ORIGINAL ARTICLE

A Comparative Study of infant and young child feeding practices (IYCF) and nutritional status under two years of age

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Abstract

Background: Infant and young child feeding is a key area to improve child survival and promote healthy growth and development. NFHS-4 2015-16 reveals improvement in EBF from 46.4% (NFHS-3) to 54.9% in India. Improvement is less in urban area (46.8%) as compared to rural area (54.2%). NFHS 4 reveals decline in EBF from 51.3% (NFHS-3) to 41.6% in Uttar Pradesh. **Aims & Objectives**: To compare the finding of feeding practices and nutritional status between urban and rural children. **Settings and Design**: Conducted in the field practice areas of Rural and Urban Health training centre of Muzaffarnagar Medical College. A list of all the registered children up to two years of age was obtained. Period of study was one year. **Methods and Material**: The sample size calculated using prevalence for urban and rural at 12% permissible error of P. The total sample size (250+ 660) 910 was taken. Statistical analysis used: The data analysed using StatCalc version 8.2.2 software. **Results**: 43.6% of the children were being exclusively breastfed in rural areas vis-à-vis 29.8% in urban areas. 40.4% were timely fed and 24% were late in starting complementary feeding. Appropriate caloric intake was seen only in 37.9% children. Maximum appropriate intake was there in 0-6 month's children (62.8%) and this progressively decreased as the age increased, to 40.5%, 17.1% at 6-12 month's, 12-24 months respectively. Thus age was significantly associated with mean deficiency of calories ($p<0.0001$). **Conclusions**: Age of the child was found to be associated with mean deficiency of calories. 33.3% of children fell in the category of wasting and 48.6% of children were stunted.

Keywords

Exclusive Breastfeeding; Complementary feeding; Top feeding

Introduction

Infant & young child feeding is area to improve child survival and promote healthy growth and development. The first 2 years of a child's life are important, as nutrition during this period lowers morbidity & mortality, reduces the risk of chronic disease, and fosters development. (1) WHO and UNICEF recommend early initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first 6 months of life, introduction of complementary foods at 6 months with breastfeeding up to 2 years of age. Nutrition during 1,000-day window of mother's pregnancy and children up to two years of age has an impact on a child's ability to grow, learn and a lasting effect on a country's health and prosperity.(2) In 2012, the WHA endorsed a plan on

maternal, infant and young child nutrition with six global nutrition targets by 2025. (3)

Aims & Objectives

To compare the feeding and nutritional status of children less than two years between urban and rural children

Material & Methods

Materials and Methods: The present study was conducted in the field practice areas of Rural and Urban Health training centre of the Department of Community Medicine, Muzaffarnagar Medical College Muzaffarnagar, Uttar Pradesh India. A list of all the registered children up to two years of age was obtained from Rural and Urban health training centres. The study design was a community based cross-sectional study. The sample size calculated separately in the back drop of different prevalence for urban [31.8% Prevalence (NFHS 3](4) and rural [55.8% Prevalence (NFHS 3)](4) at 12% permissible error of P. For Urban, the sample size came out to be 660 taking 10% of non-respondent. For rural, the sample size came out to be 250 taking 10% of non-respondent. The total sample size (250+ 660) 910 was taken. The inclusion criteria was children up to two years of age in the families registered under the rural and urban health training centres of the department. The exclusion criteria was all the mothers who did not give consent for the study and lactating mothers staying in the area for less than 6 months. With assurance of confidentiality of the information given by mothers/respondents to maintained, an informed consent was taken. They were interviewed using a semi-structured, pre-tested proforma. General examination of the child done and the weight of the child were taken with the help of spring type of weighing scale in minimum clothes without shoes. The required number of the study population was obtained by applying the simple random number table for each villages/area. Then every identified household was visited and the primary/secondary respondents were interviewed for the study. Operational feeding practices definition in the study was used.

Exclusive Breastfeeding means infant receive breast milk (including milk expressed or from a wet nurse) till six months of age. It allows the infant to receive ORS, drops, syrups (Vitamins, minerals, medicine) as per doctor's prescription. It does not allow the infant to receive anything else.

Predominant breastfeeding requires breast milk (including milk expressed or from wet nurse) as the predominant source of nourishment. It allows the infant to receive certain liquids (water and water-based drinks, fruit juice), ritual fluids and ORS, drops or syrups (vitamins, minerals, medicines). It does not allow the infant to receive anything else (in particular, non-human milk, food-based fluids).

Complementary feeding requires that the infant receive breast milk (including milk expressed or from wet nurse) and solid or semi-solid foods. It allow the infant to receive anything else

Bottle feeding requires that the infant receive any liquid (including breast milk) or semi-solid food from a bottle with nipple/teat. It allow the infant to receive anything else.(5)

Appropriate feeding: A child being exclusively breastfed during first six months of life and then being continued with breastfeeding along with supplementary feeding from six months of life till two years of life. (We have not included the adequate caloric intake along with the introduction of timely supplementary feed in our definition)**.**

Predominant top feeding: The infant's predominant source of nourishment has been top milk.

Only top feed: The child has received only top milk and never received any breast milk.

Data Analysis: The data entered in MS Excel sheet and analysed using StatCalc version 8.2.2 software. The tests used were Chi-Square Test and ANOVA

Results

A total of 910 children were included in the study, which formed the study population. Out of 910 study population we had 491 (54%) male and 419 (46%) female children in our study. Majority of the children in the study population were Hindus (54%) followed by Muslims (46%) in rural area. In urban area the majority of children in the study population were Muslims (92.7%) followed by Hindus (7.3%).

Feeding Practices

A detailed history of feeding during the first six months of life was taken from all the mothers. 43.6% of the children had been or were being exclusively breastfed in rural areas vis-à-vis 29.8% in urban areas. 32.8% of the children had been or were being predominantly breastfed in rural areas vis-à-vis 46.2% in urban areas. In totality, 33.6% had been or were being exclusively breastfed, 42.5% were predominantly breastfed, 15.1 were predominantly top fed and 8.8% were only top fed [Table 1].

[Table 2] describes the distribution of the children according to the time at which complementary feeding started. 40.4% were timely fed and 24% were late in starting complementary feeding. 28.9% of mothers had not initiated any kind of complementary feed at the time of interview.

Comparing the rural urban differences, it was observed that timely complementary feeding was started by almost same proportion of mothers in the rural areas (41.2%) as compared to the urban areas (40.2%). Early introduction of complementary feeds was seen significantly more in urban areas (8.3%) as compared to rural area (2.4%) (P<0.002).

Nutritional status

The caloric intake of the study population was calculated (based on the recommended allowance) for all age groups on the basis of mean caloric intake. The children were classified into those having inappropriate or deficient calories and those having appropriate or adequate calories. From the total study population appropriate caloric intake was seen only in 37.9% children. Maximum appropriate intake was there in 0-6 month's children (62.8%) and this progressively decreased as the age increased, to 40.5%, 17.1% at 6-12 month's, 12-24 months respectively. Thus age was significantly associated with mean deficiency of calories (p<0.0001).

The mean deficiency of calories in relation to different grades of malnutrition. Progressively increase trend in the deficiency of calories was seen as the grade of malnutrition increased (P<0.0001). Thus, we can conclude that caloric deficiency was as important as timely complementary feeding.[Table 3]

48.6% of the children in our study subject were stunted or too short for age which indicates that they had been undernourished for some time. In our study stunting was more seen in urban areas (50.6%) as compared to 43.2% in rural area (P<0.046). 33.3% of them were wasted or too thin for their height which may have resulted from inadequate recent food intake or recent illness. Slightly more wasting seen in rural area (35.2%) as compared to urban area (32.6%) (P<0.0453).[Table 4] & [Table 5]

Discussion

In our study 43.6% of the children had been or were being exclusively breastfed in rural areas vis-à-vis 29.8% in urban areas. In totality, 33.6% had been or were being exclusively breastfed, 42.5% were predominantly breastfed, 15.1% were predominantly top fed and 8.8% were only top fed. These findings corroborates with the findings of a survey undertaken by BPNI in (2011)(6) in order to assess the current situation of breastfeeding in 4 districts of Uttar Pradesh which reports EBF to be 36%. Ashwini et al. (2014)(7) had reported exclusive breastfeeding to be 16.25% in urban area and 15.26% in rural area of J.N.M.C Belgaum. Kumar et al. (2015)(8) had reported exclusive breastfeeding to be 48.5% in infants of rural Western Uttar Pradesh. Asif Khan and Radha R (2013)(9) had reported that only 35% of mothers did exclusive breastfeeding in children less than 6 months of age in Nagamangala Tuluk of Mandya district in Karnataka. Dipen V.Patel et al. (2015)(10) had reported exclusive breastfeeding to be 55.9% in children attending paediatric OPD of Tertiary Care Shree Krishna Hospital of Pramukhswami Medical College located at Karamsad from Anand district of Gujarat. Chudasama RK, and Amin CD (2015)(11) had reported exclusive breastfeeding to 62% by the end of six months of age of infant in a cohort study done in Rajkot Gujarat. In our findings, 43.2% children were being fed appropriately, out of which 26.1% were of the age group of less than six months and 73.9% were of the age group of six months to two years. Similar findings of inappropriate breastfeeding and complementary feeding practices were given in many studies [Philip et al. (2003), Khokhar et al. (2003)] (12, 13,). In the present study 40.4% were timely fed and 24% were late in starting complementary feeding. Aneja et al. (2001)(14) observed that 11.6% children had not started taking solids in their weaning diets at the time of interview. Likewise, in a study done in several blocks in India, similar to our observations 25.7% of mothers had not initiated any kind of complementary feeding of their infants (Gupta and Gupta, 2003).(15) Passi and Shad, (2004)(16)reported 5.26% of the study population were complementary feeding at 2-3 months of age. In agreement with our observation Aneja et al. (2001)(14) reported the timely introduction of semisolids and solids was done in 46.9% and 54.7% children respectively. NFHS-4 (2015-2016) factsheet for Uttar Pradesh (17) data depicts that only 32.6% breastfed children received solid and semi-solid food along with breast milk between 6-8 months of age. Khan et al. (1990)(18) reported that the mean age of introduction of solid food in a child diet varies considerably across the country. The earliest introduction of solid food was reported in west

Bengal (6.9 months, urban & 8.5 months, rural) while in Poona (Maharashtra) and Hyderabad (Andhra Pradesh) it was introduced as late as 24 months. In a study by Khokhar et al(2003)(13) the age of introduction of solid food/semi-solid foods items was 4-5 months in 47.8% children and 10-11 months in 0.1% children. Mahmood et al. (2012)(19) reported about one quarter of the respondents in their study started complementary feeding before six months. Too early or late introduction of complementary feeds was common and responsible for under nutrition between six and twenty-four months Ramchandaran P (2004).(20)Growth faltering incipiently worsens from around six months of age and results in malnutrition in later months and years. NFHS-4 (2015-2016) factsheet for Uttar Pradesh.(17) data revealed that 32.6% of children were receiving solid or semi solid foods at the age of 6-8 months of age. The present study outlines 59.1% (538) of children fell in the category of normal and remaining 40.9% (372) were underweight. NFHS-4 (2015-2016) factsheet for Uttar Pradesh(17) also reported 39.5% underweight children in Uttar Pradesh. The present studies outlines 48.6% of the children in our study subject was stunted or too short for age which indicates that they had been undernourished for some time. In our study stunting was more seen in urban areas (50.6%) as compared to 43.2% in rural area. 33.3% of them were wasted or too thin for their height which could have resulted from inadequate recent food intake or recent illness. More wasting seen in rural area (35.2%) compared to urban area (32.6%). Our finding is similar with NFHS-4 (2015-2016) factsheet for Uttar Pradesh.(17) data as (46.3%) under age free were stunted or too short for their age (more in rural {48.5%} as compared to urban {37.9%}). Wasting in our study was slightly on higher side, as 19% are wasted (16.5% for urban and 20.3% for rural), or too thin for their height as per NFHS-4 (2015-2016) factsheet for Uttar Pradesh.(17) 17.9% percent were underweight, which takes into account both chronic and acute undernutrition and was in line with our study

Conclusion

On observing the feeding pattern it can be ascertained that most mothers believed in predominant breastfeeding (42.5%) and exclusive breastfeeding (33.6%) had still not reached 50% with more deficiency in urban areas

A shift from breastfeeding to breastfeeding with supplementary food and to only supplementary food, as the age of the child increased, exhibited the transition of various feeding practices with the increase in age

1. Age of the child was found to be significantly associated with mean deficiency of calories.
2. Severely undernourished children (<3SD) was maximum in the age group of 12-24 months.
3. 33.3% of children fell in the category of wasting and 48.6% of children were stunted. Stunting was seen more in urban as compared to rural areas

Recommendation

Family should extend their unwavering support till 1000 days of mother's pregnancy and child as it is often witnessed that mother's health and nutrition is neglected post-delivery of the child. Increase in caloric content of the children should be supervised and growth of children needs a regular monitoring. Proper utilisation of Village Health Sanitation and Nutrition Day (VHSND) where all stakeholders participate in the development of the community. Mother and Child Protection Card (MCP card) use should not be restricted for immunization purpose only but it shall also record growth patterns of the concerned child. A management information system capable of collating and analyzing appropriate information on breastfeeding and complementary feeding from national and district based surveys is important

Limitation of the study

The main drawback of the study is memory or recall bias. There was every possibility that mother could have forgotten the events pertinent to birth history and history of feeding patterns of the children

Relevance of the study

Comparative analysis of feeding practices in children less than 2 years contribute to one section of 1000 day model which is the fulcrum of nutrition of children. Studies in 1000 day model, help us to address the important impediments faced and will contribute in accomplishing the nutritional target as mentioned in Poshan Abhiyan.

Authors Contribution

All authors havecontributed equally.

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Tables

TABLE 1 HISTORY OF BREAST FEEDING DURING THE FIRST SIX MONTHS OF LIFE (N=910)

Type of feeding practice	Rural		Urban		Total	
(At 0-6 months of age)	No	%	No	%	No	%
Exclusively Breastfed	109	43.6	197	29.8	306	33.6
Predominantly Breastfed	82	32.8	305	46.2	387	42.5
Predominantly Top fed	38	15.2	99	15	137	15.1
Only Top Fed	21	8.4	59	8.9	80	8.8
Total	250	100	660	100	910	100
x^2=17.931 df=3, p<0.0001, Significant.						

TABLE 2 DISTRIBUTION OF CHILDREN ACCORDING TO THE TIME AT WHICH COMPLEMENTARY FEEDING WAS STARTED (N=910)

Time	Rural		Urban		Total	
	No	%	No	%	No	%
Early (3-5 months)	6	2.4	55	8.3	61	6.7
Timely (6 months)	103	41.2	265	40.2	368	40.4
Late (≥ 7 months)	54	21.6	164	24.8	218	24
Not introduced at the time of interview	87	34.8	176	26.7	263	28.9
Total	250	100	660	100	910	100
x^2=14.521 df=3, p<0.002, Significant						

TABLE 3 DISTRIBUTION OF THE CHILDREN ACCORDING TO THE MEAN DEFICIENCY OF CALORIES (N=910)

Age	Inappropriate		Appropriate		Total	
	No	%	No	%	No	%
0-6	102	37.2	172	62.8	274	30.1
06-Dec	163	59.5	111	40.5	274	30.1
Dec-24	300	82.9	62	17.1	362	39.8
Total	565	62.1	345	37.9	910	100
x^2=139.174 df=2, p<0.0001, Significant						
Age	Rural		Urban		Total	
	No	%	No	%	No	%
0-6	18	17.6	84	82.4	102	18.1
06-Dec	39	23.9	124	76.1	163	28.8
Dec-24	99	30	201	67	300	53.1
Total	156	27.6	409	72.4	565	100
x^2=10.533 df=2, p<0.005, Significant						

TABLE 4 RELATIONSHIP BETWEEN THE GRADE OF MALNUTRITION AND MEAN DEFICIENCY OF CALORIES (N=565)

Grade of malnutrition	No. of	%	Mean	Standard	F =112.955
	Children			Deviation	df=564
Normal	193	34.3	114.2	97.3	
Underweight	259	45.8	202.5	86.9	P<0.0001
Severely underweight	113	20	305.9	160.2	
Total	565	100			Significant
Rural					
Grade of malnutrition	No. of	%	Mean	Standard	F =30.281
	Children			Deviation	df=155
Normal	58	37.2	118.3	87.3	
Underweight	75	48.1	204.2	89.3	P<0.0001
Severely underweight	23	14.7	309.2	169.3	
Total	156				Significant
Urban					
Grade of malnutrition	No. of	%	Mean	Standard	F =85.013
	Children			Deviation	df=408
Normal	135	33	112.3	99.2	
Underweight	184	45	199.8	84.9	P<0.0001
Severely underweight	90	22	303.9	154.5	
Total	409				Significant

TABLE 5 ASSOCIATION OF NUTRITIONAL STATUS OF CHILDREN BETWEEN URBAN & RURAL AREAS

	Rural		Urban		Total	
5.a Wasting	No	%	No	%	No	%
Present	88	35.2	215	32.6	303	33.3
Absent	162	64.8	445	67.4	607	66.7
Total	250	100	660	100	910	100
x^2=0.562 df=1 P<0.453 Not significant						
5.b Stunting	No	%	No	%	No	%
Present	108	43.2	334	50.6	442	48.6
Absent	142	56.8	326	49.4	468	51.4
Total	250	100	660	100	910	100
x^2=3.981 df=1, p<0.046, Significant						