

Feeding Pattern of Infants and Young Children Under Two Years - An Observational Study

Aparna Sahu¹, Dr Usha Singh², BR Abha Ayushree³

¹Lecturer in Home Science, Attabira College, Attabira, Bargarh, Odisha-768027
Email: [aparnasahu84\[at\]gmail.com](mailto:aparnasahu84[at]gmail.com)

²Professor & Dean, College of Community Science, Dr. Rajendra Prasad Central Agricultural University, Pusa-848125 (Samastipur), Bihar, India.
Email: [usha.pusa\[at\]rpcau.ac.in](mailto:usha.pusa[at]rpcau.ac.in)

³Assistant Professor, Department of Home Science, Rama Devi Women's University, Bhubaneswar, Odisha-751022
Corresponding Author Email: [br.abhaayushree\[at\]gmail.com](mailto:br.abhaayushree[at]gmail.com)

Abstract: ***Introduction:** First two years of life is very important for laying good foundation for future wellbeing. Also, this age group is more vulnerable to various health issues, which can be prevented with the help of proper diet of the individual. So, it is very essential to study the infant and young child feeding practices. **Methods:** A community based cross-sectional study was performed in Harpur panchayat, Pusa block, Samastipur district, Bihar. A total of 268 dyads of mother and child aged six to twenty-four months were included in the study. A standard questionnaire was developed and employed for collection of data. The data was then processed and feeding practices including breastfeeding practices, food and water consumption pattern as well as food diversity pattern of infants and young children were studied. **Results:** Exclusive breastfeeding was seen among all (100 %) the infants and young children and did not have pre-lacteal food. Complementary feeding was initiated between six to nine months of age. All the children are continuing breastfeeding along with the complementary foods. But, their diet is mainly comprised of starchy foods. Only the diet of 50 per cent children includes pulses/nuts/legumes on daily basis while Only 16.42 per cent children are being provided meat and fish daily while 63.43 per cent children are not given meat and fish. Similarly, egg is consumed by 23.88 per cent children on weekly basis and 20.15 per cent on fortnightly basis whereas 55.97 per cent children do not consume eggs. Simply, the diet of less than half of total subjects contains the required minimum variety. **Conclusions:** All the infants were exclusively breastfed for the first six months. No pre-lacteal feed was given. Starchy foods like cereals and tubers are predominant in the diet of infants and young children. But, even half of the child population is not getting minimum diversity in their daily diet. Hence, it is recommended to enhance the diversity in the daily diet of children by incorporation of different food groups during preparation of food for children.*

Keywords: Feeding Practices, Complementary Feeding, Breastfeeding, Infants and Young Children

1. Introduction

Good nutrition is having important role for survival, physical growth, mental development, performance, productivity, health and wellbeing of individuals throughout their lifecycle, right from infancy, childhood, adolescence till adulthood (WHO, 2020). Infants and young children have growing demand of nutrients during this first two years of life for their optimal growth and development and thus demands more nutrient-dense complementary foods than that of adult's needs (Dewey, 2013). When an infant reaches six months of age, the biggest problem of providing proper nutrition occurs. This is because of the lower intake of foods other than breast milk by the breast-fed infants (Dewey & Brown, 2003). If they don't get proper nutrition, deficiency occurs. Hence, it is essential to receive right nutrition during infancy to ensure optimum growth and development (Hardwick and Sidnell, 2014). Moreover, the first two years of life are turning points in order to raise nutrition and dietary behaviours for desirable growth and development (Michaelsen *et al.*, 2020).

Besides, about 45 per cent of deaths among children under five are because of under nutrition (UNICEF, 2019). According to NFHS 4 (2015-16), Bihar has the highest share of severely stunted children among under 5 (23.10%). Out of 55.90 per cent malnourished children, the percentage of

stunted and wasted children are 48.30 and 20.80 per cent respectively. Furthermore, seven per cent of children are severely wasted. Low birth weight babies constitute about 15 per cent. Out of them, the percentage of underweight children is 43.90 per cent, consisting 15.20 per cent as severely underweight children.

Hence, when infants reach six months of age, they are required to start having soft, semi-solid and solid foods, called complementary foods along with human milk (FAO, 2018). Late or improper complementary feeding has adverse impact on the physical, cognitive and economic development of the child which finally affect the development of the nation as well (Mehlawat, *et al.*, 2017). In addition, both quality and quantity of complementary foods have an optimal result on linear growth of infants and young children (Dewey and Adu-Afarwuah, 2008). So, this study was conceived and designed to assess the feeding practices including breastfeeding practices, food and water consumption pattern as well as food diversity pattern of infants and young children.

2. Material and Methods

A community-based, cross-sectional study was undertaken in the Harpur panchayat of Pusa block in Samastipur district, Bihar. All the thirteen Anganwadi centers were covered

under this investigation. A total of 268 infants and young children, aged between six to twenty-four months were selected as the sample for the study. As these infants and young children were unable to respond, their mothers were selected as the respondents of the study.

A standard questionnaire was developed to collect data which includes general and socioeconomic information of infants and young children like age, gender, category, education of first care-giver, occupation of parents, family size, income. Besides, food and water consumption pattern and food diversity pattern of infants and young children were studied by interviewing the mothers.

The obtained data were then processed and expressed in terms of statistical parameters like frequency, percentage, mean and standard deviation.

3. Results

General and socio-economic information of infants and young children

Among the total 268 infants and young children, included for the research, a total of 41.42 per cent of them belonged to 6 to 12 months of age group followed by 36.57 per cent to 13 to 18 months and 22.01 per cent subject in the age group of 19 to 24 months age group. It was seen that among all subjects, 52.98 per cent were boys while the remaining 47.02 per cent were girls.

Monthly income of the family was found to be less than 10,000 rupees among 56.34 per cent respondents, while 38.06 per cent families had this income between the range of 10, 000 to 20,000 rupees. Only 5.60 per cent of subjects were living in the family having monthly income more than 20,000 rupees. Fathers of most of the children (46.27 %) were engaged in agriculture, 36.57 per cent belonged labourer category, 10.44 per cent had government job while only 6.72 per cent were dependent on their business for their livelihood. On the other hand, mothers of 55.97 per cent subjects were home maker whereas those of 21.27 per cent were JEEVIKA member. Only mothers of 22.76 per cent children were working as labour to support their family. While concerning the educational level of mother, majority of them (47.76 %) only could write their names while 13.80 per cent were illiterate. On the other hand, 21.26 per cent mothers were educated up to primary level of education, while 11.94 per cent had achieved education up to middle level and only 5.22 per cent mothers had completed their secondary level of education.

Table 1: General and socio-economic information of infants and young children

Particulars	Subjects (N=268)	
	n	%
Age (months)		
6-12	111	41.42
13-18	98	36.57
19-24	59	22.01
Gender		
Male	142	52.98
Female	126	47.02
Father's occupation		
Labour work	98	36.57

Business	18	6.72
Agriculture	124	47.27
Govt. job	28	10.44
Mother's occupation		
Home maker	150	55.97
Labour	61	22.76
JEEVIKA member	57	21.26
Educational level of mother		
Illiterate	37	13.81
Only can write name	128	47.76
Primary	57	21.27
Middle	32	11.94
Secondary	14	5.22
Monthly family income		
< 10,000	151	56.34
10,000- 20,000	102	38.06
>20,000	15	5.60

Dietary information of infants and young children

In order to get an idea regarding the prevalent feeding pattern among infants and young children in the study area, data was collected on different aspects of breastfeeding and start of complementary feeding. The information of breastfeeding pattern as well as food and water consumption pattern has been presented in Table 2.

Upon gathering information on feeding habits of children, it was found that majority of subjects (56.34 %) were breastfed within one to three hours of delivery which is favourable for their babies while 39.18 per cent infants got breastfeeding in less than an hour of time after delivery which can be considered as the most preferable favour for newborns. On the other hand, there were 3.36 per cent respondents who couldn't recall about it and 1.12 per cent of subjects were put to breasts after three hours of delivery which calls for attention regarding nutrition education to mothers. Thankfully, newborns were not given any food after delivery other than mother's milk. In other words, all the subjects were given mother's milk since birth. In addition, all the infants and young children are having mother's milk in current days.

When facts about frequency of breastfeeding the child actually gets has been collected, it was found that in a day around 6.72 per cent subjects are being breastfed for one to three times a day while 27.99 per cent infants were being breastfed for four to six times followed by 22.38 per cent infants who were put for breastfeeding for seven to nine times while 1.11 per cent of subjects are having mother's milk more than ten times also or it can be said that as per demand of infants. At the same time, major fractions of the respondents (41.79 %) were unable to remember when asked about number of breast-feedings.

It can be observed that about 6.72 per cent subjects are being breastfed within an hour of interval, while 46.26 per cent are taking breast milk based on their needs and 10.45 per cent subjects are having it as per their demand irrespective of their requirements. But, 36.57 per cent respondents couldn't recall it. Similarly, 55.22 per cent subjects are reported to have mother's milk one to three times at night while the remaining 44.78 per cent mothers couldn't provide this information.

Almost 67.54 per cent subjects are dependent on water tap whereas 19.40 per cent depend on tube well for drinking water. The rest (13.06 %) infants and young children depend on other measures like buying mineral water, hand pump etc.

As far as introduction of food to infants for the first time is concerned, it has been observed that all children (100 %) got first food between six to nine months of age. As far as type of food being used for introduction of first food is concerned, it has been observed that 30.22 per cent subjects were provided rice, followed by dal (26.86%), khichdi (3.35 %) and dal water (0.37 %). A total of 17.16 per cent infants and young children consumed other foods like commercially available cereals, skimmed milk etc. while 22.02 per cent respondents couldn't recall about it. Moreover, 63.06 per cent subjects are getting food for four to five times, preceded by 23.88 per cent subjects taking food for more than five times whereas 13.06 per cent subjects are taking food for only two to three times in a day.

Table 2: Dietary information about the infants and young children under the study

Particulars	Subjects (N=268)	
	Frequency	Percentage
After how many hours of delivery, baby was put to breasts?		
Not remember	9	3.36
< 1 hour	105	39.18
1-3 hours	151	56.34
> 3 hours	3	1.12
What did the baby have immediately after delivery?		
Ghutti	0	0
Jiggery water	0	0
Honey	0	0
Mother's milk	268	100.0
Water	0	0
Nothing	0	0
Does the child breast-feed at current days?		
Not suitable	0	0
Yes	268	100.00
No	0	0
How long the child was breastfed?		
< 6 months	0	0
6-12 months	0	0
13-24 months	0	0
Still continuing	268	100.00
Not remember	0	0
Not suitable	0	0
How many times did the child breastfed in a day?		
0 time	0	0
1-3 times	18	6.72
4-6 times	75	27.99
7-9 times	60	22.38
≥ 10 times	3	1.12
Not remember	112	41.79
Not suitable	0	0
When did the child breastfed?		
Not remember	98	36.57
< 1 hour	18	6.72
Based on need	124	46.26
Based on demand	28	10.45
Means of drinking water		
Tube well	52	19.40
Well	0	0
Pond	0	0
Water tap	181	67.54
Other	35	13.06

When did the child take food for the first time?		
< 1 month	0	0
1-3 months	0	0
4-6 months	0	0
6-9 months	268	100.0
>9 months	0	0
Not given	0	0
Not suitable	0	0
What did the child consume for the first time?		
Tea-biscuits	0	0
Roti	0	0
Khichdi	9	3.36
Rice	81	30.22
Egg	0	0
Dal water	1	0.37
Dal	72	26.87
Fruits	0	0
Other	46	17.16
Not remember	59	22.02
How many times does the child get food?		
Once	0	0
2-3times	35	13.06
4-5 times	169	63.06
>5 times	64	23.88
Not suitable	0	0

Food Diversity pattern of infants and young children It is observed in Table 3 that all children (100%) are being provided cereals/roots & tubers in their daily diet. The main cereals being given to children are wheat and rice. Among roots and tubers, normally potato and carrots are given to children. But, the use of carrot is seasonal.

As far as use of pulses/nuts/legumes is concerned, only 50.00 per cent children are getting it in their daily diet. Rest 30.22 per cent children get it alternatively and 19.78 per cent children get it on weekly basis. Only 16.42 per cent children are being provided meat and fish daily whereas 20.15 per cent fortnightly and 63.43 per cent children are not given meat and fish. The consumption of eggs has been observed among 23.88 per cent children on weekly basis and 20.15 per cent on fortnightly basis whereas 55.97 per cent children do not consume eggs.

Inclusion of green leafy and yellow-coloured vegetables and fruits in daily diet has been observed only among 9.70 per cent children. The inclusion of other vegetables and fruits has been observed in the diet of 17.54 per cent children on daily basis. But the daily milk consumption other than mother's milk is among 70.52 per cent children.

Table 3: Food Diversity pattern of infants and young children under the study area

Food Groups	Frequency	n	%
Cereals and Root & Tubers	Daily	268	100.00
	Weekly	0	0
	Fortnightly	0	0
	Rarely	0	0
	Not consumed	0	0
Pulses, Nuts and Legumes	Daily	134	50.00
	Alternatively	81	30.22
	Weekly	53	19.78
Meat and Fish	Weekly	44	16.42
	Fortnightly	54	20.15
	Not Consumed	170	63.43

Egg	Weekly	64	23.88
	Fortnightly	54	20.15
	Not Consumed	150	55.97
Green leafy and Yellow coloured vegetables and fruits	Fortnightly	26	9.70
	Rarely	156	58.20
	Not consumed	86	32.10
Other Vegetables and Fruits	Daily	47	17.54
	Weekly	79	29.48
	Fortnightly	87	32.46
	Rarely	20	7.47
Milk & milk products	Not consumed	35	13.05
	Daily	189	70.52
	Rarely	79	29.48
	Not consumed	0	0

*n- Numbers; %- Percentage

4. Discussion

From Table 1, it is indicated that most of the children (41.41 %) are 6-12 months old, followed by 13-18 months (36.57%) and 19-14 (22.01 %) months old children. Singh and Dunkwal (2019) also reported higher percentage of 6-12 months old infants and young children.

In this study, the total of 268 subjects consisted of 52.98 per cent male while 47.02 per cent female infants and young children. Rao *et al.* (2011) also found 56.5 per cent male and 43.5 per cent female subjects in their study. Demilew *et al.* (2017) reported higher percentage of male children compared to female children.

As the education of mother has an important role in the optimal nutritional status of children, information collected and it is found that majority of them (47.76 %) only could write their names while 13.80 per cent were illiterate. On the other hand, 21.26 per cent mothers had completed their primary level of education, while 11.94 per cent had achieved education up to middle level and only 5.22 per cent mothers had completed their secondary level of education. Singh and Dunkwal (2019) also found most of the mothers to be illiterate (82.14 %).

As regarding to occupation of fathers, most of the children (46.27 %) were engaged in agriculture, 36.57 per cent belonged labourer category, 10.44 per cent had government job while only 6.72 per cent were dependent on their business for their livelihood whereas mothers of 55.97 per cent subjects were home maker whereas those of 21.27 per cent were JEEVIKA member. Only mothers of 22.76 per cent children were working as labour to support their family.

Monthly income of the family was found to be less than 10,000 rupees among 56.34 per cent respondents, while 38.06 per cent families had this income between the range of 10, 000 to 20,000 rupees. Only 5.60 per cent of subjects were living in the family having monthly income more than 20,000 rupees.

Infants should be breastfed immediately after birth, most preferably within one hour after delivery (GOI, 2006). Only 39.18 per cent subjects got breastfeeding in less than an hour of time after delivery. Similarly, Dabar *et al.* (2014) reported that only 43.3 per cent subjects were put to breasts within an hour of delivery.

Usually, pre-lacteal feeding is avoided for the first six months of life to prevent various kinds of infection (Samdarshi *et al.*, 2016). And in the present study newborns were not given any food after delivery other than mother's milk. In addition, all the infants and young children are exclusively breastfed for six months and having mother's milk in current days.

It was found that in a day around 6.72 per cent subjects are being breastfed for one to three times a day while 27.99 per cent infants were being breastfed for four to six times followed by 22.38 per cent infants who were put for breastfeeding for seven to nine times while 1.11 per cent of subjects are having mother's milk more than ten times also or it can be said that as per demand of infants. At the same time, major fractions of the respondents (41.79 %) were unable to remember when asked about number of breastfeedings.

It can be observed that about 6.72 per cent subjects are being breastfed within an hour of interval, while 46.26 per cent are taking breast milk based on their needs and 10.45 per cent subjects are having it as per their demand irrespective of their requirements. But, 36.57 per cent respondents couldn't recall it. Similarly, 55.22 per cent subjects are reported to have mother's milk one to three times at night while the remaining 44.78 per cent mothers couldn't provide this information.

It can be observed that tube well, tap water and some other means including hand pump are the main sources of water. Almost 67.54 per cent subjects are dependent on water tap whereas 19.40 per cent depend on tube well for drinking water. The rest (13.06 %) infants and young children depend on other measures like buying mineral water, hand pump etc.

As far as introduction of food to infants for the first time is concerned, it has been observed that all children (100 %) got first food between six to nine months of age. As far as type of food being used for introduction of first food is concerned, it was found that rice has been included as the first food in majority (30.22%) of infant's diet. Moreover, 63.06 per cent subjects are getting food for four to five times, preceded by 23.88 per cent subjects taking food for more than five times whereas 13.06 per cent subjects are taking food for only two to three times in a day.

Almost all children (100%) are being provided cereals/roots & tubers in their daily diet. The main cereals being given to children are wheat and rice. Among roots and tubers, normally potato and carrots are given to children. But the use of carrot is seasonal. As far as use of pulses/nuts/legumes is concerned, only 50.00 per cent children are getting it in their daily diet. Only 16.42 per cent children are being provided meat and fish daily whereas 20.15 per cent fortnightly and 63.43 per cent children are not given meat and fish. A boost has been observed in egg production, but its consumption by infants and young children is not at all satisfactory. It is not in a habit of daily consumption. The consumption of eggs has been observed among 23.88 per cent children on weekly basis and 20.15

per cent on fortnightly basis whereas 55.97 per cent children do not consume eggs. The situation is even more pitiable when the information on availability of green leafy and yellow-coloured vegetables and fruits in daily diet of the children has been recorded. Its inclusion in the daily diet has been observed only among 9.70 per cent children. The inclusion of other vegetables and fruits has been observed in the diet of 17.54 per cent children on daily basis. But the daily milk consumption other than mother's milk is among 70.52 per cent children. Similar findings were observed by Demilew *et al.* (2017) in their study. It might be because of the lower income of family that cereals and tubers like starchy vegetables are predominant in the diet of infants and young children.

5. Conclusion

All the infants were exclusively breastfed for the first six months. No pre-lacteal feed was given. Rice was the first complementary food introduced in the diet of infants and young children. It is also observed that even half of the child population is not getting minimum diversity in their daily diet. As a result, children suffer from nutritional deficiency disorders. Hence, it is recommended to enhance the diversity in the daily diet of children by incorporation of different food groups during preparation of food for children. Home based diversified foods if inculcated in the diet, can help children in obtaining their optimal nutritional status.

List of abbreviations

UNICEF: United Nations Children's Fund; FAO: Food and Agriculture Organization; WHO: World Health Organization; NFHS-4: National Family Health Survey-4. ICDS: Integrated Child Development Services

Declarations

Ethics approval and consent to participate

This study was approved by the advisory committee of Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur. Letter of permission was taken from. Primary Health Centre, Pusa, and ICDS officer, Pusa. Verbal consent was taken from the respondents of the study.

Consent for publication

Not applicable.

Availability of data and materials

All the relevant data of the study are given in tables.

Competing interests

None.

Funding

None.

Author's contribution

US: Designed the study, read and approve the manuscript. AS: Conducted the study, collected data and performed statistical analysis and result interpretation, prepared the manuscript. SS: Read and approve the manuscript.

Acknowledgements

The authors would like to express their sincere gratitude to Primary Health Centre, Pusa, and ICDS officer, Pusa for their support. We are also indebted to the anganwadi workers and participants for their valuable support.

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