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RESEARCH ARTICLE

COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS AMONGST 7- 12 MONTHS INFANTS IN RURAL AREAS OF KAMRUP DISTRICT, ASSAM.

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Abstract

Background: Faulty feeding practices of infants in India generally arise from ignorance and wrong food beliefs. These are mainly responsible for aggravating malnutrition. Physical growth, brain development that occurs during infancy period is extensive and largely irreversible. Any investment after this period are less likely to improve the nutritional status. **Objective:** To assess the complementary feeding practices and nutritional status amongst 7-12 months infants in rural area of Kamrup, Assam. **Materials and Method:** A cross-sectional study was conducted from 1st February 2014 to 31st July 2014. Considering the prevalence of complementary feeding amongst 7-12 months infants in rural areas of Assam as 67% (DLHS-3), absolute precision of 7% and design effect of 2, sample size was calculated as 360. Cluster sampling method was used to select 12 villages. From each village 30 infants were selected to get a total of 360 study subjects. **Results:** Prevalence of exclusive breastfeeding for 6 months was 66% ; 46.2% of infants were receiving complementary foods at the completion of 6 months, 58% were receiving minimum meal frequency (MMF), 55% were receiving minimum dietary diversity (MDD), 52% were receiving minimum acceptable diet (MAD). Prevalence of underweight, stunting and wasting at one year was found to be 44%, 43.2% and 45.6% respectively. **Conclusion:** Higher prevalence of malnutrition was noticed in infants with inappropriate complementary feeding practices ($p < 0.0001$).

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INTRODUCTION

Infants are the future of the nation and constitute the most important human resource of any country. Infants constitute almost 2.92% of the total population in India [1]. Appropriate nutritional practices play a key role in proper growth and development of children. It represents a picture of the prevailing socio-economic status, culture, customs, beliefs, literacy status and health consciousness of the people prevailing in a community. Indian and global studies have shown that after 6 months, breast milk alone is not sufficient to meet the nutritional needs of growing infants. Introduction of semisolid energy rich complementary food from 6 months of age promotes optimal growth [2].

Based on the data, the 55th World Health Assembly has adopted a resolution recommending introduction of complementary food after 6 months and continue breast feeding up to the age of two years and beyond. Feeding should be continued during episodes of common childhood illness like diarrhoea, respiratory tract infection etc. unless the medical condition of the child contradicts it. However, many mothers restrict the child's food intake

during illness and tend to give small diluted amounts of food. Although the child is anorexic during an episode of illness, yet he can be fed with small quantities of food but more frequently. Once the child recovers, he needs to eat more than the usual diet to regain the weight loss during an illness. It is found many times, that the cause of malnutrition is not so much the illness as the restricted foods. The timely introduction of complementary feeding can prevent almost 6% of mortality. It was estimated that, if 90% of infants are covered with a package of intervention to protect, promote, and support the optimal with Infant and Young Child Feeding Practices (IYCF), almost one-fifth of overall mortality can be averted [3].

The WHO and UNICEF have developed the Global Strategy for Infant and Young Child Feeding (IYCF), which recognizes appropriate infant feeding practices to be crucial for improving nutrition status and decreasing infant mortality in all countries. WHO offers three recommendations for IYCF practices for children aged 6-23 months : Continued breastfeeding or feeding with appropriate calcium-rich foods if not breastfed ; feeding solid or semi-solid food for a minimum number of times per day according to age and breastfeeding status ; and including foods from a minimum number of food groups per day[4].

Child malnutrition status is an essential component of a country's overall human development. Inappropriate feeding practices are linked with the problems of malnutrition, overweight, obesity that may develop beyond 2 years. India is home to the largest number of underweight and stunted children in the world. Approximately 30% of children in India are born with Low Birth Weight (LBW) and rest of the damage happens during the following two years of life due to faulty feeding practices, infections etc [5].

Data with respect to complementary feeding suggest that 50-60% children have timely introduction of complementary food, but good feeding practices are reported in just about 50% of the children at 12-24 months [6].

Complementary feeding practices and Nutritional status	Rural (%)
Child 6-9 months receiving solid/semi solid food:	67%(DLHS3)
Stunted	28.9(NFHS-3)
Wasted:	16.3(NFHS3)
Underweight:	34.1(NFHS3)

Material and Methods

Study design, setting and duration

It is a community based cross sectional study of feeding practices and nutritional status amongst 7-12 months infants in rural areas (Villages under Rani Community Development Block) of Kamrup district, Assam.

Rani Community Development Block comes under Kamrup district of Assam. It was started in 1959. Rani Community Development Block is situated at a distance of about 30 Km southwest from the capital city of Guwahati, Assam. The block office is directly connected to Mirza town and Guwahati city. It is one of the main entry point to Assam from Meghalaya.

The block consists of population of 94,728 as per **Census 2001** [7]. The proportion of male being 50,751, while that the female being 43,799 (**Census 2001**). Sex ratio estimated to be 1.15. As per the data provided by the **Block development Officer (BDO)**, Rani, the block consists of 96 villages, out of which 77 revenue villages covering an area of 128 km² or 22,754.22 hectares. The population pattern of Block is mixed one accounting 18% of tribal, which again comprises of the Bodos, the Rabhas and the Garos. About 80% of the population is Hindu while rest of the population is Muslim and Christians.

Study was conducted during February – July 2014.

Study population

Infants in the age group of 7-12 months of age. Only one infant (7-12 months) has been selected from each house hold and mothers of each child were interviewed and in the absence of mother, father or other guardians above 18 years of age were interviewed. Infants (7-12 months), both males and females and residing more than one year in the study areas were included in the study, whereas ,infants with low birth weight (<2.5 kg), congenital anomalies,

metabolic disorders influencing growth, history of acute respiratory infection, diarrhoea in preceding 15 days and measles in 3 months prior to the date of survey were excluded.

Sample size and sampling technique

The sample size for the study was calculated using the formula $N = \frac{4pq}{l^2}$, where $p=67\%$ (prevalence of complementary Feeding amongst 7-12 months infants in rural area of Assam as 67% (DLHS-3), $q=33\%$, $l=$ absolute precision set at 7% & design effect of 2 = 360.

As per **Census 2011** [8], Rani Community Development Block consists of 26 Sub-centres. Out of 26 Sub-centres, 6 Sub-centres were selected randomly and out of 6 Sub-centres 12 villages (2 villages from each sub-centre) were selected through cluster random sampling using the method of probability proportional to size. From each cluster 30 infants were selected to get the sample size of 360 i.e., $12 \times 30 = 360$ using cluster sampling method who fulfilled our inclusion criteria. If, the required number of sample units is not met in that village or ward, then the adjacent village or ward was taken to get the remaining sample units.

The study was conducted in each village by house to house visits and if one house is found locked the adjacent house is approached. Age of child was ascertained from birth certificate, hospital discharge certificate, mother and child protection card (MCPC) and local event calendar prepared for this purpose. The data were collected with the help of both open ended and closed ended questionnaire, dietary history of the infant, physical examination, anthropometry. Parents/Guardians especially mothers were interviewed and all the informations were recorded.

Dietary assessment : With the help pre-design questionnaire dietary history of the infants and was taken from the respondents (mothers) using 24 hours recall methods.

Anthropometric assessment measurement were taken which includes weight with Salter's type of hanging scale and measurement was recorded nearest to 100 gm Length with infantometer with accuracy nearest to 0.5 cm and head circumference with accuracy nearest to 0.1cm and chest circumference.

Permission to conduct the study was obtained from the Institutional Ethics Committee, Gauhati Medical College, Assam. Data was analyzed and presented in suitable tables; chi-square test was applied to test statistical significance where ever necessary. Data was collected and entered in Microsoft Office Excel and analyzed by using SPSS-Version 17.

Criteria of significance used in the study were $p < 0.05$.

Results

A total 360 Infants from the villages under Rani Community Development Block, Kamrup district, were studied for feeding practices and nutritional status. Mean age of the infants was 9.3 months. 60.2% infants were male and around 75% were Hindus and around 43% belonged to ST and 31% belonged to OBC. Majority (60%) were from nuclear families. Most of the mothers (27%) were illiterate, followed by 35% mothers had studied up to Middle School level and 13% up to Higher Secondary school. Majority (68%) of the mothers were house wife followed by 10% were cultivators.

Most of the infants (36%) belonged to the lower middle class followed by 30% of the infants and children belong to upper middle class.(Modified B G Prasad classification based on AICPI 2013).

Amongst the infants studied 85% were institutional born and 15% were home born.

Prevalence of exclusive breast feeding for 6 months was 66%.Breastfeeding rate at one hour was 89% and prevalence of bottle feeding was 13%. Prevalence of underweight at one year was 44%, stunting was 43.2% and wasting was 45.6%.

Table 1 : Relationship between Complementary feeding practices and nutritional status.

Feeding Practices	Nutritional Status		Nutritional Status		Nutritional status	
Introduction of CF	Normal	Underweight	Normal	Stunting	Normal	Wasting

<6months (N=105) (29.1%)	32 (30.5%)	73 (69.5%)	41 (39%)	64 (61%)	46 (60.9%)	59 (56.1%)
7- 9 months (N=166) (46.2%)	131 (78.9%)	35 (21.1%)	123 (74%)	43 (26%)	110 (66.2%)	56 (33.8%)
>10 months (N=89) (24.7%)	39 (43.8%)	50 (56.2%)	41 (46%)	48 (54%)	40 (45%)	49 (55%)
	X²: 68.533 df=2	p <0.0001	X²: 37.930 df=2	p<0.0001	X²:17.379 df=2	p<0.0001

As shown in Table 1, 29.1% (n=105) infants received complementary feeding before 6 months of age and among them 69.5%, 61% and 56.1% were found to be underweight, stunted and wasted respectively. Around 46.2% (n=166) received CF in the age group of 7-9 months and among them 21.1%, 26% and 33.8% were underweight, stunted and wasted respectively and 24.7% (n=89) received CF after 10 months of age and among them 56.%, 54% and 55% were found to be underweight, stunted and wasted respectively. All were found to be statistically significant (p<0.0001).

Table 2 : Relationship between nature of Complementary foods given and nutritional status.

Nature of CF	Nutritional Status		Nutritional Status		Nutritional Status	
	Normal	underweight	Normal	Stunting	Normal	Wasting
Liquid (N=99) (27.5%)	39 (39.3%)	60 (60.7%)	49 (49.4%)	50 (50.6%)	41 (41.4%)	58 (58.6%)
Semi-solid (N=157) (43.6%)	106 (67.5%)	51 (32.5%)	110 (70.6%)	47 (29.4%)	100 (63.6%)	57 (56.4%)

Solid (N=104) (28.9%)	83 (79.8%)	21 (20.2%)	93 (89.4%)	11 (10.6%)	80 (76.9%)	24 (23.1%)
	X²:37.769 df=2	p <0.0001	X²:38.505 df=2	p <0.0001	X²:27.605 df=2	p <0.0001

As shown in Table 2, 27.5% (n=99) received liquid foods (formula milk, cows milk and other liquid foods) and among them 60.7%, 50.6% and 58.6% were found to be underweight, stunted and wasted respectively. Around 43.6% (n=157) received semi-solid items and among them 32.5%, 29.4% and 56.4% were underweight, stunted and wasted respectively and remaining 28.9% (n=104) received solids (rice, Khishri, fruits) and among them 20.2%, 10.6% and 23.1% were underweight, stunted and wasted respectively. All were found to be significant (p<0.0001).

Table 3 : Relationship between MMF and Nutritional Status of infants in rural area.

Minimum Meal Frequency	Nutritional Status		Nutritional Status		Nutritional Status	
	Normal	Underweight	Normal	Stunting	Normal	Wasting
Adequate (N=210) (58%)	146 (69.6%)	64 (30.4%)	169 (80.4%)	41 (19.6%)	159 (75.8%)	51 (24.2%)
Inadequate (N=150) (42%)	59 (39.3%)	91 (60.7%)	66 (44%)	84 (56%)	51 (34%)	99 (66%)
	X²: 32.529 df=1	p <0.0001	X²:51.363 df=1	p <0.0001	X²:62.643 df=1	p <0.0001

As shown in Table 3, 58% (n=210) had adequate MMF and among them 30.4%, 19.6% and 24.2% were found to be underweight, stunted and wasted respectively and was found to be significant (p<0.0001).

Table 4 : Relationship between MDD and Nutritional Status of infants in rural area

Minimum Dietary Diversity	Nutritional Status		Nutritional Status		Nutritional Status	
	Normal	Underweight	Normal	Stunting	Normal	Wasting
Adequate (N=198) (55%)	141 (71.2%)	57 (28.8%)	121 (61.1%)	77 (38.9%)	143 (72.3%)	55 (27.7%)
Inadequate (N= 162) (45%)	65 (40.1%)	97 (59.9%)	77 (47.5%)	85 (52.5%)	69 (42.6%)	93 (57.4%)
	X ² :35.180 df=1	p <0.0001	X ² :6.639 df=1	p <0.01	X ² : 32.310 df=1	p <0.0001

As shown in Table 4, 55% (n=198) had adequate MDD and among them 28.8%, 38.9% and 27.7% were found to be underweight, stunted and wasted respectively and was found to significant (p<0.0001).

Table 5 : Relationship between MAD and Nutritional status of infants in rural areas

Minimum Acceptable Diet	Nutritional Status		Nutritional Status		Nutritional Status	
	Normal	Underweight	Normal	Stunting	Normal	Wasting
Adequate (N=188) (52%)	127 (67.5%)	61 (32.5%)	139 (73.9%)	49 (26.1%)	130 (69%)	58 (31%)
Inadequate (N=172) (48%)	78 (45.3%)	94 (54.7%)	79 (45.9%)	93 (54.1%)	83 (48.2%)	89 (51.8%)

	X²:18.063 df=1	p<0.0001	X²:29.495 df=1	p<0.0001	X²:16.229 df=1	p<0.0001
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As shown in Table 5, 52% (n=188) had adequate MAD and among them 32.5%, 26.1% and 31% were found to be underweight, stunted and wasted respectively and was found to significant (p<0.0001).

Discussion

High rates of initiation of complementary feeds at the recommended time of six months in our study could be related to high institutional deliveries in the study population. In our study, approximately 62% of mothers were literate. The association of literacy and initiation of complementary feeds at the recommended time was statistically significant.

In the present study, 46.2% of infants were receiving CF between 7-9 months compared to 59.5% (NFHS-3) [9]. Banapuramath CR.(1996) [10]found it 57.3%. Kalita D.(2007) [11] found it 51.9% (7-9 months) . 69.5%, 61% and 56.1% infants were underweight, stunted and wasted respectively with CF <6 months of age and 56.2%, 54% and 55% were underweight, stunted and wasted respectively with CF >10 months. Rahman M. (2009) [12] found that early CF was associated with underweight (40%), stunting (22.5%) and wasting (10.9%).

43.6% of mothers gave semi-solid foods and among them 32.5%, 29.4% and 56.4% were underweight, stunted and wasted respectively & 28.9% mothers gave solid foods and among them 20.2% , 10.6% and 23.1% were underweight, stunted and wasted respectively.

58% of infants had adequate MMF & among them 30.4%, 19.6% and 24.2% were underweight, stunted and wasted respectively . Contrary to this, **Ara R.(2012)** [13] found that 44.8%,43.1% and 43.1% were underweight, stunted and wasted respectively with adequate MMF. **Banapmah CR. (1996)** found it similar to the present study. 60.7%, 56% and 66% of infants were underweight, stunted and wasted respectively with inadequate MMF. **Kumar D. (2006)** [14] found that 36%, 81.8% and 10.6% were underweight, stunted and wasted respectively with inadequate MMF.

55% of infants had adequate MDD and among them 28.8%, 38.9% & 27.7% were underweight, stunted and wasted respectively with adequate MDD. Contrary to this ,**Ara R. (2012)** found that 44.8% , 43.1% and 45.5% were underweight, stunted and wasted respectively with adequate MDD.

52% of infants had adequate MAD and among them 32.5%, 26.1% and 31% were underweight, stunted and wasted respectively with adequate MAD.

Medhi GK.(2004) [15] found that 47.3%, 68.4% and 15.7% were underweight, stunted and wasted respectively with adequate MAD.

54.7%, 54.1% and 51.8% of infants were underweight, stunted and wasted respectively with inadequate MAD. **Kumar D. (2006)** found that 36%,81.8% and 10.6% were underweight, stunting and wasted respectively with inadequate MAD.

Conclusion

The study shows that Complementary feeding practices in Rani Block were poor.

Higher prevalence of malnutrition was noticed in infants with inappropriate complementary feeding practices and in whom MMF, MDD and MAD was inappropriate which was found to be statistically significant. Raising the awareness regarding the advantages appropriate feeding practices through IEC/BCC activities as well as through NGO's and even the government machinery. Further large community based studies are required to determine the measures such as health education can change existing infant feeding practices and bring down prevalence of malnutrition.

Limitations

This study suffers some bias in terms of more representation of infants selected according to inclusion criterion, which was due to their easy availability with mothers at home at the time of survey and more willingness to participate shown by their mothers. Moreover, the data was collected by recall method and therefore short memory, forgetfulness, impatience and evasiveness of the mothers during interview may fail to give accurate information. The present study was restricted to dietary history taking (24 hours recall method), clinical examination and anthropometric measurement. Grade of malnutrition (mild, moderate and severe) could not be determined due to the small sample size. The result of the study are therefore to be viewed within the framework of these limitations.

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