

Does faulty feeding practices act as a driver to undernutrition? A comparative study on rural and urban preschool children in Western Uttar Pradesh

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ABSTRACT

Background: India is home to the largest number of underweight and stunted children in the world. While several studies have focused on the determinants of child's nutrition status in India, little attention has been given to the aspect of rural-urban variation in child's nutritional status. Bearing in mind that around 70% of India's population resides in the rural area, the study of rural-urban divergence in nutritional status as indicator can be appreciated naturally. **Objective:** The objective of the study is to compare the feeding practices of children in the initial six months of life in rural and urban setting and to find out any relation between early feeding practices and nutritional status of young children. **Materials and Methods:** A community-based study was conducted for 2 months in the field practice areas of a tertiary care hospital. Multistage random sampling technique was used for the selection of study subjects. A total of 117 under-five children were studied equally from rural and urban area. A predesigned pre-tested proforma was used to assess the feeding practices. Stunting and underweight were used to proxy the child nutrition status. Data were evaluated on SPSS version 17. Chi-square test was used to compare the feeding practices and to find out their association with nutritional status in the two areas. **Results:** Undernutrition was found in children who initiated early artificial feeds, i.e., in the first 6 months of life, were given over diluted milk, were bottle fed, and had inappropriate weaning practices in both the areas. **Conclusions:** Faulty feeding practices were found in both areas, but some of the parameters were still better in urban areas. Faulty feeding practices were found to be a significant predictor for undernutrition.


KEY WORDS: Nutritional Status; Infant Feeding Practices; Rural; Urban; Faulty Feeding

INTRODUCTION

Adequate nutrition during the formative years of life is vital for the growth and development of every child's possible

limit.^[1] It is a well-documented fact that the age of child up to 2 years is a "critical window" for the endorsement of most favorable growth, well-being, and behavioral improvement.^[2] Nourishment of children is of principal significance as the basis for life long well-being, power, and rational vivacity is laid during this age.^[3] Malnutrition during the decisive phases of the beginning of development can cause stunting of physical growth and also to below average logical progress and poor neurointegrative capability in children.^[4]

Around 75% of under-five mortality are ascribed to improper feeding practice and take place mainly during the infancy.

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Inadequate feeding practices in early days of upbringing, ensuing in undernourishment, lead to defect in learning and social progress, low IQ and compromised work efficiency in later stages of life.^[5]

Undernutrition occurs when one or more vital nutrients are not present in the desired quantity. This may be due to reduced intake, excess loss, increased demand, or conditions that reduce the absorption capacity.^[6] Undernutrition has a direct correlation with the prevailing feeding practices. A severe shortage of food in early life may lead to wasting and stunting.^[7]

Undernutrition during the formative years of life is also related to long-standing delay in growth and development. Undernourishment in the first 2 years of life leads to stunting, causing the adult being much shorter than his or her probable height. There is enough substantiation that adults who were underfed in initial phase of life have compromised scholarly performance. This may reduce their competence for bodily performance. Undernutrition in females as children may reduce their reproductive ability, the infants of such mothers may be underweight at birth and have more complications during deliveries. Since children are so commonly undernourished, it affects the overall national development. Thus, the overall consequence of undernourishment is enormous.^[8]

In view of the above characteristics, our study aimed to assess the feeding practices of pre-schoolchildren and to find out the association of early feeding practices with nutritional status.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted for 2 months in the field practice areas of a tertiary care center. The urban health training center has nine registered peri-urban localities with a registered population of 36,146. The rural health training center has 24 registered villages having a registered population of 52,543. The estimated sample size was calculated according to the formula.

$$n = 4 p q / d^2$$

n = Sample size

$$= 4 \times 42.5 \times 57.5 / 7^2$$

p = Prevalence of underweight

$$= 199 \text{ children (42.5\%)}$$

d = absolute precision

$$= 7\%$$

$$q = 100 - p$$

Considering a non-response rate of 10%, the sample size was calculated to be 219. A total of 234 households were covered in both the areas, of which 117 under five were studied from

the rural area and an equal number of under five were studied from the urban area. Multistage random sampling technique was used for the selection of study subjects. Ethical clearance was obtained from the Institute's Ethical Committee before the conduction of the study.

The households were visited personally. Parents were informed about the objectives of the study and consent was taken for the same. Mothers with children having developmental delay, congenital anomalies, and any other systemic disorder, children having birth weight <2.5 kg, born from pregnancy with multiple gestations, born preterm or with major inherited malformations and chronic disease or history of acute infections such as acute respiratory infection/diarrhea in preceding 15 days, or measles in last 3 months before the date of survey were excluded from the study. Information regarding child's feeding practices was collected using semi-structured, pre-tested proforma by interviewing the mothers or any responsible member of the family in case of non-availability of mother. Consent of mothers participating in the study was taken before study. Face and content validity of the interview schedule was evaluated by piloting on 30 women of this community having young infants and three epidemiologists also evaluated the clarity and representativeness of the questions related to the feeding practices of infants.

Each child was subjected to anthropometric measurements too. Data were gathered by a combination of a semi-structured questionnaire and collection of anthropometric data through measurements of weight and height. The anthropometric measurement by the new WHO standards (WHO, 2006) was used for the determination of nutritional status of pre-schoolchildren. Two standard indices of physical growth that describes the nutrition status of children, namely, stunting and underweight were used to proxy the outcome variable of interest, child's nutrition status. Data were analyzed on SPSS version 17. Chi-square test was used to compare the feeding practices and to find out their association with nutritional status in the two areas. $P < 0.05$ was considered as statistically significant at 95% confidence level.

RESULTS

A total of 234 pre-schoolchildren were included in the study. The prevalence of stunting, wasting, and underweight was found to be 69.7%, 52.8%, and 42.2% respectively. Underweight and wasting was mostly seen in 1–3 years children, whereas stunting was maximally seen in 3–5 years children. Infants had better nutritional status than the other two groups [Figure 1].

Table 1 shows that majority of the children in the urban areas were given top milk (74.36%) before 6 months as compared to their rural counterpart (60.68%). It was also noted that

Table 1: Top Feeding Practices of Children according to their area**

Variable	Distribution of children		Total	χ^2	P
	Rural	Urban			
Top milk					
Yes	71 (60.68)	87 (74.36)	158 (67.52)	4.99	<0.05
No	46 (39.32)	30 (25.64)	76 (32.48)		
Total	117	117	234		
Fed overdiluted milk					
Yes	71 (100.0)	65 (74.71)	136 (86.08)	18.80	<0.001
No	0 (0.00)	22 (25.29)	22 (13.92)		
Total	71 (44.94)	87 (55.06)	158		
Top milk started (months)					
<1	21 (29.58)	37 (42.53)	58 (36.71)	3.96	<0.05
1–3	17 (23.94)	23 (26.44)	40 (25.32)		
4–6	33 (46.48)	27 (31.03)	60 (37.97)		
Total	71 (44.94)	87 (55.06)	158		
Bottle feeding					
Practiced	67 (94.37)	79 (90.80)	146 (92.41)	0.71	>0.05
Not practiced	4 (5.63)	8 (9.20)	12 (7.59)		
Total	71 (44.94)	87 (55.06)	158		
Bottle cleaning with					
Water	10 (14.08)	3 (3.45)	13 (9.58)	6.15	<0.05
Detergent	3 (4.23)	6 (6.90)	9 (6.62)		
Boiling	58 (81.69)	78 (89.66)	136 (86.07)		
Total	71 (44.94)	87 (55.06)	158		
Complementary feed* at (months)					
4–6	53 (47.79)	65 (59.26)	118 (53.39)	3.92	<0.05
>6	60 (52.21)	43 (40.74)	103 (46.61)		
Total	113 (51.13)	108 (48.87)	221		

*Weaning was not yet started in four rural children and nine urban children, **History of top feeding practices for only the initial 6 months is taken, #Figure in parenthesis denotes percentage

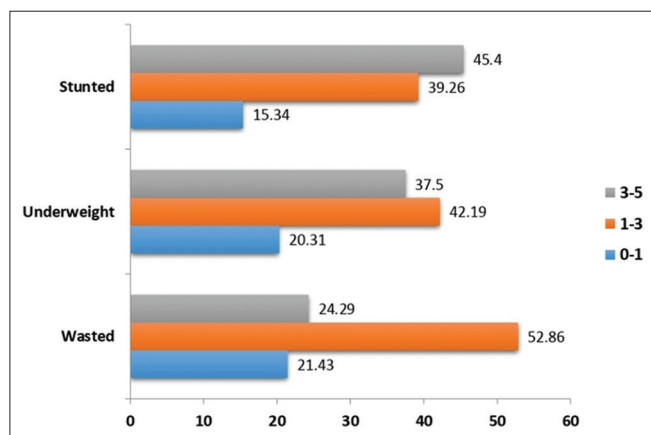


Figure 1: Distribution of children according to their nutritional status

maximum children were given top milk in less than a month in urban area, whereas in rural setup, it was given at 4–6 month. Another important finding was, all the children in the rural area were given diluted milk (100%) as compared to urban children where one-fourth of the children were fed undiluted

milk. A higher number of mother’s in urban areas used to boil bottle, whereas in the rural area, some of the mothers use to rinse bottle only with plain water. Weaning was started late in rural area as compared to urban setup.

Underweight (69% and 44.8%) and stunting (83.1% and 54%) were more prevalent in children who were fed on top milk in the early 6 months of life in both the areas, although the prevalence was much higher in the rural children. Further, dilution of milk was yet another factor which favored underweight (69% and 52.3%) and stunting (83.1% and 60%). In majority of the underweight and stunted children, the time of initiation of top milk was found to be earlier in comparison to those in whom it was initiated a bit later, though the association was not found to be significant. Children who were bottle fed were more stunted (67.2% and 45.6) and underweight (82.1 and 53.2%). The prevalence of underweight (70% and 33.3%) and stunting (80% and 66.7%) was found to be higher in children whose bottle was washed with plain water as compared to those whose bottle was boiled. Further, children who were weaned later than 6 months were more undernourished, i.e., stunted

Table 2: Nutritional status of children according to top feeding practices**

Variables	Area							
	Rural		Urban		Rural		Urban	
	T	Underweight	T	Underweight	T	Stunted	T	Stunted
Top milk								
Yes	71	49 (69.0)	87	39 (44.8)	71	59 (83.1)	87	47 (54.0)
No	46	25 (54.3)	30	8 (26.7)	46	35 (76.1)	30	12 (40.0)
Chi-square test (χ^2 , df, P)	4.07, 1, <0.05				4.86, 1, <0.05			
Dilution of milk								
Yes	71	49 (69)	65	34 (52.3)	71	59 (83.1)	65	39 (60.0)
No	-	-	22	6 (27.3)	-	-	22	9 (40.9)
Chi-square test (χ^2 , df, P)	5.68, 1, <0.05				9.77, 1, <0.005			
Initiation of top milk (months)								
<1	21	15 (71.4)	37	19 (51.4)	21	18 (85.7)	37	22 (59.5)
<3	17	12 (70.6)	23	10 (43.5)	17	12 (70.6)	23	13 (56.5)
<6	33	21 (63.6)	27	11 (40.7)	33	22 (66.7)	27	13 (48.1)
Chi-square test (χ^2 , df, P)	3.08, 2, >0.05				2.60, 2, >0.05			
Bottle feed								
Given	67	45 (67.2)	79	36 (45.6)	67	55 (82.1)	79	42 (53.2)
Not given	4	2 (50.0)	8	3 (37.5)	4	3 (75.0)	8	4 (50.0)
Chi-square test (χ^2 , df, P)	0.046, 1, >0.05				0.10, 1, >0.05			
Cleaning bottle with								
Only water	10	7 (70.0)	3	1 (33.3)	10	8 (80)	3	2 (66.7)
Detergent	3	2 (66.7)	6	4 (66.7)	3	2 (66.7)	6	5 (83.3)
Boiling	58	36 (62.1)	78	35 (44.9)	58	31 (53.4)	78	41 (52.6)
Chi-square test (χ^2 , df, P)	4.90, 2, >0.05				5.76, 2, <0.05			
Weaning* at (months)								
<6	53	26 (48.1)	65	25 (39.0)	53	34 (62.9)	65	39 (60.9)
>6	60	42 (71.2)	43	18 (40.9)	60	48 (81.3)	43	26 (59.1)
Chi-square test (χ^2 , df, P)	4.2, 1, <0.05				4.98, 1, <0.05			

*Weaning was not yet started in four rural children and nine urban children, **History of top feeding practices for only the initial 6 months is taken

(81.3% and 59.1%) and underweight (71.2% and 40.9%) in both the areas [Table 2].

A total of 234 pre-schoolchildren were included in the study. The prevalence of stunting, wasting, and underweight was found to be 69.7%, 52.8%, and 42.2%, respectively. Underweight was mostly found in 1–3 years age group children, whereas stunting was maximally seen in 3–5 years children (45.4%).

DISCUSSION

Feeding practices were slightly better in urban areas as compared to rural ones. Feeding practices in the initial 6 months which were found to be significant predictor of undernutrition were dilution of milk, time of initiation of artificial feed, bottle feeds, unsterilized bottle, and late weaning.

In our study, though introduction of top milk before 6 months was found as a significant risk factor for undernutrition in

rural and urban areas, i.e., underweight (69% and 44.8%) and stunting (83.1% and 54%) was more prevalent in children who were fed on top milk in the early 6 months of life in both the areas, but the time of initiation of top milk (i.e., <1 month, <3 months, etc.) was not found to be significant. Synonymous findings were found in a study by Vyas *et al.* at Uttarakhand region where it was further seen that children who were fed artificial feeds in the early phase of life were found to be more undernourished (66.25%) than their counterparts (56.33%).^[9] In most of the cases, it is only the false idea of inadequate milk secretion which is responsible for early introduction of top milk compromise among children & their after effects later on in life. In early introduction of artificial feeds, there is diminished sucking by the baby, leading to less secretion of milk and consequently lactation failure. In the event of any illness to the mother, there is further reduction in breast milk as the baby is with the thought that he may also contract infection etc, but in reverse his nutritional needs gets further compromised if he is stopped from breast feeding due to maternal illness. Synonymous findings were observed

in another study by Khan at Jammu who observed that time of initiation of top milk was not found to be significantly associated with either stunting or underweight.^[10] Further in our study, almost all their mothers used to dilute milk, i.e., 100% of mothers in rural setup as compared to 74% of mothers in urban area. In addition, dilution of milk was yet another factor which favored underweight (69% and 52.3%) and stunting (83.1% and 60%) in children of the two areas which were found to be statistically significant. In a study at Uttarakhand at Uttarakhand by Vyas *et al.*, most of the mothers diluted milk (87.5%) i.e., 1:1 dilution.^[9] Another study at Telangana by Kumari *et al.* also revealed that milk was given in the dilution of 1:1.^[11] Our study revealed that majority of the rural children were bottle-fed as compared to urban children. The reason for this may be rural mothers are overworked and have several other works to do other than house hold chores, in addition to it the false notion of inadequate breast milk is more frequent in rural setup as compared to urban mothers, hence rural mothers preferred bottle feeding as compared to urban mothers. Our findings are synonymous with the study done by Yadav *et al.* at Ujjain.^[12] Further, children who were bottle-fed were more stunted (67.2% and 45.6) and underweight (82.1 and 53.2%) than non-bottle fed children. Identical findings were observed by Vyas where both the factors i.e., bottle feeding as well as overdilution of milk had a significant association to child's undernourishment.^[9] The prevalence of underweight (70% and 33.3%) and stunting (80% and 66.7%) was found to be higher in children whose bottle was washed just with water as compared to those whose bottle was boiled or sterilized. Meshram *et al.*, in his study in AP, India, found a significant association between hygiene practices in feeding with underweight, stunting, and wasting.^[13] According to the present study, majority of the rural mothers started giving complementary feed after 6 months, whereas majority of the urban mothers started giving it at an early age, i.e., before 6 months. Our findings were seconded by Ashwini *et al.* at Karnataka and Goutam *et al.* at Delhi.^[14,15] The reason cited for early initiation by urban mothers was inadequacy of breast milk, mother in law's advice, as per the ritual which allows premature initiation of complementary feed and as most of the urban mothers were working, they wanted to return back to their work. As per the rural mothers, delayed initiation was the babies non-acceptance to solid food, lack of awareness regarding low-cost weaning food, etc. Statistically significant association was found between children who were weaned after 6 months and nutritional status. Our findings are similar to the study by Gandhi *et al.*, Goutam *et al.*, and Vyas *et al.*, where undernourishment was more in children who were put on weaning food at later than 6 months of age.^[5,15,16] In contrast, Sreedhara Banapurmath in Tumkur found that higher malnutrition was seen in infants whose complementary feeding was started early, i.e., before 6 months.^[17] Reasons cited were not knowing the exact age for starting complementary feeds and many other myths and erroneous concept established in the society. The parents

need to accept the fact that weaning is a gradual process and hence constant try out and support is needed. Tradition that promotes faulty feeding practices can be surmounted only by giving correct information, awareness, and further counseling of the parents.

Strengths and Limitations

The strength of this study is that our study is one of the few studies which have assessed the rural-urban variation in the feeding practices of young child. Very few studies in the recent past have tried to find the relation between early feeding practices and nutritional status of young children; most of the studies have tried to just highlight the feeding practices of young children.

The limitation of our study is, its small sample size and selection of area are highly limited. This study could be conducted as a multicentric project all over the country in future.

CONCLUSIONS

We conclude our study with the conclusion that infant and young child feeding practices were poor in both the areas, yet it was still better in urban setting in some of the parameters as compared to rural area. Further, high prevalence of malnutrition in our study may be related to faulty feeding factors which were found to have a significant association with introduction of top milk before 6 months, overdilution of milk, age of weaning after 6 months, use of feeding bottle, and hygiene practices which suggests the need of nutrition education and counseling regarding feeding practices among the mothers and elders of the family. Further, there is also an urgent necessity for enlightening the mothers about timely weaning and introduction of weaning foods which are seasonal, locally available in the market, at an affordable cost.

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