

ORIGINAL ARTICLE

Assessment of Infant and Young Child Feeding Practices and its Relation with Nutritional Status of Under Two Children: A Community Based Study at Malda Town, West Bengal

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ABSTRACT

Background: Correct practices of nutrition remains the cornerstone to combat the problem of under nutrition among the children. Most important of them is propriety of breast feeding. Its initiation within an hour of birth is important for both mother and child as the first breast milk (colostrums) is considered to be highly nutritious and has antibodies that protect the new-born from serious diseases. The study was conducted to assess the IYCF practices among the under two children and the relationship between the aforesaid practices and the nutritional status of the study participants of a district town of West Bengal. **Methods:** It was a community based observational study, cross-sectional in design conducted among children aged less than twenty four months in a district town of West Bengal using cluster sampling method among 390 participants. **Results:** The study revealed that less than half (47.9%) of mothers initiated breast feeding within one hour of birth. Exclusive breast feeding rate at 6 months was 68.3% and 84.3% mothers were continuing breast feeding at two years age of the child. Optimal diversity of food was seen among 30.3% eligible children. The proportion of underweight and stunting was 40.7% and 43.6% respectively and were significantly related to initiation of breast feeding in one hour, adequate food diversity, adequate meal frequency, age adjusted minimum acceptable diet and exposure to bottle feeding. **Conclusion:** The study reiterates that appropriate feeding practices in first two years of life are crucial to attain proper growth of the children in their later life.

KEYWORDS

IYCF indicators, Malnutrition, Nutritional status, Stunting

INTRODUCTION

As today's children are the citizens of tomorrow's world, their survival, protection and development are the prerequisites for the future development of humanity (1). Exclusivity of breast milk without any pre-lacteal feeding till six months, and its continuation till two years along with nutritionally rich complementary feeds of adequate amount and frequency is of equal significance to prevent malnutrition in children. Studies have proved absence of any of these practices leading to adversities in the health of the child (2, 3).

Considering the above, World Health Organization (WHO) has come up with objective definition of the different specific aspects of

these practices, called optimal Infant and Young Child Feeding (IYCF) practices and the various indicators to assess those (4). So it becomes an imperative to find out the association of these practices of an area with the nutritional status of the children there.

National Family Health Survey IV (NFHS IV, 2015 – 2016) has demonstrated a rise in severely undernourished children in West Bengal with reduction in exclusive breastfeeding practice from 58.6 percent to 52.3 percent (NFHS III to IV) among mothers of West Bengal based on youngest child living with the mother, Beside this proportion of breastfeeding and non-breastfeeding children receiving adequate diet

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was significantly low (5). There has been some improvement regarding some basic indicators of IYCF practices but some studies still indicate that there exists heterogeneity in the finding that these changes are not uniform, neither is their association with the nutritional status of the children there (6).

Only 42% of newborns are put to the breast within the first hour of birth, and only 2 in 5 infants less than 6 months of age are exclusively breastfed in global reports (7). In India 41.6% mothers starts breastfeeding within 1 hour of birth with exclusivity in 55% cases (2, 8). However, a significant decrease in early initiation of breast feeding (34.2%) with exclusivity around 58.7% was found in a study conducted in rural setup of West-Bengal (9). Breastfeeding practices among Indian mothers are almost universal but initiation of breastfeeding is not timely and the valuable colostrums is discarded may be out of ignorance or false notions which is reflective of social-cultural and socio-economic conditions (10). If a child is malnourished in the womb of the mother or before the age of 2 years the damage can be irreparable. Thus malnutrition remains a hidden crisis for the world. To reverse the scenario and to make a difference, it is essential to concentrate on the nutrition of pregnant women, breastfeeding women and children under 2 years (11).

So with these perspectives; the study was conducted to assess the IYCF practices among the under two children and to find out the relationship between the aforesaid practices and the nutritional status of the study subjects of a district town of West Bengal.

MATERIAL & METHODS

It was a Community based observational study, cross-sectional in design conducted among children aged less than twenty four months in the municipal area of English Bazar, Malda town. Data were collected in the study period of 2 months (June- July 2018).

Sample size: According to National Family Health Survey IV West Bengal (2015 – 2016) (5) the average proportion of three principal IYCF indicators (Children under age 3 years breastfed within one hour of birth, Children under age 6 months exclusively breastfed and Children age 6- 8 months receiving solid or semi-solid food and breast milk) was calculated to be 50.6%. Taking that proportion as the prevalence, considering 95% confidence level and absolute

precision of 0.075, the sample size was calculated.

Sample size (n) = $Z_{\alpha/2} * p * (1-p) / E^2 = 171$
(Where $Z_{\alpha} = 1.96$ at that 95% confidence level, p = assumed prevalence rate (0.506), E= Absolute precision=0.075)

Multiplying by a design effect of 2 for cluster sampling and adding a non-response rate of 10% the sample size was 377. Finally the study was conducted among 390 participants.

Inclusion and exclusion criteria: Inclusion criteria was children aged less than twenty four months in the municipal area of English Bazar, Maldatown. Exclusion criteria was those who were not given consent.

Sampling Procedure: The standard procedure of 15-cluster sampling was followed from the selected municipal wards (Clusters) of the English Bazar municipality. The list of population of the individual wards was collected from the municipality and it was used to select the clusters based on population proportional to size (PPS). It meant (390/15=) 26 subjects were collected from each cluster. Study population were children aged less than twenty four months in the municipal area of English Bazar, Malda town.

Strategy of data collection: Each cluster was divided into two halves based on geographical distribution of the locality. From the midpoint of each half moved towards a direction chosen randomly to collect sample. Starting from the first home of that direction, adjacent homes were visited until required samples were not met. The parents of the child were explained the objectives, procedure and benefits of the study. The assent form was provided to them and once the consent was obtained the interview and anthropometric assessments were conducted. One cluster or ward was visited on a single day, so data was collected by researcher on fifteen visits to cover the study area.

IYCF practices, based on the definitions described by WHO (4)

1. Early initiation of breastfeeding (**IBF**) - Proportion of children born in the last 24 months who were put to the breast within one hour of birth
2. Exclusive breastfeeding (**EBF**) under 6 months - Proportion of infants 0–5 months of age who are fed exclusively with breast milk.
3. Continued breastfeeding at 1 year (**CBF-1**) - Proportion of children 12–15 months of age who are fed breast milk.

4. Introduction of solid, semi-solid or soft foods or Complementary feeding (CF) - Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.
5. Minimum dietary diversity (**MDD**) - Proportion of children 6–23 months of age who receive foods from 4 or more food groups.
6. Minimum meal frequency (**MMF**) - Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more.
7. Minimum acceptable diet (**MAD**) - Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).
8. Consumption of iron-rich or iron-fortified foods (**IF**) - Proportion of children 6–23 months of age who receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.
9. Children ever breastfed (**CEBF**) - Proportion of children born in the last 24 months who were ever breastfed.
10. Continued breastfeeding at 2 years (CBF-2) - Proportion of children 20–23 months of age who are fed breast milk.
11. Age-appropriate breastfeeding (**AABF**) - Proportion of children 0–23 months of age who are appropriately breastfed.
12. Predominant breastfeeding under 6 months (**PBF**) – Proportions of infants 0-5 months of age who are predominantly breastfed.
13. Duration of breastfeeding - Median duration of breastfeeding among children 0–35 months of age.
14. Bottle feeding (**BOF**) - Proportion of children 0–23 months of age who are fed with a bottle.
15. Milk feeding frequency for non-breastfed children - Proportion of non-breastfed children 6–23 months of age who receive at least 2 milk feedings.

The indicators of nutritional status of the children were Weight for Age (WFA) and Length for Age (LFA)

Data Analysis: Data compiled on Microsoft Excel worksheet. Data were analyzed using Statistical Package for Social Science (SPSS)

statistical software program version 16 (IBM, Chicago, USA). The categorical variables were analyzed by proportions while the continuous ones by means and standard deviations. Categorical characteristics were compared between groups with the use of Chi-square test. For the entire statistical test applied; p value less than 0.05 considered as significant.

Ethical clearance: Ethical clearance was obtained from the Institutional Ethics Committee of Malda Medical College prior to the initiation of the study.

RESULTS

The study revealed that out of the 390 respondents; six were not initiated breast feeding at all. Among the rest 384 children; breast feeding was initiated within recommended time in 184 (47.9%) subjects [Indicator 1]. (Table 1) Exclusive breast feeding for among children of 0-5 months of age was seen in 41 cases, calculating the rate for Indicator 2 was $(41/60 \times 100 =) 68.33\%$. Minimum dietary diversity (Proportion of children 6–23 months of age who receive foods from 4 or more food during the previous day – Indicator 5) was calculated to be $(100/330 \times 100 =) 30.30\%$. (Table 2) Indicator 6; Minimum meal frequency (Proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more was found to be $(270/300 \times 100 =) 90\%$ for breast-fed children and $(28/30 \times 100 =) 93.33\%$ for non-breast-fed children. Minimum acceptable diet; Proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk; Indicator 7; was found to be $(90/300 \times 100 =) 30\%$ for breast-fed children and $(9/30 \times 100 =) 30\%$ for non-breast-fed children. Continued breastfeeding at 2 years, Indicator 10, (Proportion of children 20–23 months of age who are currently fed with breast milk) was found to be $(58/69 \times 100 =) 84.05\%$. Age-appropriate breastfeeding, Indicator 11; Proportion of children 0–23 months of age who are appropriately breastfed was $(41/60 \times 100 =) 68.33\%$ for children 0 – 5 months of age and $(308/330 \times 100 =) 93.3\%$ for children 6 – 23 months of age. Indicator 13 could not be calculated as it required recruitment of 0 – 36 months children; which was beyond the scope of the study. Proportion of children 0–23 months of age who are fed with a bottle was found to be

(147/390*100 =) 37.69% (Indicator 14). Lastly; proportion of non-breastfed children 6–23 months of age who receive at least 2 milk feedings was (12/30*100=) 40% (Indicator 15). Total number of children with normal Weight For Age (WFA) were 233 (59.7%). Numbers of underweight children were 157 (40.3%). Total number of children with normal Length For Age (LFA) were 220 (56.4%). Numbers of stunting children were 170 (43.6%). The details of the

relationship between such anthropometric indicators and the different IYCF practices are shown in (Table 3). It was found that Weight for Age was significantly related with early initiation of breast feeding, minimum dietary diversity, minimum meal frequency, minimum acceptable diet, bottle feeding while Length for Age was significantly associated with early initiation of breast feeding only.

TABLE 1 DISTRIBUTION OF STUDY PARTICIPANTS ACCORDING TO TIME OF INITIATION OF BREAST FEEDING (N=384)

Age	Within 1 hr No (%)	1-6 hrs No (%)	6-24 hrs No (%)	>24 hrs No (%)	Total	Proportion
0 to 5 month	23 (39%)	22 (37.3%)	05 (8.5%)	09 (15.2%)	59	0.15
6-11 months	60 (50%)	37 (30.8%)	07 (5.8%)	16 (13.4%)	120	0.31
12-17 months	56 (52.8%)	33 (31.1%)	05 (4.7%)	12 (11.4%)	106	0.28
18-23 months	48 (48.5%)	35 (35.3%)	05 (5.1%)	11 (11.1%)	99	0.26
Total	187	127	22	48	384*	

* 6 children did not breastfed ever

TABLE 2 DISTRIBUTION OF STUDY PARTICIPANTS ACCORDING TO DIFFERENT IYCF PRACTICES (N= 390)

Practices	Age	Yes No (%)	No No (%)	Total
Exclusivity of breast feeding	0 to 5 months	41 (68.4%)	19 (31.6%)	60
	6-11 months	23 (18.5%)	101 (81.5%)	124
	12-17 months	03 (2.8%)	104 (97.2%)	107
	18-23 months	01 (1.1%)	98 (98.9%)	99
	Total	68	322	390
Still Breastfeeding	0 to 5 months	57 (95%)	03 (5%)	60
	6-11 months	116(94%)	08 (6%)	124
	12-17 months	99(92.5%)	08 (7.5%)	107
	18-23 months	85(85.8%)	14 (14.2%)	99
	Total	357	33	390
Introduction of solid, semisolid or soft foods	0 to 5 months	18 (30%)	42 (70%)	60
	6-11 months	99 (80%)	25 (20%)	124
	12-17 months	103 (96.3%)	04 (3.7%)	107
	18-23 months	96 (97%)	03 (3%)	99
	Total	316	74	390
Minimum dietary diversity	0 to 5 months	00 (00%)	60 (100%)	60
	6-11 months	18 (14.5%)	106 (85.5%)	124
	12-17 months	39 (36.4%)	68 (63.6%)	107
	18-23 months	43 (43.4%)	56 (56.6%)	99
	Total	100	290	390
Consumption of iron-rich or iron-fortified foods	0 to 5 months	00 (00%)	60 (100%)	60
	6-11 months	10 (8.1%)	114 (91.9%)	124
	12-17 months	25 (23.4%)	82 (76.6%)	107
	18-23 months	47 (47.5%)	52 (52.5%)	99
	Total	82	308	390
Children ever breastfed	0 to 5 months	59 (98.3%)	01 (1.7%)	60
	6-11 months	120 (96.7%)	04 (3.3%)	124
	12-17 months	106 (99%)	01 (1%)	107
	18-23 months	99 (100%)	00 (00%)	99
	Total	384	06	390
Predominant breastfeeding under 6 months	0 to 5 months	42 (70%)	18 (30%)	60
	6-11 months	24 (19.4%)	100 (80.6%)	124
	12-17 months	04 (3.7%)	103 (96.3%)	107

	18-23 months	01 (1%)	98 (99%)	99
	Total	71	319	390
Bottle feeding	0 to 5 months	14 (23.3%)	46 (76.7%)	60
	6-11 months	50 (40.3%)	74 (59.7%)	124
	12-17 months	44 (41.1%)	63 (58.9%)	107
	18-23 months	39 (39.4%)	60 (60.6%)	99
	Total	147	243	390

TABLE 3 RELATIONSHIP BETWEEN IYCF INDICATORS WITH WEIGHT FOR AGE AND LENGTH FOR AGE

Indicator	Practices	Weight For Age (WFA)			Chi-square Test	Length For Age (LFA)			Chi-square Test
		Normal	Grade 1	Grade 2		Normal	Grade 1	Grade 2	
IBF	YES (187)	132 70.6%	34 18.2%	21 11.2%	$\chi^2 = 18.21$ 1 df= 1 p= 0.001	109 58.3%	44 23.5%	34 18.2%	$\chi^2 = 7.147$ 1 df= 1 p= 0.028
	NO (197)	97 49.2%	60 30.5%	40 20.3%		107 54.3%	33 16.7%	57 29%	
EBF	YES (41)	11 26.8%	12 29.2%	18 44%	$\chi^2 = 0.949$ 1 df= 1 p= 0.621	13 31.7%	06 14.6%	22 53.7%	$\chi^2 = 2.335$ 1 df= 1 p= 0.311
	NO (19)	07 37%	06 31.5%	06 31.5%		05 26.3%	06 31.6%	08 42.1%	
CBF-1	YES (55)	40 72.8%	10 18.2%	05 9%	$\chi^2 = 1.657$ 1 df= 1 p= 0.436	32 58.2%	12 21.8%	11 20%	$\chi^2 = 2.091$ 1 df= 1 p= 0.351
	NO (04)	03 75%	00 00%	01 25%		02 50%	02 50%	00 00%	
CF	YES (49)	31 63.3%	12 24.5%	06 12.2%	$\chi^2 = 2.282$ 1 df= 1 p= 0.319	38 77.5%	07 14.3%	04 8.2%	$\chi^2 = 0.236$ 1 df= 1 p= 0.888
	NO (19)	09 47.4%	05 26.3%	05 26.3%		15 79%	02 10.5%	02 10.5%	
MDD	YES (100)	92 92%	04 4%	04 4%	$\chi^2 = 45.89$ 5 df= 1 p= 0.001	60 60%	23 23%	17 17%	$\chi^2 = 1.157$ 1 df= 1 p= 0.561
	NO (230)	123 53.5%	73 31.7%	34 14.8%		142 61.7%	42 18.3%	46 20%	
MMF	YES (298)	201 67.4%	67 22.5%	30 10.1%	$\chi^2 = 9.038$ 1 df= 1 p= 0.010	180 60.4%	60 20.1%	58 19.5%	$\chi^2 = 0.850$ 1 df= 1 p= 0.653
	NO (32)	14 43.8%	10 31.2%	08 25%		22 68.8%	05 15.6%	05 15.6%	
MAD	YES (99)	91 92%	04 4%	04 4%	$\chi^2 = 36.94$ 3 df= 1 p= 0.000	59 59.6%	23 23.2%	17 17.2%	$\chi^2 = 0.822$ 1 df= 1 p= 0.662
	NO (31)	13 42%	10 32.2%	08 25.8%		21 67.8%	05 16.1%	05 16.1%	
IF	YES (82)	62 75.6%	14 17.1%	06 7.3%	$\chi^2 = 5.334$ 1 df= 1	44 53.7%	18 21.9%	20 24.4%	$\chi^2 = 2.903$ 1 df= 1
	NO (248)	153 61.7%	63 25.4%	32 12.9%		158 63.7%	47 19%	43 17.3%	

					p=				p=
CEBF	YES (384)	229 59.6%	94 24.5%	61 15.9%	χ^2 =0.199 df= 1 p= 0.905	216 56.3%	77 20%	91 23.7%	χ^2 =1.546 df= 1 p= 0.461
	NO (06)	04 66.6%	01 16.7%	01 16.7%		04 66.7%	00 00%	02 33.3%	
CBF-2	YES (58)	37 63.8%	15 25.9%	06 10.3%	χ^2 =0.348 df= 1 p= 0.833	27 46.6%	13 22.4%	18 31%	$\chi^2=0.24$ 2 df= 1 p= 0.885
	NO (11)	08 72.7%	02 18.2%	01 9.1%		06 54.5%	02 18.2%	03 27.3%	
AABF	YES (41)	11 26.8%	12 29.3%	18 43.9%	χ^2 =0.948 df= 1 p= 0.621	13 31.7%	06 14.6%	22 53.7%	χ^2 =2.336 df= 1 p= 0.310
	NO (19)	07 36.8%	06 31.6%	06 31.6%		05 26.3%	06 31.6%	08 42.1%	
PBF	YES (42)	12 28.6%	12 28.6%	18 42.8%	χ^2 =0.476 df= 1 p= 0.788	14 33.3%	06 14.3%	22 52.4%	χ^2 =2.963 df= 1 p= 0.227
	NO (18)	06 33.3%	06 33.3%	06 33.3%		04 22.2%	06 33.3%	08 44.5%	
BOF	YES (147)	72 (49%)	46 (31.3%)	29 (19.7%)	χ^2 =11.90 9 df= 1 p= 0.003	78 (53%)	27 (18.4%)	42 (28.6%)	χ^2 =2.904 df= 1 p= 0.234
	NO (243)	161 (66.2%)	49 (20.2%)	33 (13.6%)		142 (58.4%)	50 (20.6%)	51 (21%)	

DISCUSSION

The nutritional status of children under two years of age is proportional with IYCF practices affecting immensely the child morbidity and mortality. Thus the present study was conducted to scrutinize the IYCF practices in a town which is the headquarters of a district having divergent nature of population.

Initiation of breast feeding was done within 1 hour in 47.95% of the study population. According to The world breastfeeding trend initiative (WBTi-2012) 40.5% and NFHS-4 (2015-2016), 48.8% (Urban), 47.3% (Rural) Indian mothers were engaged in early initiation of breastfeeding (5, 12).

Exclusivity of breast milk as a food 64.8% exclusivity in District Level Household and Facility Survey (DLHS-IV; 2012-2013) and 52.3% in National Family Health Survey (NFHS-IV; 2015-2016) data (5,13) which is very much in accordance with our study. India belongs to Yellow Zone constituting 46.8% Exclusive breast feeding prevalence in WBTi-2012 (12).

Proportion of children 6-23 months of age who received foods from four or more food groups were 30.30% in our study as compared to 32.6%

in a similar study in Delhi (14). According to NFHS IV Breast feeding and non-breast feeding children having minimum dietary diversity were 19.1% and 25.7% respectively (5). In a similar study conducted in a rural area of west Bengal 87.5% study populations showed minimum dietary diversity(9).

Minimum meal frequency among breastfed and non-breastfed children of 6-23 months of age in our research were 90% and 93.3% respectively which is very similar to a study conducted in Malaysia where 69.3% of breastfed and 95.2% of non-breastfed children received solid, semi-solid or soft foods including milk feeds the minimum number of times or more (15).

There was no difference between the breastfed (30%) and non-breastfed (30%) children receiving minimum acceptable diet (MAD) which has a higher frequency in our study as compared to 16% found in NFHS- IV (5). In an institution based study lower proportion of minimum acceptable diet, among breastfed (7.5%) and non-breastfed (8.5%) children was found almost in equal proportions. Lack of postnatal counseling by health workers as well as infrequent antenatal health clinics, maternal

illiteracy were found to be significant for not meeting Minimum dietary diversity (MDD) and Minimum acceptable diet (MAD) criteria (16). Bottle feeding among children less than 2 years of age should not be encouraged as a part of post natal care (9). In our study 147 (37.7%) individuals were found who practiced bottle feeding where as 28.1% was found in a study conducted in rural setup of West-Bengal (9). 51% and 47% of them were suffering from malnutrition and stunting. Out of 243 individuals who were not practiced bottle feeding, 161 (66.2%) and 58.4%) children were found to be normal. The effect of bottle feeding on WFA was found to be significant.

This study conducted among children revealed that the different IYCF indicators were as poor as elsewhere in India (5,9,13,14) (e.g.. initiation of breast feeding in one hour: 47.9%, Exclusive breast feeding 68.3%, Optimal diversity of food: 30.3%). The proportion of underweight and stunting was 40.7% and 43.6% respectively and were significantly related to initiation of breast feeding in one hour, adequate food diversity, adequate meal frequency, age adjusted minimum acceptable diet and exposure to bottle feeding.

Mukhopadhyay et al. in their study asserted that poor IYCF practices were associated with undernourishment in West Bengal, India. (6) At the same time; as Jones A D et al. found in their synthesis from the studies on the various communities; there has been great inconsistency in respect of the association of such indicators with the anthropometric findings of the children. (17) Like in this study; initiation of breast feeding within one hour of birth was positively related with Height for Age in Bangladesh, Ethiopia and Zambia. (17) In addition; in the current study IBF was more significantly associated with Weight for Age. Studies from Banglaesh and Pakistan reported a significant association between Exclusivity of Breast Feeding and indicators like Weight for Height; but the current study did not reveal any association with either weight for age or length for age. (18, 19) There was no significant association between height for age and IBF and EBF in Nepal as well.(20) Studies elsewhere obtained significant association between indicators related to complimentary feeding with both height and weight; which could not be upheld here.(18, 20) In this study, minimum dietary diversity, minimum food frequency and

minimum adequate diet – all three were significantly associated with weight for age of the children; a finding corroborated in many other studies.(18-20) A significant negative association was found in this study between bottle feeding and weight for age, a finding not similar to other studies. But in Nepal, a weak negative relationship between bottle feeding and height for age was seen.(20)

CONCLUSION

It should be mentioned here that this was a cross sectional study and so the temporal cause and effect relationship could not be established beyond doubt. However; this kind of heterogeneity in the relationship between the different IYCF indicators and the anthropometric indicators of growth of children has been indicated by other authors as well; indicating the importance of various other unknown confounding factors in play.(17, 20) Hence, more studies with justifiable methodologies are required for final conclusion about such relationships.

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AUTHORS CONTRIBUTION

All authors contributed equally in conducting the study and preparing the manuscript.

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