

ORIGINAL ARTICLE

Infant and Young Child Feeding Practices and its Correlates in an Urban Area of Murshidabad District, West Bengal

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ABSTRACT

Background: A significant proportion of Indian under-five population is jeopardized by inappropriate breastfeeding and complementary feeding practices which impede growth and cognitive development. Status of infant and young child feeding can be assessed by 15 population-level indicators described by WHO. The study was conducted to assess the status of IYCF indicators among children aged 0-23 months, to identify correlates of suboptimal feeding and to document the relationship between suboptimal feeding and other biological variables with the nutritional status of the participants. **Methodology:** This cross-sectional study was conducted in five wards of Berhampore municipality in urban Murshidabad, West Bengal, among 212 children aged 0–23 months, obtained through multistage sampling. Data collection was done by interviewing the caregivers and anthropometry of the study participants. Variables related to feeding practice were translated to WHO IYCF indicators. Correlates of suboptimal feeding and under-nutrition were expressed as Odds ratio with 95% CI. **Results:** Median time for initiation of breastfeeding was 2 h (IQR 1–10) with only 45.9% of the subjects having early initiation of breastfeeding, 55.4% of infants were exclusively breastfed, and over 50% were bottle-fed. Only 37.4% (95% CI: 29.6–45.2) of children in the age group of 6–23 months received a minimum acceptable diet. Nearly half of the subjects were suboptimally fed. The prevalence of underweight, stunting, and wasting was 26%, 11.8%, and 10.8%, respectively. The major correlate of suboptimal feeding was age >6 months. The most important factor influencing stunting was episodes of illness (AOR= 3.7), while that for underweight and wasting was maternal illiteracy (AOR 3.8 and 5.4 respectively). **Conclusion:** The IYCF practices, especially complementary feeding indicators were far from satisfactory in urban Berhampur, although it has ameliorated compared to NFHS 4 and DLHS 4 in West Bengal. This underscores the importance of targeted communication for behavior change as a major mitigation strategy.

Key words: Breastfeeding, complementary feeding, infant and young child feeding indicators, under-nutrition, urban

INTRODUCTION

India, though on the verge of evolving as a “developed” nation, is still intimidated by the fact of its insufficient progress in meeting the Millennium Development Goals. A vast majority of the under-five population, which is a staggering 112.8 million, is still threatened for survival due to improper adherence to the norms of standard feeding practices. Infant and Young Child Feeding (IYCF) is a set of evidence-based recommendations for appropriate feeding of newborn and children under 2 years of age. Optimal feeding comprises early and exclusive breastfeeding from birth

to 6 months of age, continued breastfeeding for 2 years or beyond, and adequate, safe and appropriate complementary feeding after 6 months of age to meet nutritional needs.^[1] A high prevalence of malnutrition among children during the first 2 years of life points toward inappropriate feeding practices, which can translate to impaired cognitive and social development, poor school performance in the near future, and reduced productivity in later life. If malnutrition

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is not corrected within this small “window of opportunity,” irreparable damage to physical growth and brain development is rather inevitable.^[2,3]

Suboptimal feeding contributes to increased morbidity and mortality among infants and children.^[3] Under-nutrition attributes to more than half of all under-five deaths,^[4,5] the proportion of underweight and stunting being 43% and 48%, respectively.^[6] Breastfeeding is an important child survival intervention and initiation of the same within an hour of birth can avert one-fifth of all neonatal deaths. The chances of dying from diarrhea and pneumonia, the two leading causes of under-five mortality, are diminished by 11 times and 15 times respectively, by continuing exclusive breastfeeding for the first 6 months of life. Early initiation of breastfeeding was 44%, as revealed by a recent survey despite the fact that 3/4th of the deliveries were institutional.^[1] Breast milk is also an important source of energy and nutrients in children of 6–23 months of age. It can provide one-half or more of a child’s energy needs between 6 and 12 months of age and one-third of energy needs between 12 and 24 months.^[7] Myths and misconceptions, busy schedules, lack of awareness, and lack of support are the major impediments to breastfeeding in India. Complementary feeding is introduced in only 53% infants between 6 and 8 months, with only about 44% of breastfed children being fed the minimum number of times recommended. In India, only one child in five (21%) between 6 and 24 months is fed optimally, that is, fed as per the recommended practices. Only 35% children are fed minimum number of food groups, while 42% are fed a minimum number of times.^[8]

Measuring Infant and Young Child Feeding Practices in children more than 6 months of age is complex because feeding practices are multidimensional, with a number of inter-related practices which change rapidly within short intervals.^[9] NFHS 4 statistics revealed only a marginal improvement in the IYCF and nutritional status indicators compared to NFHS 3 figures.^[6] WHO has described 15 population level indicators (eight core and seven optional indicators) to assess infant and child feeding practices for national and sub-national comparisons; to identify populations at risk, target interventions, make policy decisions about resource allocation; to monitor progress in achieving goals and to evaluate the impact of interventions.^[9]

Although a plethora of literature regarding infant and young child feeding practices are available across the Indian subcontinent and West Bengal, including NFHS 4 data, information pertaining to the same in urban Murshidabad is indeed scant. Against this backdrop, the current study was designed with the following objectives:

1. To assess the status of infant and young child feeding indicators in urban Berhampore, Murshidabad.
2. To identify the correlates of suboptimal feeding among the study subjects.

3. To document the relationship between suboptimal feeding and other biological variables with the nutritional status of the study participants.

MATERIALS AND METHODS

This descriptive and cross-sectional community-based study was conducted in urban Berhampore, Murshidabad, West Bengal, spanning across 5 municipal wards over a period of 6 months period of 6 months from April to September 2018, among children in the age bracket 0–23 months.

Sample Size and Sampling Technique

The sample size was calculated using the formula $N = z^2 P(1-P) / d^2$ (where $P = 19.8\%$ is the proportion of children 6–23 months receiving adequate diet in urban West Bengal,^[10] $z = 1.96$ at 95% confidence limit, and $d =$ absolute precision of 8%). Considering a design effect of 2 and 10% nonresponse rate, the final sample size was 212. A multistage sampling technique was adhered to. Out of 25 municipality wards, 5 wards (1, 5, 11, 19, and 23) were selected randomly and the desired sample size in each was achieved by probability proportionate to sample size. With the help of service providers of the urban centers and local informal community leaders, households were approached. The first household was selected randomly followed by consecutive sampling for households with children in the said age bracket until the target sample size was reached in each ward. If a selected child could not be included due to reluctance or absence, the one in the nearest household was approached.

Exclusion Criteria

Children suffering from any major illnesses, having physical deformities, or whose immediate caregiver was not available were excluded from the study.

Study Variables

- Sociodemographic variables: Age, gender, parental education and occupation, income, number of siblings, place, and type of delivery.
- Variables related to feeding status breastfeeding as well as complementary feeding practices were analyzed for suboptimal feeding and assessing the IYCF indicators [Table 1].
- Variables related to nutritional status: Weight, height expressed as anthropometric parameters of weight for age, height for age and weight for height

Study tools and techniques: Data were collected using a predesigned, pretested, structured schedule by interviewing the mother/caregiver after obtaining appropriate informed consent. Current feeding practices were elicited by a 24-hour recall method. Weight was measured by digital baby

Table 1: WHO IYCF Indicators^[11]**Core indicators**

Early initiation of breastfeeding	Proportion of children born in the last 24 months who were offered breast milk within one hour of birth.
Exclusive breastfeeding under 6 months:	Proportion of infants 0–5 months of age who were fed exclusively with breast milk.
Continued breastfeeding at 1 year:	Proportion of children 12–15 months of age who are fed breast milk.
Introduction of solid, semi-solid, or soft foods:	Proportion of infants 6–8 months of age who receive solid, semi-solid, or soft foods
Minimum dietary diversity	Proportion of children 6–23 months of age who received foods from 4 or more food groups. 7 food groups used for tabulation of these indicators: i. Grains, roots, tubers ii. Legumes and nuts iii. Dairy products (milk, yogurt, and cheese) iv. Flesh food (meat, fish, poultry, and liver/organ meats) v. Eggs vi. Vitamin A rich fruits and vegetables vii. Other fruits and vegetables
Minimum meal frequency	Proportion of breastfed and non-breastfed children 6–23 months of age, who received solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.
Minimum acceptable diet	Proportion of children 6–23 months of age who apart from breast milk children had at least the minimum dietary diversity and the minimum meal frequency during the previous day.
Consumption of iron-rich foods	Proportion of children 6–23 months who received iron-rich food or iron-fortified food during the previous day

Optional indicators

Children ever breastfed	Proportion of children born in the last 24 months who were ever breastfed.
Continued breastfeeding at 2 years	Proportion of children 20–23 months of age who are fed breast milk
Age-appropriate breastfeeding	Proportion of children 0–23 months of age who are appropriately breastfed i.e. • Infants 0–5 months who are exclusively breastfed. • Children 6–23 months of age who received breast milk as well as complementary feeding during the previous day.
Predominant breastfeeding under 6 months	Proportion of infants 0–5 months of age who are predominantly breastfed
Duration of breastfeeding	Median duration of breastfeeding among children up to 24 months
Bottle feeding of infants	Proportion of children 0–23 months of age who were fed with a bottle

infantometer to the nearest 0.1 cm. To minimize inter observer and instrumental errors, anthropometric measurements were undertaken by a single researcher and by the same instrument respectively. Anthropometric parameters were analyzed using WHO z score charts for underweight, stunting, and wasting. History of episodes of diarrhea and acute respiratory infections within the last fortnight were obtained and records if available were reviewed. The study was cleared by the Institutional Ethics Committee and necessary permission for the study was sought from the concerned authorities.

Operational Definitions

IYCF indicators were defined as per WHO guidelines^[11] and indicated in Table 1. Suboptimal or age-inappropriate feeding was considered when a child did not receive age-appropriate breastfeeding and child >6 months were not given the minimum acceptable diet. Moderate and severe underweight, stunting, and wasting were considered when z scores < -2 SD and < -3 SD, respectively, as assessed by WHO z scores charts.^[11] Socioeconomic status was assessed by modified B.G. Prasad scale 2019.^[12]

Analysis

Data were entered in MS Excel 2010 and analyzed using SPSS Version 16.0. The data were described as rates, proportions, mean, and standard deviation. Inferential statistics comprised Chi-square test, normality testing, and binary logistic regression. Odd's ratio and 95% confidence interval were calculated. P value <0.05 was considered as the level of significance.

RESULTS

In this study conducted in urban Berhampore with 212 children, more than half the subjects were in the age bracket 12–23 months (52.3%), while females outnumbered the males. Table 2 shows the sociodemographic characteristics of the study subjects. Out of them, 30.67% children were aged <6 months while 69.33% children belonged to 6–23 months age group. More than one-third of the subjects had one sibling (34.3%). One-fourth of the fathers were unemployed. Most of their parents (45.3% mothers and 38.7% fathers) reported to have education at the level of higher secondary and above, while 11.32% mothers and 5.7% of fathers, respectively, were illiterate. Most of the participants belonged to Class 4 socioeconomic status.

Table 3 depicts the status of IYCF indicators. The study revealed that the median time for initiation of breastfeeding was 2 h (IQR 1–10 h), with only 45.9% of the subjects having early initiation within an hour of birth. More than one-fifth of the study subjects (21.4%) received pre-lacteals. The proportion of pre-lacteal feeding was found to be significantly higher among the study children born

weighing machine (precision of 0.1 kg) with minimal clothing using standardized techniques. Length was measured by an

Table 2: Sociodemographic profile of the study subjects: (n=212)

Variable	Categories	n	Percentage
Age	<6 months	65	30.67
	≥6–11 months	36	16.98
	12–23 months	111	52.35
Gender	Male	103	48.58
	Female	109	51.42
Religion	Hindu	116	54.71
	Muslim	96	45.29
Type of family	Nuclear	72	33.96
	Joint	140	66.04
Maternal occupation	Homemaker	186	87.73
	Working	26	12.27
Paternal occupation	Business	42	19.8
	Service	63	29.7
	Skilled worker	59	27.8
	Unskilled worker	37	17.5
	Unemployed	11	25.0
Maternal education	Illiterate	24	11.32
	Below secondary	63	29.71
	Secondary	29	13.67
Paternal education	Higher secondary and above	96	45.3
	Illiterate	12	5.7
	Below Secondary	72	33.9
Socioeconomic status (according to B. G. Prasad Scale 2019)	Secondary	46	21.7
	Higher secondary and above	82	38.7
	Class 1	28	13.2
	Class 2	41	19.3
	Class 3	45	21.2
	Class 4	60	28.3
	Class 5	38	17.9

Table 3: Core and optional IYCF indicators

	No of children with the feeding practice	Denominator	% (95% CI)
Core indicators			
Early initiation of breastfeeding	95	212	44.8 (38.1–51.5)
Exclusive breastfeeding under 6 month	36	65	55.4 (43.3–67.5)
Continued breastfeeding at 1 year	15	25	60 (40.8–79.2)
Introduction of solid, semi-solid, or soft food	19	19	100
Minimum dietary diversity	87	147	59.2 (51.2–67.1)
Minimum meal frequency	83	147	56.4 (48.4–64.5)
Minimum acceptable diet	55	147	37.4 (29.6–45.2)
Consumption of iron rich or iron fortified food	75	147	51.0 (42.9–59.1)
Optional indicators			
Children ever breastfed	207	212	97.6 (94.6–99.2)
Continued breastfeeding at 2 years	16	34	47.05 (29.9–64.8)
Age-appropriate breastfeeding	151	212	71.2 (64.6–77.2)
Predominant breastfeeding under 6 months	19	65	29.2 (18.6–41.8)
Bottle feeding	110	212	51.9 (44.94–58.8)
Median duration of breastfeeding	12 months		

in a private facility compared to those born at government institutions (29.3% vs. 15.3% respectively; $P = 0.012$) [not shown in table]. About 55.4% of infants were exclusively breastfed for at least 6 months (95% CI: 43.3–67.5). Bottle feeding was prevalent in 51.9% of the subjects, while median duration of breastfeeding was around 12 months. Although all the participants in the age group of 6–8 months were initiated complementary feeding, still (17.1%) had inappropriate timing of initiation of complementary feeding and 10 children were even not initiated the same. Assessment for core and optional IYCF indicators [Table 3] showed only 37.4% (95% CI: 29.6–45.2) of children in the age group of 6–23 months had received a minimum acceptable diet, and around 59% of them received food from 4 or more groups. Age-appropriate feeding was found only in 50.9% of the total population, which translates to nearly half of them being sub-optimally fed.

Assessment of the nutritional status of the studied children following discussed parameters showed that about 26% of them were underweight and 11.8% of the subjects had stunting. About 6.6% and 4.2% of the children had moderate and severe wasting, respectively [Figure 1].

Table 4 shows the correlates of age-appropriate feeding. Age was found to be the single most important correlate influencing age-appropriate feeding, with most children more than 6 months being sub-optimally fed (37.8%, 2.64 times more risk compared to those <6 months. $P = 0.0099$). However, other factors such as gender, religion, birth order, and disease frequency of children, parental education, and occupation were not significantly associated with age appropriate feeding.

Table 4: Sociodemographic factors influencing age-appropriate feeding

Variable	Category	Age-appropriate feeding status				OR (95% CI)	P
		Optimal		Suboptimal			
		n	%	n	%		
Age	<6 months	53	18.5	12	81.5	1 (Ref)	0.0099
	≥6 months	92	62.2	55	37.8	2.64 (1.3–5.4)	
Gender	Male	47	45.6	56	54.4	1.51	0.1715
	Female	61	56.0	48	44.0	(0.88–2.60) 1 (Ref)	
No of siblings	No	74	53.2	65	46.8	1.3059	0.3565
	Yes	34	46.6	39	53.4	(0.74–2.3) 1 (Ref)	
Religion	Hindu	59	50.9	57	49.1	0.9928	1.0000
	Muslim	49	51	47	49	(0.58–1.7) 1 (Ref)	
Education of the mother	Below secondary	48	55.1	39	44.9	1 (Ref)	0.1371
	Above secondary	56	44.8	69	55.2	0.659 (0.38–1.14)	
Occupation of the mother	Homemaker	97	52.2	89	47.8	1.486	0.3482
	Working	11	42.3	15	57.7	(0.65–3.4) 1 (Ref)	
Education of father	Below secondary	40	47.6	44	52.4	0.8	0.4310
	Above secondary	68	53.1	60	46.9	(0.462–1.39) 1 (Ref)	
Socioeconomic status	Upper and middle class	62	54.9	51	45.1	1.400	0.222
	Lower class	46	46.5	53	53.5	(0.82–2.40) 1 (Ref)	
Episodes of ARI and diarrhea (last 15 days)	Yes	22	45.8	26	54.2	0.77	0.420
	No	86	52.4	78	47.6	(0.40–1.46) 1 (Ref)	

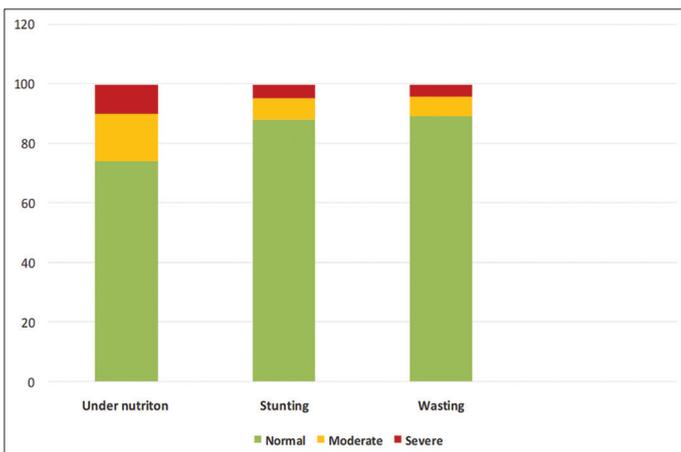


Figure 1: Nutritional status of the study subjects

Table 5 depicts the factors influencing the nutritional status of the study participants. Age > 6 months was found to be an important factor in the case of underweight children with an adjusted odds of 1.34 ($P = 0.04$). Furthermore, children with illiterate mothers had 3.85 times more risk ($P = 0.001$) and children with age-appropriate feeding had 0.31 times lesser risk for developing underweight ($P = 0.003$). Wasting and stunting showed gender differentials, where female children were at more risk for developing wasting (AOR 2.579,

$P = 0.046$) and stunting (AOR: 2.179, $P = 0.029$). While maternal education was a significant risk factor for wasting (AOR 5.43 for illiterate mothers, $P = 0.001$), episodes of respiratory infections and gastroenteritis in children posed as determinants for stunting in these children.

DISCUSSION

The present study was conducted to find out the core and optimal IYCF indicators among <24 months children in an urban area of West Bengal. Overall the complementary feeding indicators were worse than the breastfeeding indicators. The study revealed only 45.9% of the subjects having early initiation of breastfeeding, which was almost similar to the findings of NFHS 4^[10] (47.7%), DLHS 4^[13] (50.4%) in West Bengal, and 48.1% in Murshidabad. However, a gross interstate and inter-district variation existed an initiation of breastfeeding was found to be 13.6% in a study in Bankura by Sinhababu *et al.*^[14] and 18.3% by Shukla *et al.* in Lucknow,^[15] whereas Jain *et al.* found it as 59.5% in OPD setting of Bhopal, Madhya Pradesh^[16] and Bentley *et al.* as 46% in an informal settlement of Mumbai.^[17] The present study also observed pre-lacteal feeding among 21.4% children, similar to the study of Bankura and Lucknow, but it was found to be significantly more in private than Government institutions. The

Table 5: Multivariate analysis for age-appropriate feeding and demographic factors influencing nutritional status of the study subjects

Variables	Underweight				Wasting				Stunting			
	AOR	P	95% CI		AOR	P	95% CI		AOR	P	95% CI	
Age (>6 months)	1.34	0.04	1.01-	1.76	1.32	0.175	0.88-	1.97	0.933	0.641	0.67	1.24
Female gender	1.16	0.67	0.59	2.28	2.579	0.046	0.98	6.80	2.179	0.029	1.08	4.39
Religion (Islam)	1.30	0.450	0.66	2.59	0.885	0.801	0.34-	2.29	-	-	-	-
Birth order (>2)	-	-	-	-	1.272	0.54	0.59	2.75	0.865	0.625	0.48	1.55
Working Mother	0.392	0.165	0.11-	1.47	0.352	0.335	0.42	2.93	0.774	0.651	0.25	2.35
Illiterate Mother	3.851	<0.001	1.81-	8.22	5.43	<0.0001	1.98	15.0	1.14	0.764	0.48	2.70
Occurrence of ARI and diarrhea (+ within 15 days)	1.01	0.822	4.90-	2.456	1.857	0.291	0.59	5.86	3.765	0.013	1.327	10.7
Age-appropriate feeding (done)	0.307	0.003	0.14-	0.67	0.360	0.077	0.12	1.11	0.506	0.079	2.37	1.08

study in Lucknow^[15] had the opposite finding and also it also depicted a significant association with education of mother, socioeconomic status, and type of delivery with pre-lacteal feeding.

Prevalence of exclusive breastfeeding for 6 months in the study population under 24 months was seen as 55.4% in the present study, whereas it was as low as 34.2% among 6–35 months (DLHS 4)^[13] and 23.5% among under-five children in urban Allahabad by Dinesh Kumar *et al.*^[18] The difference might be due to the difference in the time frame of the study, as with time, exclusive breastfeeding might have improved due to awareness among population. Median duration of breastfeeding was seen as 12 months in the present study, which had deteriorated as opposed to more than 36 months in West Bengal, as revealed in NFHS 4.^[10]

Regarding complementary feeding, the present study observed almost all children had started it within 6–8 months, whereas it was reported as less as 52% in West Bengal (NFHS 4), 55.7% in Bankura,^[11] but seen higher (81%) in a study in Uganda.^[19] Although all the children in the age group of 6–8 months were started on semisolid/soft foods, many were still not being initiated even at a later age in the present study. Considering the initiation of complementary feeding at 6 months, the study in Lucknow showed this in only 32.4% children.^[15] However, while evaluating core and optional IYCF indicators, 37.4% and 59% of children in the present study had access to minimum acceptable diet and minimal food diversity, respectively, which were found as 43% and 13% in Mumbai.^[17] A community-based study in Ghana^[20] found 69.4% minimum meal frequency, 50.6% minimal food diversity and 38.9% minimum acceptable diet among 6–23 months children, but study in Bhopal^[16] showed these as 86%, 57%, and 58%, respectively. Age-appropriate feeding was seen as 50.9% in the present study opposed by 21% in Bankura.^[14] These variations might be due to variations in the

age group of the study population, place and type of study, and time frame, but overall complementary feeding practices are still lagging behind the desired status.

Correlates for IYCF were also revealed to be different in various studies. The study in Lucknow^[15] found an association of timely complementary feeding with upper socioeconomic status, normal delivery in Government institutions, and nuclear family, whereas higher maternal education, income, and joint family were found to be associated in a study in Bhopal.^[16] Age was found to be the single most important correlate influencing age-appropriate feeding in the present study, like the researchers pointed out in Bankura.^[14]

The present study observed low weight for age, stunting and wasting as 26%, 11.8%, and 10.8% respectively, among <2 years children, which were much lesser than NFHS 4 data in West Bengal^[10] (31.5%, 32.5%, and 20.3%), DLHS 4^[13] (37.4%, 37.4%, and 28.2%), and Allahabad^[18] (36.4%, 51.6%, and 10.6%). The better picture in the present study might be due to better child care services in urban Berhampur in recent years. Correlates for malnutrition in the present study were age, illiteracy among mothers, lack of age-appropriate feeding with underweight; female gender with wasting and stunting; and diseases such as respiratory infections and diarrhea among children with stunting. These findings were in consonance with a similar study in urban Allahabad.^[18] However, the study in Ghana^[20] showed an association, gender, and source of power for lighting in the household with age wasting; intake of iron-rich foods, child age group, and maternal height with stunting.

CONCLUSION

The IYCF practices were seen to be far from satisfactory in urban Berhampur, although it has improved compared to NFHS 4 and DLHS 4 in West Bengal. Picture of exclusive

breastfeeding was seen to be better in comparison to early initiation of breastfeeding and complementary feeding practices in the present study. However, other optional IYCF indicators seen around 50% need to be strengthened. Awareness generation program and utilizing ICDS services among the urban population are the key areas for success. Improvement was also observed in prevalence of undernutrition, wasting, and stunting in this urban area again compared to NFHS and DLHS data, though still it is a matter of concern. Improving female literacy, gender sensitiveness, and managing childhood illnesses such as ARI and diarrhea are the key issues for combating childhood malnutrition, which should be stressed with utmost priority through the IMNCI strategy. This underscores the importance of targeted communication for behavior change as a major mitigation strategy.

DECLARATION

1. Manuscript has been read and approved by all the authors, all criteria for authorship, as stated earlier in this document, have been met and this Original article is an honest work based on actual cases and procedures in the above setting.
2. Informed consent taken in both cases and photographs reproduced with permission.

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