

Comparison of feeding practices among rural and urban mothers and their effect on nutritional status of children

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Received - 12 March 2018

Initial Review - 09 April 2018

Published Online - 07 May 2018

ABSTRACT

Objective: The objective of this study was to compare the nutritional status in infants based on infant feeding practices among rural and urban areas. **Methods:** An observational study was carried out in the Department of Paediatrics of a tertiary care hospital of New Delhi. The present study included a total of 1000 children, of which 500 were from rural and 500 from urban background over a period of 1 year. Information on breastfeeding and complementary feeding practices was recorded. **Results:** In this study, we found that early initiation of breastfeeding (within 1 h after birth) was significantly more common in urban area as compared to rural (71.8% vs. 54.2%; $p=0.001$). Significantly higher proportion of mothers in urban population (88.0%) was frequently breastfeeding their children than rural ones 76.0% ($p=0.001$). Practice of night feeding was same in both the groups. Practices of giving prelacteal feeding were significantly higher in rural than in urban area (50.2% vs. 18.4%; $p=0.001$). Children in whom complementary feeding was introduced beyond 6 months had significantly higher occurrence of malnutrition (68.6% vs. 55.4%; $p=0.004$). Type of complementary feed did not affect the occurrence of malnutrition. **Conclusion:** Exclusively, breastfed children below 6 months of age and children where complementary feeding is introduced timely at 6 months have lower incidence of malnutrition as compared to those given top feeding before 6 months and inappropriate complementary feeding beyond 6 months of age.

Key words: Breastfeeding, Colostrum, Malnutrition

Appropriate feeding practices are of primary importance for the survival, growth, development, and nutrition of infants and children. The most important factor that affects growth of various organs of child is the nutrition. Breastfeeding is the primary source to provide nutrition in all newborns. Guidelines issued by the World Health Organization (Pan American Health Organization, 2002; World Health Organization, 2002) and Government of India (Ministry of Women and Child Development, Food and Nutrition Board, 2006) [1] recommend that a child should have exclusive breastfeeding till 6 months of age. Early breastfeeding within 1 h and exclusive breastfeeding for the 6 months are the key interventions to achieve millennium development goal 1 (MDG) and MDG 4 [2], which deal with reduction in child malnutrition and mortality. In India, effective implementations of these interventions are yet to be achieved.

National Family Health Survey-4 data show that the initiation of breastfeeding within 1 h is only 34.5% while the exclusive breastfeeding rates in children <6 months are only 58.2% [3] Further, it is advised that complementary feeding should be started at 6 months of age, with continuation of frequent, on-demand breastfeeding at least until 2 years of age. Optimal infant and young child feeding (IYCF) practices; especially, early initiation and exclusive breastfeeding for

the first 6 months of life, help ensure young children the best possible start to life and to start complementary feeding at 6 months of age [4]. Improper feeding practices result in malnutrition and hence various illnesses in children.

Malnutrition has been responsible, directly, or indirectly, for 60% of the 10.9 million deaths annually among children under five. Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the 1st year of life. Undernutrition is the underlying cause for about 50% of the 2.1 million under-5 deaths in India each year.

It is clear that infant feeding practices are the major determinants of nutritional status of infants and young children which, in turn, can be affected by various sociodemographic factors. Hence, the present study was designed as an observational study to understand and compare the locally prevalent infant feeding practices and their effect on the nutritional status and anemia of infants and toddlers.

METHODS

This observational study was carried out in the Department of Pediatrics of a tertiary care hospital of New Delhi after getting

approval from Ethical Committee. Children aged 0–3 years attending OPD and IPD of the department of pediatrics who were free from any severe illness or any congenital anomaly were included in the study.

Pre-designed questionnaire in Hindi was prepared after incorporating suggestions of all the respective faculty member, colleagues, and seniors. After informed consent of parents or guardians (staying with the child for at least 1 year), pro forma was filled within 20–30 min. Performa included mother's education, occupation, socioeconomic status, feeding practices of infant, and anthropometric examination of infants and hemoglobin estimation.

For assessing breastfeeding and complementary feeding practices, we followed the recommended feeding assessment questions as mentioned in integrated management of neonatal and childhood illness (IMNCI) feeding assessment chart. Nutritional status was assessed by clinical examination and anthropometric measurements including weight, height, and midupper arm circumference. Anthropometric measurements (weight for age, height for age, and head circumference) of the study group were compared with the percentile curves for weight, length/height, and head circumference for girls and boys based on the WHO standards growth charts 2006 "Multicentre Growth Reference Study." Children were classified into different grades of malnutrition according to IAP classification based on weight for age. Examination was done for clinical signs of malnutrition such as anemia, skin and hair changes, loss of subcutaneous fat, edema, bitot spot, gum bleeding, teeth eruption, and signs of rickets (frontal bossing, rachitic rosary, Harrison's sulcus, bowing of legs, knock knee, and delayed dentition).

RESULTS

In this study, we found that the early initiation of breastfeeding (within 1 h after birth) was significantly more common in urban area as compared to rural (71.8% vs. 54.2%; $p=0.001$). Significantly higher proportion of mothers in urban population (88.0%) was frequently breastfeeding their children than rural ones 76.0% ($p=0.001$). Practice of night feeding was same in both the groups. Practices of giving prelacteal feeding were significantly higher in rural than in urban area (50.2% vs. 18.4%; $p=0.001$). The most common prelacteal feeds in rural and urban area were kadha (homemade mixture of water with honey or jaggery) (34.2%) and animal milk (71.8%), respectively (Table 1).

Colostrum feeding was significantly higher in urban than the rural area (95.8% vs. 69.4%; $p=0.001$). Practices of exclusive breastfeeding were higher in urban mothers (90.2% vs. 74.4%, $p=0.001$). We have also compared complementary feeding practices of rural and urban population. Significantly higher proportion of rural mothers introduced complementary feeds at a later age than required in comparison to the urban mothers, who appropriately introduced complementary feed at 6 months of age (25.8% vs. 7.5%; $p=0.001$). In rural area, milk-based cystic fibrosis (CF) was given in 43.2%, mixed in 40.3%, and cereal

Table 1: Breastfeeding practices among study group in rural and urban area

Variables	n=500 (%)		p value
	Rural	Urban	
Initiation of BF			
<1 h	271 (54.2)	359 (71.8)	0.001
1 h-1d	69 (13.8)	74 (14.8)	
>1d	160 (32.0)	67 (13.4)	
Frequency			
<8 times	120 (24.0)	60 (12.0)	0.001
≥8 times	380 (76.0)	440 (88.0)	
Night feed			
Given	490 (98.0)	491 (98.2)	0.817
Not given	10 (2.0)	9 (1.8)	
Prelacteal feed			
Given	251 (50.2)	92 (18.4)	0.001
Not given	249 (49.8)	408 (81.6)	
Type of prelacteal feeds			
Sugar water	42 (16.7)	15 (16.3)	0.001
Honey	33 (13.2)	0 (0)	
Tea	30 (12.0)	11 (11.9)	
Kadha	86 (34.2)	0 (0)	
Milk (animal)	60 (23.9)	66 (71.8)	
Total	251 (100)	92 (100)	
Colostrum			
Given	347 (69.4)	479 (95.8)	0.001
Not given	153 (30.6)	21 (4.2)	
Exclusive BF till 6 months			
Given	293 (74.4)	370 (90.2)	0.001
Not given	101 (25.6)	40 (9.8)	
Total	394 (100)	410 (100)	

based in 16.5% of the cases. In urban population, the most common complementary feed was mixed type (73.5%), followed by milk based (18.2%), and the least common was cereal based (8.3%). Higher proportion of rural children was given complementary feeds less than recommended age-specific appropriate frequency than urban population (11.9% vs. 9.9%, $p=0.349$) as shown in Table 2.

In this study, we have assessed various complementary feeding practices with their effect on nutritional status of the infants. Children in whom complementary feeding was introduced beyond 6 months had significantly higher occurrence of malnutrition (68.6% vs. 55.4%; $p=0.004$). Type of complementary feed did not affect the occurrence of malnutrition. Of all those who were given milk-based CF feeds, 55% were malnourished. Malnutrition in mixed and cereal-based feeding group was 58.2% and 68.3%, respectively ($p=14.49$). In the present study, those children who were given complementary feeding in an inappropriate frequency had higher proportion of malnourished children as compared to those who were fed appropriately as per IMNCI guidelines (59.2% vs. 52.3%), but it was not a statistically significant difference ($p=0.212$). Children who were given bottle feeding

had higher proportion of malnourished children as compared to those who were not fed by bottle (64.7% vs. 52.5%, $p=0.001$) as shown in Table 3.

DISCUSSION

Appropriate IYCF practices are important for the growth, development and, hence, survival of infants and young children. Feeding practices include breastfeeding and complementary feeding practices. Several factors such as maternal age, education, socioeconomic status, marital status, breastfeeding support, and counseling affect the feeding practices. In the present study, we tried to find out the effect of prevalent feeding practices on the nutritional status of children. In our study, the prevalence of malnutrition in children <3 years was 56.1%, and the proportion of malnourished children in rural and urban population was 70.0% and 42.2%, respectively. It was higher than that reported by NFHS-4 (2015–2016) data [3].

Breastfeeding initiation is delayed across the country because of the belief that mother's milk does not come at the time of childbirth but flows 2–3 days later. The present study shows that 50.2% of the rural and 18.4% of urban babies received prelacteal

feeds, and the most prevalent prelacteal feeds were kadha (86%) in rural area and animal milk (71.8%) in urban areas. The results were similar to several other studies [5–9]. In the present study, colostrum was given to 95.8% of urban and 69.4% of rural babies. There is variation in the prevalence of giving colostrums countrywide. Several studies have also found similar results, i.e., in rural areas, colostrum is usually not given or given in low quantity [10,11].

In the present study, practice of giving exclusive breastfeed till 6 months was found in 90.2% of the urban and 74.4% of the rural population. It is quite satisfactory as compared with NFHS-3 data and other studies; also, it is quite high as compared with other study. While according to NFHS-3 data, less than half of the children of <6 months of age are exclusively breastfed in India and only one-third of the children of <4 months of age were exclusively breastfed in MP. Several studies were done in various parts of country also show low rate of exclusive breastfeed [5,9,12–14].

In the present study, bottle feeding was practiced by 35.0% of the rural and 19.4% of the urban mothers. Formula milk feeding was done by 2% of rural and 7.2% of urban mothers. Previous studies have reported a comparable bottle feeding prevalence [12–15]. In the present study, timely introduction of complementary food was found in 92.5% of urban and 74.2% of rural population, rest did delay introduction of complementary food, which was quite higher than other studies [8,13,14]. This late introduction of weaning food by Indian mothers is a well-documented fact [15].

In the present study, the most common complementary food in rural population was milk-based preparation (43.2%) followed by mixed type (40.3%), and the least common was cereal based (16.5%), whereas in urban area, the most common was mixed type (73.5%), followed by milk based (18.2%), and the least common was cereal based (8.35). These results were also similar to the studies done previously in Indian scenario [7,12]

In the present study, the children who were given prelacteal feeds and delayed initiation of breastfeeding had significantly

Table 2: Complementary feeding practices in children of rural and urban areas

Complementary feeding practices	Rural n=419 (%)	Urban n=385 (%)	p value
Time of introduction			
Appropriate	311 (74.2)	356 (92.5)	0.001
Delayed	108 (25.8)	29 (7.5)	
Type			
Milk based	181 (43.2)	70 (18.2)	0.001
Cereal based	69 (16.5)	32 (8.3)	
Mixed	169 (40.3)	283 (73.5)	
Frequency			
Inappropriate	50 (11.9)	38 (9.9)	0.349
Appropriate	369 (88.1)	347 (90.1)	

Table 3: Association of complementary feeding practices and bottle feeding with various grades of malnutrition

Variable	n (%)				Total
	Normal	Grade I	Grade II	Grade III and IV	
Time					
Appropriate	291 (43.6)	259 (38.8)	74 (11.1)	43 (6.4)	667
Delayed	43 (31.4)	67 (48.9)	27 (19.7)	0 (0.0)	137
Type					
Milk based	113 (45.0)	92 (36.7)	36 (14.3)	10 (4.0)	251
Cereal based	32 (31.7)	69 (68.3)	0 (0.0)	0 (0.0)	101
Mixed	189 (41.8)	165 (36.5)	65 (14.4)	33 (7.3)	452
Frequency					
Inappropriate	42 (47.7)	36 (40.9)	10 (11.4)	0 (0.0)	88
Appropriate	292 (40.8)	290 (40.5)	91 (12.7)	43 (6.0)	716
Bottle feeding					
Given	96 (35.3)	70 (25.7)	62 (22.8)	44 (16.2)	272
Not given	343 (47.1)	306 (42.0)	49 (6.7)	30 (4.1)	728

higher prevalence of malnutrition than those in whom it was omitted. Our findings are comparable with that of Reissland *et al.*, which state that in 20.3% children breastfeeding was initiated within 2 h of birth, while in 15.82% children, it was delayed beyond 2 days of delivery. These were the children in whom severe degree of malnutrition was observed.

The main limitation of our study was that only feeding practices were taken as the main variable to assess the status of nutrition in infants and children. However, various other parameters such as maternal education and socioeconomic factors also have impact on childhood malnutrition and may be contributing to such high prevalence of malnutrition in the present study.

CONCLUSION

It was concluded that mothers living in rural areas do not have much knowledge about proper feeding practices as compared to urban living mothers. The most important determinants of nutritional status of the children are early initiation of breastfeeding and timely and appropriate implementation of complementary feeding and hence proper growth of them.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Goutam S, Eske GS, Singh P, Kashyap A. Comparison of feeding practices among rural and urban mothers and their effect on nutritional status of children. *Indian J Child Health*. 2018;5(5):328-331.

Doi: 10.32677/IJCH.2018.v05.i05.004