition.⁶ Besides this, it is thought that babies are also not physiologically ready to receive complementary feeds under six months due to immaturity of the gastrointestinal and neuro developmental systems and the kidneys. Studies have demonstrated that early introduction of complementary feeds does not result in improved growth velocities or food acceptance.⁷ Complementary feeding, if not done properly, can be followed by diarrhoea and months of growth retardation leading to kwashiorkor, marasmus and immune deficiency marked by recurrent and persistent infections which may be fatal.³ Inadequate food/nutrient intake is the major factor for malnutrition. Poor nutrition leads to underweight infants and stunting.⁸ Proper breast feeding and complementary feeding practices can prevent under five mortality by 19%.⁹ Appropriate complementary feeding depends on accurate information and skilled support from the family, community and healthcare system. Inadequate knowledge about appropriate food and feeding practices is often a greater determinant of malnutrition than the lack of food. Knowledge of mothers about these factors will help in planning interventions to improve feeding practices. It has been shown in many studies that mothers in India are unable to start complementary feeding at the right time.^{1,10} As there is a paucity of literature on the complementary feeding

practices in this region, the present study was undertaken to estimate the average age of commencement of weaning, and to determine the feeding pattern of infants, including the types of commonly used foods for weaning and their frequency in the studied population.

Methodology

Study Area :

The present study was conducted at Salem District which contains 21 blocks. Among these blocks, Salem block was selected by random sampling technique. In Salem block, four roads area was selected because more number of pediatric clinics were located. Among that Dr.Rajendhran hospital was selected as the site for the selection of nursing mothers for data collection. The main reason is that, the hospital does not only records the highest attendance of nursing mothers, but also mother from all over the district. Primary research respondents for this study were mothers with infants from six months to 12 months old. The number of nursing mothers who visit that hospital post-natal clinic for 10 days was collected and recorded. Mothers of selected infants who were willing to participate in the study were interviewed for collecting the desired information.

Sample design

The data were collected during November - December 2013. About 127 infants in the age of 0 – 12 months were registered by hospital staff member. An inclusion criteria was the mothers of infants between six and twelve months who attended pediatric department of the above mentioned clinic for growth monitoring, immunization and minor illnesses. Among the 127 infants, 62 of them were at the age of 6 – 12 months and the remaining infants were at the age of 0 – 6 months. Fifty infants who were at the age of 6 – 12 months were

selected by simple random sampling method.

Research Instrument

The main survey instrument that was used to gather responses from the nursing mothers were closed ended structured questionnaire. The instrument consisted of two sections, A and B and consisted of 25 items. Section A dealt with the socio-demography characteristics of respondents and section B elicited information relevant to the infant feeding practices and nutrient intake of the infants and the data was collected with measures such as feeding bottle, food measurement cups, glass and spoons. The average interview duration per respondent was around 30 minutes. During the data collection, the researcher manually marked, recorded and wrote down responses to the questions as the respondent answers through each question face-to-face contact.

Data Collection

Information on selected socio demographic characteristic: age (in months) and weight of the infants, socio-economic status, educational status and occupational status of the mother were collected. Age was calculated for completed months on the date of interview. Information on infant feeding practices such as initiation of breast feeding, frequency and duration of breast feeding, initiation of complementary feeding, types and preferences of complementary food were collected. Data on breast-feeding practices including number of times and frequency of feeding occasion over the prior 24 hours (24-hour recall method) were collected. Informations about age at start of complementary feeding (Months), reasons for preferring complementary feeding, frequency of complementary feeding (Times/Day), complementary food intake (Gram/Day) was measured using food measurement cups, glass and spoons, types of complementary food (types of commercial complementary food), cost

spent for complementary food per month were collected.

Data management

Socio-demographic data such as patient's age, sex, type of weaning food, economic status of the family and mother's education had been collected through structured close ended questions and were coded. Data were summarized using numerical descriptive statistics including number and percentage for data representation. The data was analyzed using SPSS version 14.0. Binary logistic regression was used to determine the variables that independently predicted early weaning with infants weaned at ≤ 6 months being the dependent variable. Multivariate binary logistic regression model was developed based on a priori literature and the results obtained from the univariate modelling in the present study. Factors were retained in the model if they were significant at the $P < 0.05$ criterion. The importance of each variable, adjusted for the others in its group, was assessed by the OR and 95 % CI.

Results

Table – 1 : List of Variables

Variables	Meaning	Type of Measurement	Type of Response
Residence Area	Living area of infants	Area	1. Urban 2. Rural
Maternal Education	Average schooling years of mother	Categories	1.Schooling 2.Graduate
Maternal Occupation	Working status of the mother	Categories	1.Homemaker 2.Employee
Income	Monthly total earning of family	Categories	1.Rs. > 10,000 2.Rs. \leq 10,000

A total of 50 mother-child pairs responded and the response rate was 100%. Table – 2 shows that 46% infants belonged to the 6–9 months age group and 54% infants belonged to the 6–12 months age

group. Nearly half of them were boys and the boys to girls ratio was 1.40: 1. The mean age was 8.84 (S.D+1.78) months and the median age was 10 months. About 30 (60%) infants had body weight more than seven kg, 58% of the infants had first birth order and 56% of the infants was first child in their family. Approximately 68% infants belonged to urban area and 60% infant's family income was more than Rs. 10,000. Half of the mothers completed their graduation and moreover majority of the selected mothers were homemakers.

Table – 2: Socio demographic profile of the subjects (N-50)

Particulars	Number (%)
Age (Months)	
6 – 9	23 (46)
9 -12	27 (54)
Gender	
Boy	29 (58)
Girl	21 (42)
Weight (Kg)	
4 – 7	20 (40)
> 7	30 (60)
Birth Order	
1	29 (58)
2	18 (36)
3	3 (6)
Number of children	
1	28 (56)
2	20 (40)
3	2 (4)
Residence area	
Urban	34 (68)
Rural	16 (32)
Family income	
Rs. ≤10000	20 (40)
Rs. >10,000	30 (60)
Mother's occupation	
Homemaker	45 (90)
Employee	5 (10s)
Mother's education	
Schooling	23 (46)
Graduate	27 (54)
Primiparous	
Yes	21 (42)
No	29 (58)

Table – 3 : Feeding practices adopted by mothers

Feeding practices	Number (%)
Time of start of breast feeding (in hours)	
<1	13 (26)
4 – 12	37 (74)
Age at start of complementary feeding (month):	
≤5	31 (62)
6	18 (36)
>6	1(2)
Reasons for preferring complementary feeding	
Mother's occupation	2 (4)
Mother's sickness	-
Additional nourishment	48 (96)
Frequency of complementary feeding (Times/Day):	
≤2	35 (70)
3 –5	15 (30)
>5	-
Complementary Food intake (Gram/Day):	
<40	28 (56)
40 - 75	21 (42)
>75	1 (2)
Types of complementary food	
Commercial baby food	32 (64)
Combination of home and commercially prepared	18 (36)
Cost for complementary food per month:	
<Rs. 150	5 (10)
Rs. 150 – 300	11 (22)
>Rs.300	34 (68)

The feeding practices of the mothers were interviewed and it is shown in Table - 3. About 62% of the mothers introduced complementary foods to their infants before 5 months, while 36 % of them were introduced at 6 months. Over half (64%) of the mothers preferred commercial weaning foods because these foods save time, convenient and good taste while 18 % of them felt that these foods were more nutritious, cheaper, better taste and easily available. One fourth of the selected mothers preferred both home-prepared and commercially- weaning foods. Approximately three fourth of the subjects (70 %) fed weaning foods twice a day to

Table – 4 : Binary logistic regression analysis of the factors associated with initiation of complementary foods

Particulars	Weaning Age (months)		Adjusted		P Value
	> 6	≤ 6	OR	95% CI	
Residence area					
Urban	10	24	1.000	0.72–	0.02
Rural	11	5	3.426	6.52	
Maternal : education					0.01
Schooling	13	10	2.054	0.38–	
Graduate	18	9	1.000	4.12	
occupation					0.00
Homemaker	28	17	1.00	0.00	
Employee	3	2	0.00		
Income					0.256
Rs. > 10,000	14	6	0.231	0.11–	
Rs. ≤ 10,000	17	13	1.000	1.15	

Table – 5 : Factors associated with factors associated with type of complementary foods

Particulars	Type of complementary foods		Adjusted		P Value
	Commercial	Commercial & Home made combination	OR	95% CI	
Residence Area:					0.02
Urban	28	6	1.24	0.42–	
Rural	4	12	1.00	6.23	
Maternal education					0.24
Schooling	15	8	0.52	0.21–	
Graduate	17	10	1.00	1.54	
occupation					0.00
Homemaker	30	15	1.00	0.000	
Employee	2	3	0.00		
Income					0.01
Rs. > 10,000	18	2	1.65	0.19–	
Rs. ≤ 10,000	14	16	1.00	3.14	

their infants, while 30 % of them fed weaning foods to their infants 3 -5 times. More than three hundred rupees per month was spent for procuring complementary foods by 68% of the mothers.

Table – 4 and 5 illustrate that binary logistic regression analysis of the factors associated with initiation and type of complementary foods respectively. Residence area and maternal education were significantly ($p < 0.05$) related with initiation of complementary foods. Residence area and family income were significantly ($p < 0.05$) related with type of complementary foods.

Discussion

In the present study 36 % of mothers started complementary feeding at the recommended time i.e., six months. In an interventional study of 35 parents in Delhi only 16.5% of mothers had started complementary feeding at the recommended time, which is less when compared to the present study.¹⁰ A prospective interview study of 200 parents by Aggarwal et al.¹ showed that only 17.5% of mothers had started complementary feeding at the recommended time. A National Family Health Survey (NFHS 3) for Karnataka

State, India showed that 72.5% of children aged 6–9 months were receiving complementary foods and breast milk.¹⁴ In our study the mothers with a less number of infants started the complementary food at the recommended time of six months (36%) and the relationship between number of infants and the practice of initiation of complementary feeding at the recommended time was statistically significant ($p = 0.02$).

In this study, all the selected mothers were literate. The association of literacy and initiation of complementary feeds at the recommended time was statistically significant ($p = 0.01$). A prospective interview study of 200 parents from Delhi also showed that knowledge about the correct timing of complementary feeding significantly correlated to maternal education and father’s education but knowledge about quantity of complementary feeds was not affected by the educational status of parents.¹ About 60% of our study population had family income more than Rs.10,000 and 40% had family income less than Rs. 10,000. The association of socio-economic status and initiation of complementary feeds at the

recommended time was not statistically significant.

In the present study 62% of infants were weaned prematurely. Premature weaning is also reported in other studies.^{1,15,16} A study from Delhi indicated that premature weaning is only 5.5% children which are lesser than the present study.¹⁵ A prospective observational study from Ireland showed that 22.6% of infants were prematurely weaned onto solids at ≤ 12 weeks with mothers reporting the maternal grandmother as the principal source of advice on infant feeding.¹⁷ A study from Brazil showed that the median age for the introduction of complementary feeds was four months.¹⁷

Majority of infants (74%) were breastfed between four and 12 hours in the present study whereas in the study done at Allahabad only 55.8% of mother initiated breastfeeding within six hours of delivery.¹⁹ A study from Mumbai¹⁵ showed that 82.3% of infants were breastfed within four hours of birth which is comparable to our study. The secondary data analysis of the National Family Health Survey 2005–06, which consisted of a sample size of 20,108 children showed that only 23.5% of mothers had initiated breastfeeding within the first hour after birth and 56.7% of infants aged six to nine months received complementary feeds.¹⁹ About 70% of the mothers fed complementary foods twice a day to their infants. Efetie et al²⁰ stated that over half (54.0 %) of the nursing mothers fed their infants thrice daily with weaning foods, while 4.7 %, 23.7 % and 17.7 % of them fed their infants once daily, twice daily and several times with weaning foods respectively.

In the present study, majority of the mothers preferred commercial weaning foods. Studies revealed that the energy density and nutritive value of local weaning foods in many developing countries are suboptimal.^{21,22} There is therefore need to encourage mothers to add more nutritive foods to infant weaning

foods. Such preference should be encouraged as the WHO/UNICEF advice that home-prepared weaning foods are socioeconomically more acceptable for families and communities because it eliminates the importation of expensive commercially-prepared weaning foods.²³ WHO/UNICEF also advocate that mothers should be encouraged to feed their infants with locally available home-prepared foods which contain calories, proteins, minerals and vitamins. About 64% of the nursing mothers had preference for commercial weaning foods because they felt that they save time, convenient and taste better. About nine and nine percent of the nursing mothers had preferred home made weaning foods and combination of home made and commercial weaning foods. Efetie et al²⁰ reported that over three-quarter (76.0 %) of the nursing mothers had preference for home-prepared weaning foods, while 9.0 % and 15.0 % of them had preference for commercially-prepared weaning foods and combination of home-prepared and commercially-prepared weaning foods respectively.

Conclusions

The findings of this study indicate that majority of the cases (62%) were not up to the mark in proper use of weaning practices. Residence area and education level of mother were significantly related with the use of proper weaning practices. Most of the nursing mothers who were home makers and had family income more than Rs. 10,000 preferred commercial weaning foods. Appropriate complementary feeding should start from age of six months with continued breast feeding up to two years. The result of this study would help in educating and counselling the prospective mothers about complementary feeding.

Acknowledgement:

The authors are thankful to the mothers of infants and to Dr.Rajendhran and his staff in that hospital for their cooperation in the study.

References:

1. Aggarwal A, Verma S, Faridi MMA, Dayachand. Complementary feeding reasons for inappropriateness in timing, quantity and consistency. *Indian J Pediatr.* 2008; 75: 49-53.
2. World Health Organization. Global strategy for infant and young child feeding. Geneva, WHO,2003.Availablefrom:http://www.who.int/nutrition/publications/infantfeeding/infant_feeding.
3. World Health Organization. Complementary feeding - Report of the global consultation Summary of Guiding principles Geneva, 2001. Available from: www.who.int/entity/nutrition/publications/infantfeeding/Complementary_Feeding.pdf.
4. Iqbedioh SO, Oqbani AO. College of Food Technology, University of Agriculture, Makurdi, Nigeria. [pubmed.com] 2004.
5. Imtiaz M, Izhar TS. Feeding practices of infants in Lahore. *Pak pediar J*, 2004; 21: 115-20
6. The breast feeding promotion network of India. Introducing solids (Complementary Feeding) Available from: http://www.bpni.org/breastfeeding/introcomplementary_feeding.html
7. Cohen RJ, Rivera LL, Canahuati J, Brown KH, Dewey KG. Delaying the introduction of complementary feeding until 6 months doesn't affect appetite or mother's report of food acceptance of breast fed infants from 6-12 months in a low income Honduran population. *J Nutr.* 1995; 125(11): 2787-92.
8. Kapur D, Sharma S, Agarwal KN. Dietary intake and growth pattern of children 9-36 months of age in an urban slum in Delhi. *Indian Pediatr.* 2005; 42: 351-356.
9. Jones G, Stekette RW, Black RE, Bhutta ZA, Morris SS. How many child deaths can we prevent this year?. *Lancet* 2003; 362: 65-71.
10. Sethi V, Kashyap S, Seth V. Effect of nutrition education of mothers on infant feeding practices. *Indian J Pediatr.* 2003; 70: 463-466.
11. Government of India; National Family Health Survey (NFHS 3) 2005-2006.Fact Sheet Karnataka State. Available from: www.mohfw.nic.in/factsheets/KA.pdf.
12. Parekh C, Bavdekar SB, Shaharao V. Study of infant feeding practices: factors associated with faulty feeding. *J Trop Pediatr.* 2004; 50: 306-308.
13. Tarrant RC, Younger KM, Sheridan PM, White MJ, Kearney JM. Factors associated with weaning practices in term infants: a prospective observational study in Ireland. *Br J Nutr.* 2010; 104: 1544-54.
14. Caetano MC, Ortiz TT, DaSilva SG, De Souza FI, Sarni RO. Complementary feeding: Inappropriate practices in infants. *J Pediatr (Rio J).* 2010; 86: 196-201.
15. Kumar D, Goel NK, Mittal PC, Misra P. Influence of infant-feeding practices on nutritional status of under- five children. *Indian J Pediatr.* 2006 ;73:417- 421.
16. Patel A, Badhoniya N, Khadse S, Senarath U, Agho KE, Dibley MJ. South Asia Infant Feeding Research Network. Infant and young child feeding indicators and determinants of poor feeding practices in India: secondary data analysis of National Family Health Survey 2005-06. *Food Nutr Bull.* 2010; 31: 314-33.
17. Efezie OB, Oyibo PG, Okperi BO. Weaning practices among nursing mothers in ethiope east local Government area of delta state, Nigeria. *Continental J. Biomedical Sciences.* 2011; 5 (2): 19 – 28.
18. Treche S, Mbome IL. Viscosity, energy density and osmolality of gruels for infants prepared from locally produced commercial flours in some developing countries. *Int J Food Sci Nutr.* 1999; 50: 117-125
19. Federal Ministry of Health (2006). Infant and young child feeding in Nigeria. Department of Community Development and Population Activities; FMOH, Abuja,Nigeria
20. WHO/UNICEF (2007). Global strategy for infant and young child feeding. World Health Organization, Geneva