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Original Research Article

Assessment of feeding practices and morbidity patterns of infants in a rural field practice area of Punjab: a longitudinal study

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ABSTRACT

Background: Faulty feeding practices and infections have a detrimental effect on an infant's health. Although, breastfeeding is almost universal in India, rates of early initiation, Exclusive Breast Feeding (EBF) and timely complimentary feeds are far from desirable. This takes a heavy toll on their health and increases their susceptibility to develop several morbidities including Diarrhoea and Respiratory Tract Infections. Thus, this study was undertaken to assess the feeding practices and morbidity patterns of infants and to determine their association.
Methods: It was a longitudinal study on a birth cohort of 99 infants in the rural field practice area of GMC, Amritsar who were followed up to 6 months of birth. Baseline data on sociodemographic profile and breast feeding was collected in the first visit. Weaning practices and any morbidity suffered during six months' period were assessed at the follow up visit.
Results: Breast feeding was initiated in majority 88.87% but it was delayed in more than half (54.02%) of infants. Customs like prelacteal feeding (76.8%) and discarding colostrum (50.57%) were quite prevalent. EBF was practiced by most 65.51%. In around a quarter of infants, delayed or faulty weaning was observed. Diarrhea was the commonest morbidity (49.09%) followed by ARI (32.73%). Significant association ($p<0.05$) was observed between the feeding practices and infant morbidities especially diarrhoea.
Conclusions: Mothers should be educated more effectively regarding benefits of early and exclusive breast feeding and correct weaning practices. Emphasis should also be placed on increasing awareness in the community to bring about a significant change in the deleterious customs and traditions.

Keywords: Breast feeding, Infant, Morbidity, Weaning

INTRODUCTION

The first six months of life is the most crucial period in the life of an infant. Severe infections including sepsis/pneumonia, tetanus and diarrhea, birth asphyxia and preterm births lead to high neonatal and infant mortality and also high prevalence of morbidities. Inadequate care and faulty feeding practices have a detrimental effect on their health.[1] Breast feeding is the ideal food for the infant. It is recommended that children be put to the breast within 1 hour after birth. The first milk called "colostrum" is the most suitable food for the baby because it contains a high concentration of proteins and other nutrients and is also rich in anti-infective factors which protect the baby against respiratory infections and diarrhoeal diseases.[1] A sub analysis of Ghana data included in WHO analysis demonstrated that delayed breast feeding initiation was crucial risk factor for neonatal mortality and estimated 22% and 16% neonatal death could be prevented by increasing proportion of infant that receive breast milk in 1 hour and 24 hr respectively.[2]

India is a kaleidoscope of various cultures and traditions many of which have a deleterious effect over infant feeding practices. Some cultures in India discard colostrum and practice breast feeding only after regular breast milk begins to flow on the third to sixth day after birth. Prelacteal feed is also a popular custom in society of giving honey, sugar water etc. to the newborn.

WHO and UNICEF have recommended Exclusive Breastfeeding (EBF) for first 6 months as a key intervention to achieve significant reduction in child malnutrition and mortality? It is the practice of feeding only breast milk (including expressed breast milk).[2] The importance of exclusive breastfeeding and the immunological and nutritional values of breast milk have been well demonstrated.[3] It has been observed that infants aged 0-5 months who are not breastfed have seven-fold and five-fold increased risks of death from diarrhoea and pneumonia respectively.[4] However, only 54.9% of children under six months of age are exclusively breastfed in India.[5]

The gradual switching over the child from breast milk to other suitable foods rich in protein and other nutrients is called weaning. The delayed introduction of semisolid foods is a major cause of child malnutrition especially in South Asia. Most children do not receive semisolids until after 9 months of age, and many not until their second year of life.[6] In India, at age 6-8 months, less than half of children (42.7 percent) are given timely complementary feeding.[5] Young infants fall an easy prey to variety of ailments. Various studies in India have shown that Respiratory and Gastrointestinal tract infections are the leading cause of morbidity in infants.[7] Results of research indicate how events in early life like diet and infections affect health when child becomes an adult and how many conditions can be prevented through early action.[1] Therefore, effective child health care information regarding infant feeding practices and pattern of morbidity is important. Hence, this study was conducted to describe the infant feeding practices and the morbidity pattern as well as to ascertain their association in rural area of Amritsar, Punjab.

METHODS

It was a longitudinal study conducted at Village Naagkalan which was the field practice area of Department of Community Medicine, GMC, Amritsar. All infants born during the first 6 months of the year 2014, i.e. from January 2014 to June 2014 were identified with the help of ASHA. All these newborns formed the birth cohort who were followed up for the next 6 months. Therefore, the study period was of one-year duration commencing from January 2014 up to December 2014.

Inclusion criteria

- Included all newborns of mothers who were permanent residents of the study area and had singleton pregnancy.

Exclusion criteria

- Multiple births and temporary residents of mothers who had come to parental house for delivery which is a common cultural practice in India.

So, the final sample size came out to be 99. During the initial visit, the investigator visited houses of these mothers within 10 days of the childbirth and collected information on Socio-demographic factors and the Feeding practices using a pre-designed proforma. Later, the second visit was made after 6 months to enquire about weaning practices and the morbidities that the infant might have suffered from during the follow up period.

Statistical analysis

All the data collected was entered compiled and analyzed using version 22.0 of the Statistical Package for Social Sciences Software Package (SPSS) into categories and percentages. The Chi-square test and Fisher's exact test as appropriate was used for testing association and a p value less than 0.05 was considered as statistically significant.

RESULTS

A total of 99 mothers were enrolled in the study and their infants were followed for a period of 6 months.

Socio-demographic profile of mothers: The present study revealed that the mean age of mothers was 24.66±3.73 years and majority (86.9%) had 1-2 children. Around three-quarters (74.7%) belonged to upper lower socioeconomic status according to Modified Kuppuswamy Scale and half (58.6%) of mothers were educated only up to primary level.

Socio-demographic profile of infants: According to the present study, more than half i.e. 53.54% were male infants, 86.87% were institutional deliveries while 13.13% had home deliveries. Also, 27.77% were born through Caesarian section. Birth weight was recorded in most 88.89% of infants; out of whom 22.73% were low birth weight.

Table 1 describes the breastfeeding practices of infants. It was observed that out of 99 infants, breast feeding was initiated in majority 87(88.87%) at time of birth while 12 (12.12%) infants were not breast fed at all. It is also important to note that out of breastfed infants, only in 2(2.30%) infants, breast feeding was started within half to one hour, 38 (43.68%) between 1 to 6 hours while in majority i.e. 47(54.02%) breast feeding was initiated beyond 6 hours. Colostrum was not received by fifty percent of the infants (50.57%) while prelacteal feeds like gurthi was offered to more than three-fourths (76.8%) of newborns. Further, it was analysed that prelacteal feeds were given in all the 13 (100%) of home deliveries as

compared to 63 (73.3%) of 86 hospital deliveries ($\chi 2$=4.53, p=0.02).

Table 1: Breast feeding practices of infants.

	Breast feeding practices	No. of infants	Percentage
Breast feeding (n=99)	Yes	87	87.88%
	No	12	12.12%
Initiation of breast feeding (n=87)	Half to 1hr	2	2.30%
	1-6 hrs	38	43.68%
	>6 hrs	47	54.02%
Colostrum given (n=87)	No	44	50.57%
	Yes	43	49.43%
Prelacteal feeds (n=99)	Yes	76	76.80%
	No	23	23.20%
Exclusive breast feeding for 6 months (n=87)	Yes	57	65.51%
	No	30	34.49%

Also, as seen in Table 1, Exclusive Breast Feeding (EBF) was practiced among majority of infants, at the follow up visit. However, on close scrutiny it was observed that the EBF rates had actually declined from 73.56% (64 out of 87 infants) at 4 months and to 65.51% (57 out of 87) at 6 months of age.

Regarding top feeding, majority 62(62.6%) of infants were not put on top feeds before 6 months. Among mothers who initiated top feeds 37 (37.4%) - 33(89.19%) started with animal milk like cow or buffalo, 3 (8.11%) gave formula milk while 1 (2.7%) mother used mixed feeding. Further, 23 (62.16%) were given whole milk, 10 (27.03%) with 1:3 dilution, 3 (8.11%) with 1:1 dilution and 1 (2.70%) with 1:2 dilution (Table 2).

Table 2: Top feeding practices of infants.

	Top feeding practices	No. of infants	Percentage
Top feeding (n=99)	Yes	37	37.37%
	No	62	62.63%
Initiation of top feeding (n=37)	At time of birth	12	32.43%
	<1 month	4	10.81%
	1- 4 months	19	51.35%
	>4 months	2	5.41%
Type of milk used (n=37)	Animal milk	33	89.19%
	Formula milk	3	8.11%
	Mixed	1	2.70%
Dilution of milk (n=37)	Whole milk	23	62.16%
	1:1[@]	3	8.11%
	1:2	1	2.70%
	1:3	10	27.03%

@Ratio of water to milk

Weaning was started in majority i.e. 80 (80.81%) of infants while 19 (19.19) infants were not yet introduced to complementary foods at the time of second visit. Among those in whom weaning was initiated, most i.e. 75 (93.75%) infants were weaned at or just after 6 months while 5(6.25%) infants started early weaning before 6 months (Figure 1).

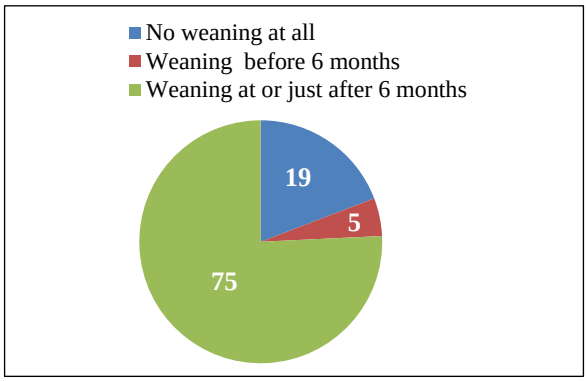

Figure 1: Weaning practices of infants as observed during follow up visit (N=99).

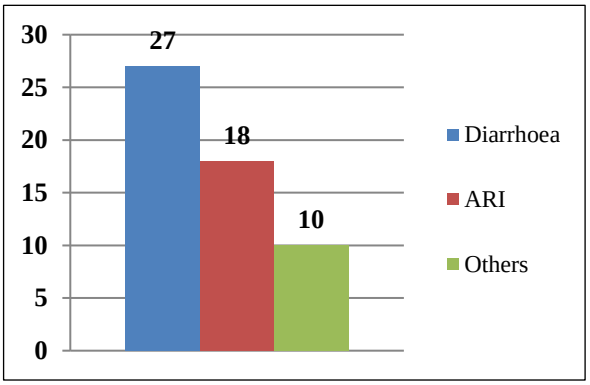

Figure 2: Morbidity pattern of infants as observed during follow up visit (n=55).

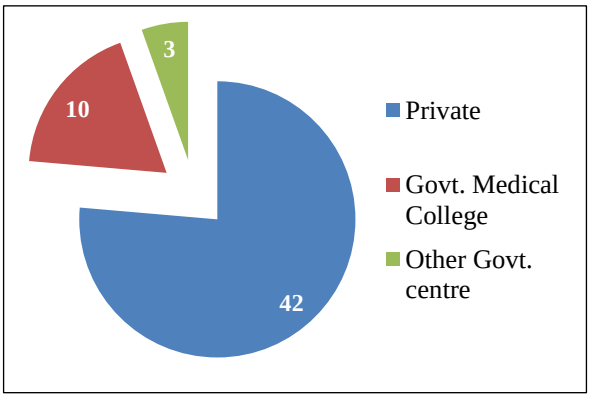

Figure 3: Health seeking behaviour of sick infants (n=55).

According to the present study, more than half i.e. 55 (55.55%) suffered from some morbidity during last 6 months, out of which, 27 (49.09%) was diarrhea, 18

(32.73%) suffered from ARI, while remaining 10 (18.18%) had other morbidities like ear problems, skin disease, jaundice etc (Figure 2).

Health seeking behavior- It was observed that out of the total 55 infants who suffered from some form of morbidity, majority i.e. 42 (76.36%) sought treatment from private institutions, 10 (18.18%) from government medical college, Amritsar while 3 (5.45%) went to other government health centers (Figure 3).

The present study showed that out of 27 (100%) infants who suffered from diarrhea, more than half i.e. 17(63%) had not received colostrum. Further, majority i.e 25 (92.6%) of diarrhea cases had been given pre-lacteal feeds. Similarly, ARI was also more common (55.6%) in those infants who received prelacteal feeds. This association was found to be statistically significant (p=0.005). Also, it was reported that among those infants who had diarrhea, three-quarters (74.1%) did not receive EBF till 6 months of them and this relation was also found to be statistically significant (p<0.05) (Table 3).

Table 3: Association of breastfeeding practices and common morbidities among infants.

Feeding practices	Type of morbidity		p value
	Diarrhoea (n/%)# 27 (100.0%)	ARI (n/%)# 18 (100.0%)	
Colostrum given			
Yes	10(37.0%)	10(55.6%)	0.18
No	17(63.0%)	8(44.4%)	
Prelacteal feeding			
Yes	25 (92.6%)	10 (55.6%)	0.005*
No	2(7.4%)	8(44.4%)	
Exclusive breast feeding			
Yes	7(25.9%)	11(61.1%)	0.02*
No	20(74.1%)	7(38.9%)	

#- Column percentages mentioned in parenthesis
*- p value significant at <0.05

Table 4: Association between weaning practices and common morbidities among infants.

Weaning practices	Type of morbidity		p value
	Diarrhoea (n/%)	ARI (n/%)	
≥6 months	16(48.5%)	17(51.5%)	0.02*
4-6 months	5(100.0%)	0(0.0%)	
No weaning done	6(85.7%)	1(14.38%)	

*- p value significant at <0.05

Significant association (p<0.05) was found between weaning practices and morbidities of Diarrhea and Acute Respiratory Infections. All 5 (100.0%) of the infants where weaning was initiated early (4-6 months) as well as 6 (85.7%) infants among whom weaning was not started at all suffered from diarrhea (Table 4).

DISCUSSION

This study revealed that although breast feeding was started in most (88.87%), it was much less in comparison to other studies where breastfeeding was initiated in 96.8% and 99.1% of infants respectively.[8,9] The probable reason could be that study population resided in a periurban area. Bottle feeding has infiltrated quite widely into this village and even commercial formula feeds were used by many mothers. Among those who did not breast fed, the common reasons reported were inadequate breast milk in 8 (66.67%) followed by local breast problem in 2 (16.67%) mothers. These findings are in concordance with the study by Syed E. Mahmood et.[8] It is important to clear the myths and misconceptions surrounding breastfeeding.

It was further observed that majority (54.02%) of children were put to breast only after 6 hours which is congruent to another study by Vyas Shaili et al, (57.05%).[10] However, in this study 50.57% did not receive colostrum as against 87.18% of infants in this Uttarakhand study.[10] The reason for this difference could be lack of awareness among the study population about the importance of colostrum. More than 75% of infants were given prelacteal feeds like gurthi which is a mixture of honey and water. This is sharp contrast to a study in South India where only 8.8% of newborns were fed prelacteal feeds like sugar water and honey.[11] This could be due to different family customs and religious beliefs prevalent in this study area.

In this study, exclusive breast feeding came out to 65.51%. Various studies conducted across different parts of India have revealed varying exclusive breast-feeding rates. In the state of Uttar Pradesh, studies by Syed E. Mahmood and Verma R found EBF to be 77.2% and 45.5% respectively while it was staggering low at 5.13% in Vyas S study in the neighbouring state of Uttarakhand.[8-10] Coming towards South Indian states, Hedge et al, and Asif Khan have stated the exclusive breast feeding rates at 58% and 35% respectively.[11,12]

This study revealed that 62.63% children were not given any top feeding. In a similar study conducted in semiurban community of Gujarat, 76.7% were not top fed at all and in 23.3%, top feeding was introduced within first four months of life.[13] This variation in the rate of top feeding may be due to difference in the socioeconomic status of the two study populations. Another study by Oommen et al, in rural Haryana reported that 3.3% of infants received commercial powdered milk as top feed as against 8.11% in the present study.[14] This difference may be due to declining rates of breast feeding and increasing trend of bottle feeding with commercial formula milk which are readily available in the market nowadays.

Most of the mothers (62.16%) gave whole milk while the rest diluted the milk. Taneja DK et al, study in rural area

of Delhi had revealed that 95.3% of mothers diluted the milk, 47.1% with 1:1, and 16.5% with 1:2 and 20.0% with 1:3 dilutions with water.[15] Mothers diluted the milk mainly because they believed that this facilitated digestion while for some it may have been economical.

According to the present study, weaning was initiated in majority 80.81% of infants which is almost same as DLHS-4 data where 74.4% of children aged 6-9 months started receiving semisolid/ solid foods.[16] In majority i.e. 75 (93.75%) weaning was started at or just after 6 months while 5 (6.25%) infants were put on early weaning which is similar to a study in rural Meerut where 4.7% started giving complimentary food before 6 months of age.[17]

Regarding, morbidity pattern, more than half (55.55%) of infants suffered from some morbidity amongst which diarrhea was commonest (49.09%) followed by ARI (32.73%). These findings were much higher than the study in another rural area of Punjab where 39% children had got some health related problems, out of which cold and cough was (34.7%), crying for unknown reasons (32.7%), fever (32%) and diarrhea (11%).[18] The reasons for higher prevalence of morbidities in the present study may be because most of the families belonged to lower socioeconomic status. Diarrhea was also more common in the study population which may be attributed to poor sanitation and hygienic behavior.

In the present study, all mothers sought treatment for the sick infants and most (76.36%) went to private set up. These findings are different from the study by Balpreet Singh et al, who observed that majority 42.5% infants were taken to private institutions, 27.4% to government institutions, 24% were treated at home while no action was taken in 1.3% of infants.[18] Preference for private institutes was seen which may be due to better facilities and round the clock availability of health care providers.

Infant and young child feeding practices play significant role in reducing early childhood morbidity, mortality as well as improving growth and development. Prelacteal feeds may interfere with the establishment of lactation and if contaminated can lead to diarrhea in the newborn. Srinivasan Vijayalakshmi study revealed that among those infants who had prelacteal feeds and those who were not exclusively fed till 6 months, 87.5% and 73.7% of infants suffered from diarrhea respectively which was found to be statistically significant and is similar to this study.[19] Likewise, another study in Andhra Pradesh found a significant association between feeding practices and morbidities.[20] This shows that avoidance of prelacteal feeds and practice of EBF is beneficial and offers protection against diseases like diarrhea.

Coming to weaning practices, all the infants who were weaned early suffered from diarrhea which is consistent to another study in Bihar where the incidence of diarrhea was found to be much higher (34.4%) in children who were weaned before 4 months in comparison to those who were weaned after 4 months (17.2%).[21] This could be due to inability to manage the solid load because of immature digestive system of infants.

CONCLUSION

Practices like prelacteal feeding, denial of colostrum “the first immunization of child”, early and unnecessary introduction of top feeding in incorrect dilutions and in unhygienic pattern and faulty weaning were also quite prevalent in the rural population. Significant association ($p<0.05$) was observed between the feeding practices like giving pre-lacteal feeds, lack of Exclusive Breast feeding (EBF) and early weaning with increase in infant morbidities especially diarrhoea.

Therefore, new mothers should be educated more effectively regarding benefits of exclusive breast feeding and correct weaning practices. Emphasis should also be placed on increasing awareness among community as a whole to bring about a change in the deep-rooted customs and traditions related to prelacteal and colostrum feeding etc. Hence, there is a need of a prospective educational intervention study or other innovative techniques to achieve optimal feeding practices among infants.

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