RESEARCH ARTICLE

IMPACT OF FEEDING PRACTICES ON NUTRITIONAL STATUS OF CHILDREN IN RURAL AREA OF NAVSARI DISTRICT

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ABSTRACT
Background: Infant feeding practices have a major role in determining the nutritional status of children and are associated with household socioeconomic and demographic factors.
Aims & Objectives: (1) To study the socio-demographic profile of mothers; (2) To assess impact of feeding practices on nutritional status of children.
Materials and Methods: A cross-sectional study in rural areas of Navsari district, Gujarat, included 243 women, who had one child aged 12 to 23 months preceding data collection. Data were analyzed using statistical software Epi Info 6. Anthropometric analysis was done by using WHO Anthro software (version 3.2.2).
Results: Breastfeeding was universal in the study area. Only 56.4 % of mothers initiated breastfeeding within one hour. Only 36.2 % of infants were exclusively breastfed for 6 months and 97.5 % had received complementary feeding at 6–9 months of age. There was 11.5% prevalence of underweight, 15.6% prevalence of stunting and 8.6% prevalence of wasting. There was significant association between underweight with the birth order of the child, birth weight of the child and time of initiation of the breast-feeding to the child. There was significant association between stunting with the sex of the child. There was significant association between time of initiation of breast-feeding with the birth order of the child and type of delivery.
Conclusion: Malnutrition was associated with perinatal care practices and infant feeding practices. Efforts are needed to promote early initiation of breastfeeding, exclusive breastfeeding for 6 months and age-appropriate complementary feeding among infants.
Key Words: Breast Feeding; Infant; Malnutrition; Complementary Feeding; Education

Introduction

Malnutrition has been responsible, directly or indirectly, for 60% of the 10.9 million deaths annually among children under five. Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life. No more than 35% of infants worldwide are exclusively breastfed during the first four months of life; complementary feeding frequently begins too early or too late, and foods are often nutritionally inadequate and unsafe. Malnourished children who survive are more frequently sick and suffer the life-long consequences of impaired development. Because poor feeding practices are a major threat to social and economic development, they are among the most serious obstacles against attaining and maintaining health that face this age group.[1]

Infant feeding practices have a major role in determining the nutritional status of a child.[2] About 60% of all deaths among children <5 years of age are, directly or indirectly, attributed to malnutrition. About two-thirds of these deaths are associated with inappropriate feeding practices, and occur during the first year of life. Poor feeding practices during infancy and early childhood, resulting in malnutrition, contribute to impairment of cognitive and social development, poor school performance and reduced productivity in later life.[3]

With this background, aims and objectives of this study are,

- To study the socio-demographic profile of mothers of young children between age group of 12-23 months.
- To assess impact of feeding practices on nutritional status of children in the age group of 12-23 months.

Materials and Methods

It was a cross sectional study which was done betweem August 2012 and April 2013. Gandevi block of Navsari district was selected for this study purposively. Out of six in Gandevi block, three primary health centers (PHC) were randomly selected for this study. Mothers having one child in the age group of 12-23 months from these randomly selected PHCs were enrolled in this study.

Percent distribution of mothers who have not received even a single TT vaccine during last pregnancy was taken for calculation of sample size. This was taken because it had lowest prevalence among all other variables in this study. According to DLHS-3 Gujarat, (2007-2008) percentage of mothers who have not received even a single TT vaccine was 31.4%. An allowable error of 20% was taken to calculate the sample size. Considering a

10% of non-response, the sample size came out to be 240; however in the present study 243 children were covered. This was calculated by using formula, $4PQ / L^2$, where, P = prevalence of No TT taken, Q = 1-P and L = allowable error.

We had randomly selected two sub-centres from each selected PHC. Thus we had selected 40 mothers randomly from each selected sub-centres. Verbal consent of mothers of all the children was taken prior to study. Those mothers who denied participating in the study were excluded.

A structured questionnaire was constructed and pretested on a group of non-participating mothers, and adjustments to the questions were incorporated accordingly. The pretested questionnaire was used to collect information from mothers with children between 12 and 23 months of age.

Children were weighed on Salter scale provided by UNICEF to the Anganwadi centres. It was measured to the nearest 0.1 kg while children were minimally clothed and without shoes. Recumbent length was measured by measure tape. With the child lying in supine position length was measured to the nearest centimetre.

Statistical Analysis

Data was collected and entered in MS Office XL sheet and analysis was done by using the EPI Info 6 software. Anthropometric analysis was done by using WHO Anthro software (version 3.2.2). This software was calculating nutritional indicator as per recent WHO growth standard using Z score.

Results

Mean age of the study population at time of first child birth was 22.05 (± 3.08) years. At the time of first child birth, 39 (16%) mothers were ≤ 19 years. Majorities were Hindus and belongs to OBC caste. Higher secondary & above education was seen more commonly among mothers (43.2%) as compared to the fathers (31.7%).

About half of the mothers had initiated breast-feeding within 1 hour of birth. Majority of mothers were giving breast-feeding on demand. Around one third mothers had given exclusive breast-feeding to their baby for 6 months. In this study, one third of the infants had received pre-lacteals feeds. Among infants who had received pre-lacteals, most common feed was Gripe water (44.9%), followed by Janam ghutti (26.9%) and Honey (21.8%). About 90.9% mothers fed colostrum to their child.

Table-1: Distribution according to Socio-demographic characteristics of mothers

Characteristics (N=243)		N (%)
Mother's present age (years)	≤ 19	2 (0.8)
	≥ 20	241 (99.2)
Mother's age at the time of first child birth (years)	≤ 19	39 (16.0)
	≥ 20	204 (84.0)
Religion	Hindu	234 (96.3)
	Muslim	9 (3.7)
Caste	General	13 (5.3)
	ST	58 (23.9)
	SC	10 (4.1)
	OBC	162 (66.7)

Table-2: Distribution of study population according to education

Education (N=243)	Mother	Father
Illiterate	11 (4.5)	10 (4.1)
Primary*	43 (17.7)	51 (21.0)
Secondary**	84 (34.6)	105 (43.2)
Higher secondary & above***	105 (43.2)	77 (31.7)

*Figure in the parenthesis indicates percentage; * Primary education: education up to 8th standard; ** Secondary education: education up to 10th standard; *** Higher secondary & above: 12th standard completed & more*

Table-3: Breast-feeding practices of mothers

Breast feeding Practices (N=243)		N (%)
Time of initiation of breast-feeding	Within 1 hours	137 (56.4)
	Within 8 hours	199 (81.9)
	Within 24 hours	219 (90.1)
	After 24 hours	24 (9.9)
Pattern of breast-feeding	On demand	226 (93.0)
	Fixed intervals	17 (7.0)
Practices of exclusive breast-feeding for 6 months	Yes	88 (36.2)
	No	155 (63.8)

Table-4: Complementary feeding practices

Complementary feeding Practices (N=243)		N
Time of introduction of complementary feeding	< 6 months	6 (2.5)
	6-9 months	237 (97.5)
Type of complementary food*	Cow/Buffalo/Goat milk	121 (49.8)
	Homemade semisolid/solid food	243 (100)
	Commercial baby food	4 (1.6)
	Adult food	93 (38.3)
Food item included in homemade complementary food*	Cereals & Millets	243 (100)
	Milk & its products	126 (51.9)
	Pulses & legumes	221 (90.9)
	Green leafy vegetables	216 (88.9)
	Fish/Egg	77 (31.7)
Frequency of feeding (per day)	1-2 times	18 (7.4)
	≥ 3 times	225 (92.6)

** Multiple responses*

Table-5: Nutritional status of living children between 12-23 months (according to WHO Anthro software)

Characteristic (N=243)		Percentage (95% CI)*
Weight for age	% below -2SD	11.5% (7.3%, 15.7%)
	% below -3SD	2.5% (0.3%, 4.6%)
	Mean Z score	-0.99
Height for age	% below -2SD	15.6% (10.9%, 20.4%)
	% below -3SD	5.3% (2.3%, 8.4%)
	Mean Z score	-1.08
Weight for height	% below -2SD	8.6% (4.9%, 12.4%)
	% below -3SD	3.7% (1.1%, 6.3%)
	Mean Z score	-0.65

** Calculated using WHO Anthro (version 3.2.2) software as per WHO growth standard*

Table-6: Relation between Underweight & various sociodemographic variables, birth profile of children & child feeding practices

Practices (N=243)	Normal	Underweight	X^2	P value
Age of mother at the time of first child birth				
≤ 19	37 (94.9)	2 (5.1)	1.19*	0.27
≥ 20	178 (87.3)	26 (12.7)		
Sex of the child				
Male	108 (86.4)	17 (13.6)	1.09*	0.29
Female	107 (90.7)	11 (9.3)		
Type of family				
Joint	134 (91.8)	12 (8.2)	4.54**	0.10
Nuclear	38 (80.9)	9 (19.1)		
Three generation	43 (86)	7 (14)		
Social class				
I	5 (100)	0 (0)	5.51**	0.06
II	25 (92.6)	2 (7.4)		
III	69 (90.8)	7 (9.2)		
IV	89 (89)	11 (11)		
V	27 (77.1)	8 (22.9)		
Birth order of the child				
1	124 (92.5)	10 (7.5)	4.83*	0.02
2-3	87 (84.5)	16 (15.5)		
4-5	4 (66.7)	2 (33.3)		
Birth weight of the child				
< 2.5 kg	36 (76.6)	11 (23.4)	8.06*	0.00
≥ 2.5 kg	179 (91.3)	17 (8.7)		
Pre-lacteal feeding given				
Yes	70 (89.7)	8 (10.3)	0.18*	0.67
No	145 (87.9)	20 (12.1)		
Time of initiation of breast-feeding (hours)				
≤ 1	124 (90.5)	13 (9.5)	8.13**	0.01
1-24	74 (90.2)	8 (9.8)		
> 24	17 (70.8)	7 (29.2)		
Time of introduction of complementary feeding (months)				
6	91 (91.9)	8 (8.1)	1.58*	0.20
7-11	119 (86.2)	19 (13.8)		
< 6	5 (83.3)	1 (16.7)		

*Figures in the parenthesis indicates percentage; * degree of freedom: 1; ** degree of freedom: 2*

Most of the children had received complementary feeding during 6–9 months of age. The commonly used complementary food included homemade complementary food followed by cow/ buffalo/ goat milk. Homemade complementary food included cereals and millets, pulses and legumes, green leafy vegetables, milk and milk products and fish/ egg. Majority had received complementary feeding at least three times a day.

At the time of study, 218 children (89.7%) were taking both complementary feeding as well as breast-feeding, whereas, 25 children (10.3%) were taking only complementary feeding. Most of the mothers (96.7%) were washing their hands before each feeding of the child, whereas 150 mothers (61.7%) were cooking special meal for the child. Majority of mothers (93.8%) think that breast-feeding should be continued for 1 to 2 years.

In this study, there was 11.5% prevalence of underweight (weight-for-age < -2SD), 15.6% prevalence of stunting (height-for-age < -2SD) and 8.6% prevalence of wasting (weight-for-height < -2SD) amongst 12-23 months children according to WHO growth standards.

Table-7: Relation between Stunting & various socio-demographic variables, birth profile of children & child feeding practices

Practices (N=243)	Normal	Stunting	X^2	P value
Age of mother at the time of first child birth				
≤ 19	35 (89.7)	4 (10.3)	0.59*	0.44
≥ 20	170 (83.3)	34 (16.7)		
Sex of the child				
Male	100 (80)	25 (20)	3.71*	0.02
Female	105 (89)	13 (11)		
Type of family				
Joint	121 (82.9)	25 (17.1)	0.63**	0.72
Nuclear	41 (87.2)	6 (12.8)		
Three generation	43 (86)	7 (14)		
Social class				
I	5 (100)	0 (0)	0.59**	0.74
II	17 (63)	10 (37)		
III	70 (92.1)	6 (7.9)		
IV	85 (85)	15 (15)		
V	28 (80)	7 (20)		
Birth order of the child				
1	111 (82.8)	23 (17.2)	0.52*	0.46
2-3	88 (85.4)	15 (14.6)		
4-5	6 (100)	0 (0)		
Birth weight of the child				
< 2.5 kg	39 (83)	8 (17)	0.08*	0.77
≥ 2.5 kg	166 (84.7)	30 (15.3)		
Pre-lacteal feeding given				
Yes	70 (89.7)	8 (10.3)	2.52*	0.11
No	135 (81.8)	30 (18.2)		
Time of initiation of breast-feeding (hours)				
≤ 1	122 (89.1)	15 (10.9)	5.49**	0.06
1-24	65 (79.3)	17 (20.7)		
> 24	18 (75)	6 (25)		
Time of introduction of complementary feeding (months)				
6	84 (84.8)	15 (15.2)	0.02*	0.88
7-11	116 (84.1)	22 (15.9)		
< 6	5 (83.3)	1 (16.7)		

*Figures in the parenthesis indicates percentage; * degree of freedom: 1; ** degree of freedom: 2*

There was 2.5% prevalence of severe underweight (weight-for-age < -3SD), 5.3% prevalence of severe stunting (height-for-age < -3SD) and 3.7% prevalence of severe wasting (weight-for-height < -3SD) amongst 12-23 months children according to WHO growth standards.

As shown in table 6, among the study population, 11.5% were underweight. There was statistically significant association between underweight with the birth order of the child, birth weight of the child and time of initiation of the breast-feeding to the child ($p < 0.05$).

As per table 7 & 8, among the study population, 15.6% were stunted and 8.6% were wasted. There was statistically significant association between stunting and sex of the child ($p<0.05$). Among the mothers, 56.4% had initiated breast-feeding within 1 hour after birth. There

was statistically significant association between time of initiation of breast-feeding with the birth order of the child and type of delivery (p<0.05). (Table 9)

Table-8: Relation between Wasting & various socio-demographic variables, birth profile of children & child feeding practices

Practices (N=243)	Normal	Wasting	X^2	P value
Age of mother at the time of first child birth				
≤ 19	38 (97.4)	1 (2.6)	1.35*	0.24
≥ 20	184 (90.2)	20 (9.8)		
Sex of the child				
Male	112 (89.6)	13 (10.4)	1.00*	0.31
Female	110 (93.2)	8 (6.8)		
Type of family				
Joint	137 (93.8)	9 (6.2)	2.84*	0.09
Nuclear	40 (85.1)	7 (14.9)		
Three generation	45 (90)	5 (10)		
Social class				
I	5 (100)	0 (0)	0.37*	0.54
II	24 (88.9)	3 (11.1)		
III	71 (93.4)	5 (6.6)		
IV	92 (92)	8 (8)		
V	30 (85.7)	5 (14.3)		
Birth order of the child				
1	125 (93.3)	9 (6.7)	1.40*	0.23
2-3	93 (90.3)	10 (9.7)		
4-5	4 (66.7)	2 (33.3)		
Birth weight of the child				
< 2.5 kg	40 (85.1)	7 (14.9)	2.88*	0.08
≥ 2.5 kg	182 (92.9)	14 (7.1)		
Pre-lacteal feeding given				
Yes	72 (92.3)	6 (7.7)	0.13*	0.71
No	150 (90.9)	15 (9.1)		
Time of initiation of breast-feeding (hours)				
≤ 1	124 (90.5)	13 (9.5)	0.28*	0.59
1-24	78 (95.1)	4 (4.9)		
> 24	20 (83.3)	4 (16.7)		
Time of introduction of complementary feeding (months)				
6	5 (83.3)	1 (16.7)	1.41*	0.23
7-11	93 (93.9)	6 (6.1)		
< 6	124 (89.9)	14 (10.1)		

*Figures in the parenthesis indicates percentage; * degree of freedom: 1; ** degree of freedom: 2*

Table-9: Relation between Time of initiation of breast-feeding & various socio-demographic & other variables

Characteristic (N=243)		Initiation of breast-feeding		X^2	P value
		≤ 1 hour	> 1 hour		
Caste of mother	General	8 (61.5)	5 (38.5)	5.25**	0.07
	SC	7 (70)	3 (30)		
	ST	39 (67.2)	19 (32.8)		
	OBC	83 (51.2)	79 (48.8)		
Family type	Joint	78 (53.4)	68 (46.6)	2.42**	0.29
	Nuclear	26 (55.3)	21 (44.7)		
	Third generation	33 (66)	17 (34)		
Education of mother	Illiterate	7 (63.6)	4 (36.4)	1.74**	0.41
	Primary	23 (53.5)	20 (46.5)		
	Secondary	52 (61.9)	32 (38.1)		
	Higher secondary & more	55 (52.4)	50 (47.6)		
Type of delivery	Normal	123 (63.7)	70 (36.3)	20.62*	0.00
	Caesarean	14 (28)	36 (72)		
Birth order of the child	1	65 (48.5)	69 (51.5)	7.52*	0.00
	2-3	67 (65)	36 (35)		
	4-5	5 (83.3)	1 (16.7)		

*Figures in the parenthesis indicates percentage; * degree of freedom: 1; ** degree of freedom: 2*

Discussion

Breastfeeding is the best method of infant feeding to meet the nutritional, metabolic and psychological needs of the baby. Exclusive breastfeeding is a feasible strategy especially in low-income countries, as it reduces the risk of infant mortality and morbidity, especially from infections.[4,5]

Present study depicted that 32% of the infants had received pre-lacteals feeds. Most common feed was Gripe water (44.9%). Colostrum was fed by 90.9% mothers. Meshram et al found that 45% children had received pre-lacteal feeds and 15.1% babies had not received colostrum.[8] Saxena D et al found that 11.2% mothers had not given colostrums to their child.[10]

This study depicted that 56.4% mothers initiated breast-feeding within one hour of birth, while 90.1% initiated it within one day of birth. NFHS-3 study for Gujarat revealed that 30.0% mothers of under-five children initiated breast-feeding within one hour of birth, while 58.0% mothers initiated breast-feeding within one day of birth.[7] Meshram et al found that 22% infants had received breast-feeding within one hour of birth while 64% had received it within 24 hours of birth.[8]

In present study, about 97.5% children received complementary feeding during 6–9 months of age and 2.5% had received it before 6 months of age. Meshram et al found that 68% children received complementary feeding during 6–9 months of age and 25% received the same before 6 months of age.[8] Rao S et al found that 10.5% children received complementary feeding before age of 6 months while 77.5% received at the age of 6 months.[9]

In present study, underweight was significantly associated with the birth order of the child, birth weight of the child and time of initiation of the breast-feeding to the child (p<0.05). There was significant association between stunting with the sex of the child (p<0.05). There was significant association between time of initiation of breast-feeding with the birth order of the child and type of delivery (p<0.05).

Meshram et al found that there was no significant association between feeding practices and nutritional status of infants. Prevalence of stunting and wasting was higher among children who were exclusively breastfed than those who received complementary feeding or who were totally weaned, but this difference was not

statistically significant.[8] While NFHS-3 study for India revealed that under-nutrition was generally lower for first births than for subsequent births, and consistently increased with increasing birth order for all measures of nutritional status. Under-nutrition had a strong negative relationship with the mother's education.[6] Kumar et al observed that initiation of breastfeeding after 6 hours of birth, deprivation from colostrum and improper complementary feeding were significantly associated with underweight, but not with stunting and wasting.[11] Panpanich et al also observed a higher prevalence of under-nutrition among EBF children and partial/non-breastfed children 7–12 months of age.[12]

Conclusion

Malnutrition was associated with perinatal care practices and infant feeding practices. Efforts are needed to promote early initiation of breastfeeding, exclusive breastfeeding for 6 months and age-appropriate complementary feeding among infants.

In addition, mothers, caregivers, and those who influence their decisions need nutrition and hygiene education messages that are easily understood and communicated in a manner that maximizes the likelihood of their being implemented.

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