

Original research article

Knowledge and practices of mothers regarding infant feeding practices, attending a tertiary care institute of Solan, HP

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Abstract

Babies feeding from birth up to the first years of life influences an individual's whole life. It is common knowledge that breastfeeding is important for optimal infant feeding. Breast milk alone can be used for feeding babies in the first six months of life, but from then on, complementary feeding is necessary. The nutritional adequacy of complementary food is essential for the prevention of infant morbidity and mortality, including malnutrition and overweight. Lack of knowledge and misconceptions among people are often barriers to initiating appropriate feeding and at correct age. Objective of the study is to assess the current breastfeeding and complementary feeding practices and food beliefs in young mothers. These feeding practices will be assessed in infants only, using a structured open-ended questionnaire. An informal interview method will be used to gather information regarding feeding practices.

Keywords: Breastfeeding, complementary feeding, infant

Introduction

Every infant and child has the right to good nutrition according to the "Convention on the Rights of the Child". Adequate nutrition is essential for children's health and development and thereby achieving 'The Millennium Development Goal' of eradicating extreme poverty and hunger. Globally at least 1 in 3 children under 5 is undernourished or overweight and 1 in 2 suffers from micronutrient deficiencies, undermining the capacity of millions of children to grow and develop to their full potential ^[1]. In 2018, globally 149 million children under 5 were stunted and almost 50 million were wasted ^[1]. In India under five years age, 38% of children are stunted, 21% are wasted, 36% are underweight and 2% are overweight ^[2]. The corresponding data for Himachal Pradesh is 26.3%, 13.7%, 21.2% and 0.5% respectively ^[2]. Adequate nutrition is required for child health and development. Period from birth to two years of age is very critical for the promotion of optimal growth, health and behavioral development and after a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier ^[3]. Breast milk gives immunologic protection against mortality from infectious diseases, cause increase in intelligence, and probable causes reduction in overweight and diabetes ^[4]. Current nutrition policy encourages mothers to exclusively breastfeed their children for the first 6 months of life ^[5], providing the infant with a nutritionally sufficient, clean, and safe diet. Despite the recommendations and widespread promotion of exclusive breastfeeding, it is often not practiced, even in developing countries where it would be most beneficial. World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) recommend exclusive breastfeeding within an hour after birth, followed by appropriate, adequate and regular complementary feeding to be started after 6 months of age while continuing breast feeding up to 2 years of age or beyond. The health consequences of not practicing exclusive breastfeeding have been demonstrated in numerous studies and settings ^[6]. Mothers benefit from breastfeeding too. It helps prevent heavy bleeding after birth and accelerates the contraction of the uterus, it improves birth spacing and protects against breast and ovarian cancer. There is some evidence of a reduced risk of type 2 diabetes, and a reduction of hypertension and lower cardiovascular risk among mothers who breastfeed. Introducing solid foods into an infant's diet is recommended at about 6 months because at that age breast milk is no longer adequate in meeting a child's nutritional needs to promote optimal growth ^[7].

According to National Family Health Survey -4 (NFHS-4) data ^[2], in India, prevalence of exclusive breastfeeding under 6 months of age is 55% (67.2% in Himachal Pradesh) and prevalence of breastfeeding children age 6-23 months receiving an adequate diet is 9% (11.2% in Himachal Pradesh).

Intake of complementary feeding along with continued breast feeding in 6-8 months age is only 52.9% in Himachal. In the first three days of life, globally 43% of newborns are given liquids or foods other than breast milk, most commonly sugar water, honey, tea, animal milk, infant formula or plain water^[8]. Malnutrition rates increase between 6 and 18 months, the period of complementary feeding and this critical transition period is associated with dramatic increase in malnutrition among infants^[9]. Stunting is irreversible and can have long-term effects on cognitive development, school achievement, and economic productivity in adulthood and maternal reproductive outcomes^[10]. In developing countries adequate nutrition is not met as a result of poverty, lack of nutrition knowledge, poor child feeding practices and infections which results in high morbidity and mortality. India is a kaleidoscope of various cultures and traditions. A lot of the customs and practices have their effect over health including infant feeding practices. Inappropriate practices such as early or delayed introduction of complementary foods, low energy and nutrient density of foods offered, feeding thin consistency feeds and in small amounts and food restriction due to cultural beliefs are common^[11]. Fewer than 1 in 3 children eats foods from the minimum number of food groups and only 1 in 5 children from the poorest households and rural areas eats foods from the minimum number of food groups^[1]. Lack of knowledge and misconceptions among elderly women like mother-in-law, who generally influence and guide child feeding practices in the family, are often barriers to initiating appropriate complementary feeding at correct age^[12]. Having enough food at household level does not guarantee the nutritional well-being of every household member, especially that of children^[13]. Use of bottles, which is very common in India, is not recommended since it is a source of infection^[14]. Even though large numbers of Indian families consume eggs and meats, it is traditionally believed that meat products and eggs cannot be given to infants due to the fact that infants fail to digest animal foods^[15]. Introduction of dal water as a weaning food leads to a child receiving only liquid feeds rather than the semi solid dal rich in proteins and calories. A lot of convenience foods are being used these days by mothers like biscuits, marketed weaning foods and fast foods like noodles, fried savory items etc. These foods are non-nutritious foods. They lack in many vitamins, minerals, fibre and contain hydrogenated fat; preservatives which may harm infant's health. These snacks can be energy dense but with a very low micro nutrient density^[16]. The consumption of tea is also observed. Polyphenols in tea have a marked adverse effect on non-heme iron absorption^[17]. Breast-feeding has also declined worldwide in recent years as a result of urbanization, marketing of infant milk formulae and maternal employment outside the home. The rise in the promotion, sales and use of breast milk substitutes and toddler milks, is an area of growing concern. Between 2008 and 2013, sales of milk-based formula grew by 41 per cent globally and by 72 per cent in upper middle-income countries^[18]. Studies in India have also shown a decline in breastfeeding trends, especially in urban areas^[19, 20].

Knowledge, attitudes and practices are associated with infant and child feeding forms an essential first step towards any 'need-felt' for an intervention program to be designed to bring positive behavioral change in the health of infant^[21]. By assessing the knowledge, attitude and practices of mothers regarding their child's feeding, an overview can be obtained about the areas which need modifications and hence specific intervention strategies can be made to correct the same. Thereby this study was done to assess the knowledge and practices of breastfeeding/ milk feeding and complementary feeding of infants among mothers and to find the most common feeding malpractices and misconceptions in infants so as to implement the preventive measures/strategies in our hospital.

Materials and Methods

This was a cross sectional study carried out from 25 March 2023 onwards (after ethics committee approval) for a period of 1 year or till 400 cases were taken. Mothers of children less than one year of age attending the outpatient department of Pediatrics department of Maharishi Markandeshwar Medical College and Hospital (MMMC&H), Solan, Himachal Pradesh were included in the study. Infants with Intellectual disability, congenital malformations, born at less than 37 completed weeks gestational age and/or < 2.5 kg birth weight, diabetes, cerebral palsy, congenital heart disease, chronic renal, liver or lung disease were the exclusion criteria. Study participants were selected through a random sampling method and those who met the defined criteria were interviewed. Minimum sample required was 176, which was calculated using purposive sampling technique, from the formula $Z^2PQ/(D)^2$ [where, Z = Z variate corresponding to desired reliability level of 1.96 for 95% reliability, P=prevalence, Q= (1-P) and D=precision (10%)^[22]. 400 mothers were enrolled in to the present study. Both written and orally expressed consent was taken from the participating mothers/caretakers. Participants were explained in detailed about the study and that they were free to withdraw from the study at any given point of time. An open ended structured questionnaire was prepared for the study based on the national guidelines for infant and young child feeding issued by the government of India and WHO^[23, 24, 25]. Data was collected by the principal or co-investigators only through face-to-face interview. After the interview, the mothers were educated regarding correct feeding practices and advantages of breastfeeding (though it was not a part of the study). No specific intervention was done for the sake of study and participants' confidentiality was respected throughout.

Data entry and analysis

Data entry was done using Microsoft excel 2007 and analyzed using XLSTAT 2020 (version 22.3.7). The descriptive parameters are represented as frequencies and percentages. 40 cases had to be excluded from the study due to various reasons. Finally 360 cases were taken for statistical analysis.

The operational definitions utilized for this study are [23, 24, 25]:

Exclusive breast feeding

It is defined as no other food or drink, not even water, except breast milk (including milk expressed) for 6 months of life, but allows the baby to receive Oral Dehydration Solution (ORS), drops and syrups (vitamins, minerals and medicines).

Non –Breast milk requirements in age > 6 months (in case of no breast feeding)

If adequate amounts of other animal-source foods are consumed regularly, the amount of milk needed is ~200-400 mL/d; otherwise, the amount of milk needed is ~300-500 mL/d. Acceptable milk sources include full-cream animal milk (cow, goat, buffalo, sheep, camel), Ultra High Temperature milk, reconstituted evaporated (but not condensed) milk, fermented milk or yogurt, and expressed breast milk (heat-treated if the mother is HIV-positive).

Complementary feeding

Complementary feeding is the process starting when breast milk alone or infant formula alone is no longer sufficient to meet the nutritional requirements of a baby and when other foods and liquids along with breast milk or a breast milk substitute are needed. The age range for complementary feeding is generally 6-24 months. Complementary feeding should be timely, adequate in amount, frequency, consistency and using a variety of foods to cover the nutritional needs of the growing of the child while maintaining breastfeeding.

Age of starting complementary feeding: Will be considered correct if it is started at the age of 6 months.

Frequency of complementary feeding considered correct as follows:

Age Frequency

- 6-8 months 2-3 meals/day.
- 9-11 months 3-4 meals/day.
- 12-24 months 3-4 meals/day.

If baby is not breastfed, give in addition: 1-2 cups (1cup=250ml) of milk per day and 1-2 extra meals per day.

For breastfed children, minimum is defined as 2 times for infants 6-8 months and 3 times for children 9-23 months. For non-breastfed children, minimum is defined as 4 times for children 6-23 months.

Amount of weaning food according to age is correct as follows:

Age Amount/feed

6-8 months 2-3 tablespoonful** -½ cup*.

9-11 months ½ to 2/3 cup*.

12-24 months ¾th to 1 cup*.

*(1cup=250ml), ** 1 tablespoon =15ml.

Consistency of weaning food is considered correct as follows:

Age Consistency

6-8 months Thick paste/thick porridge.

9-11 months Mashed/finely chopped food.

12-24 months Small pieces/chopped family food.

Hygienic principles of complementary feeding are considered correct if:

Three/four following principles are applied:

- Washing caregivers' and children's hands before food preparation and eating.
- Storing foods safely and serving foods immediately after preparation.
- Using clean utensils to prepare serve and feed the food.
- Avoiding the use of feeding bottles, which are difficult to keep clean.

Food groups: There are seven food groups:

- i) Grains, roots and tubers.

- ii) Legumes and nuts.
- iii) Dairy products (milk, yogurt, cheese).
- iv) Vitamin A rich fruits and vegetables.
- v) Other vegetables and fruits.
- vi) Meat/fish/poultry/glandular meat (e.g. liver, kidney etc.).
- vii) Eggs.

There should be at least 4 or preferably > 4 food groups to be utilized/day by the infant as a complementary food.

Frequency of food to be given to the sick infant is considered correct if:
After illness the infant receives 1-2 extra meals/day.

Water requirement (>6 months age)

Because breast milk is almost 90% water, infants and young children who are breastfed frequently generally receive plenty of fluids. However, non-breastfed children need to obtain fluids from other sources. Non-breastfed infants and young children need at least 400-600 mL/d of extra fluids (in addition to the 200-700 mL/d of water that is estimated to come from milk and other foods) in a temperate climate, and 800-1200 mL/d in a hot climate. Plain, clean (boiled, if necessary) water should be offered several times per day to ensure that the infant's thirst is satisfied.

Bottle feeding

Feeding an infant from a bottle, whatever is in the bottle, including expressed breast milk, water and formula, etc.

Infant: Refers to those less than 12 months old. Children are defined as 12 months old or more.

Prelacteal feeds:

Any feeds given before the onset of lactogenesis, which is the onset of copious breast milk secretion that occurs within four days of birth^[26]. They are given in many cultures and may include plain water, infant formula, glucose, sugar water, or other traditional feeds such as diluted infant cereal with honey, tea, ghee, and herbal preparations.

Minimum dietary diversity (MDD)

Proportion of children 6-23 months of age who receive foods from 4 or more food groups during previous day (if child is not breastfed then milk/milk products are not considered in the food groups).

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 as mentioned above.

Minimum acceptable diet (MAD)

Proportion of children 6-23 months of age who receive a minimum acceptable diet (apart from breast milk).

(Breastfed children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day)/Breastfed children 6-23 months of age.

And

(Non-breastfed children 6-23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day)/Non-breastfed children 6-23 months of age.

As our study was of children < 1yr age group, we calculated the above mentioned 3 parameters (MDD, MMF & MAD) according to our age group of 6-11 mths.

Results

A total of 360 cases were included in the study. The descriptive parameters are represented in the following tables.

Table 1: Age and sex of infants whose mothers were interviewed

Age	<6 months (%)	≥6 mths to <1 year (%)	All infants (%)
Total	176 (48.88)	184 (51.11)	360(100)
Males	102 (58)	120 (65.2)	222 (61.67)
Females	74 (42)	64 (34.8)	138 (38.33)

Table 2: Total age distribution of infants

Age (months)	Frequency	Percentage (%)
≥0 to <2	48	13.3
≥2 to <4	64	17.8
≥4 to <6	64	17.8
≥6 to <8	76	21.1
≥8 to <10	54	15.0
≥10 to ≤12	54	15.0

Table 3: Educational status of parents

Categories	Mother (No)	Mother (%)	Father (No)	Father (%)
Higher education	100	27.77	110	30.55
Senior secondary	66	18.33	106	29.44
Matriculation	64	17.77	64	17.78
Upper primary	92	25.56	60	16.67
Lower primary	2	0.56	2	0.56
Illiterate	36	10	18	5

Occupation of parents

88.33% of mothers were housewife. Rest were either self-employed (5%) or salaried (6.67%). All of fathers were working.48.89% were only salaried, 48.33% were only self-employed and the rest were both.

Maternal age

92.8% of mothers were in age group ≥20 to <32 years.6.2% were in age group ≥32 to ≤36 yrs. Only two mother each was in ≥18 to <20 yrs and 36-38 yrs age group. None of them was of less than 18 yrs or more than 36 yrs age.

Monthly income distribution: Detailed distribution shown in Table 4.

Table 4: Monthly income of family (in Rupees)

Monthly Income (rupees)	Frequency	Percentage (%)
≥5000 to <10000	60	16.7
≥10000 to <15000	102	28.3
≥15000 to <20000	54	15.0
≥20000 to <25000	44	12.2
≥25000 to <30000	40	11.1
≥30000 to <35000	26	07.2
≥35000 to <40000	16	04.4
≥40000 to <45000	4	01.1
≥45000 to <50000	4	01.1
≥50000 to <55000	4	01.1
≥60000 to <65000	2	0.6
≥75000 to <80000	2	0.6
≥90000 to <95000	2	0.6

Table 5: Data on question-“During pregnancy where did the mother get information about breastfeeding and complementary feeding?”

	Mode	Mode frequency	Categories	Frequency	Percentage (%)
Breastfeeding	D, R	49	AW	10.000	2.778
			D	40.000	11.111
			D, AW	2.000	0.556
			D, F	6.000	1.667
			D, R	98.000	27.222
			D, R, AW	2.000	0.556
			D, R, F	58.000	16.111
			D, R, F, S	18.000	5.000
			D, R, F, S, TV	10.000	2.778

			D, R, F, S, TV, Radio	2.000	0.556
			D, R, F, TV	6.000	1.667
			D, R, S	6.000	1.667
			D, R, S, TV	2.000	0.556
			D, R, TV	4.000	1.111
			D, S	10.000	2.778
			D, S, TV	2.000	0.556
			D, TV	4.000	1.111
			F, AW	2.000	0.556
			None	40.000	11.111
			R	12.000	3.333
			R, AW	2.000	0.556
			R, F	16.000	4.444
			R, S, T	2.000	0.556
			R, S, TV	2.000	0.556
			R, TV	2.000	0.556
			TV	2.000	0.556
Complementary feeding	None	208.000	AW	4.000	1.111
			D	30.000	8.333
			D, F	2.000	0.556
			D, R	46.000	12.778
			D, R, AW	2.000	0.556
			D, R, F	12.000	3.333
			D, R, F, S	20.000	5.556
			D, R, F, S, TV	8.000	2.222
			D, R, F, S, TV, Radio	2.000	0.556
			D, R, F, TV	6.000	1.667
			D, R, S, TV	2.000	0.556
			D, S	2.000	0.556
			D, S, TV	2.000	0.556
			D, TV	4.000	1.111
			None	208.000	57.778
			R	2.000	0.556
			R, F	2.000	0.556
			R, S, TV	4.000	1.111
			TV	2.000	0.556

D-Doctor, R-Relatives, F-Friends, S-social media, TV-Television, AW-Anganwadi worker.

Table 6: Data on question-“After delivery who encouraged mother for breastfeeding?”

Mode	Mode frequency	Categories	Frequency	Percentage (%)
H, R, F	79	H	30.000	8.333
		H, F	2.000	0.556
		H, R	74.000	20.556
		H, R, AW	2.000	0.556
		H, R, F	158.000	43.889
		H, R, F, S	32.000	8.889
		H, R, F, S, TV	10.000	2.778
		H, R, F, S, TV, Radio	2.000	0.556
		H, R, F, TV	6.000	1.667
		H, R, S	2.000	0.556
		H, TV	2.000	0.556
		H. R. F	6.000	1.667
		NO	2.000	0.556
		R	6.000	1.667
		R, AW	4.000	1.111
		R, F	18.000	5.000
		R, F, AW	2.000	0.556
		R, F, S	2.000	0.556

H-Hospital staff, R-Relatives, F-Friends, S-social media, TV-Television.

Time of Initiation of breastfeeds after birth

83.9% started breastfeeds within 2 hours of birth, 15% ≥2 to <4 hrs and 0.6% ≥4 to <6 hrs after birth. Only two neonates were started on breastfeeds at 72 hrs of life. Out of total cases, 55.5% newborns were breastfed within 1 hour of life and 6.6% within ½ hour of birth.

<6 months age group

In this category caretakers of all children were mothers. Almost all mothers had only 1 live child of < 1 year age. There were only 2 cases where there were 2 children of < 1 yr age (they were twins).

Breastfeeding after birth

In only 4 cases breastfeeding was stopped before completion of 6 months age. Reasons regarding these were 'inadequate breast milk' and 'mother sickness'. They were given cow milk (diluted and undiluted respectively). 14.8% of total were given prelacteal feeds. Ghutti (10), honey (6) and tulsii water (4) were the most common prelacteal feeds. Others were water, gangajal and medicated water (2 each).

Only 60.22% babies were exclusively breastfed throughout their life (till the time of interview). Rest (39.78%) were given either top feeds, water etc with or without breastfeeds (detailed distribution given in Table 7). Out of these 20.45% used bottles while 19.32% used Katori/Spoon for feeding. Majority had a total of 1-2 bottles at home for feeding. Only 2 cases had 3 bottles and 2 had 15 bottles which were used for feeding. Only in 6 cases the bottle/nipple was boiled for the recommended duration every time before feeding. Lactogen was prepared in recommended dilution and was an age specific preparation in all the 8 cases. Plain water was fed to baby in 30 cases (17%).

Table 7: Distribution of feeding practices (<6 mths age group)

Categories	Frequency per category	Percentage (%)
Exclusive breast feeds	106.000	60.227
Mixed Feeding (Breastfeeds plus other feeds)		
Complementary feeds	2.000	1.136
Complementary feeds, Water	2.000	1.136
Cow milk/Diluted	12.000	6.818
Cow milk/Diluted, Lactogen, Water	2.000	1.136
Cow milk/Diluted, Water	2.000	1.136
Cow milk/Diluted, Water, Complementary feeds	2.000	1.136
Cow milk/Diluted, Water	4.000	2.273
Cow milk/Undiluted	6.000	3.409
Cow milk/Undiluted, Complementary feeds	4.000	2.273
Ghutti	4.000	2.273
Ghutti, Water, Complementary feeds	2.000	1.136
Ghutti, Churan, Honey	2.000	1.136
Lactogen	6.000	3.409
Water	12.000	6.818
Water-Spices	2.000	1.136
Water, Powder milk	2.000	1.136
Only top feeding (No breast feeds)		
Cow milk/Undiluted, Complementary feeds	2.000	1.136
Cow milk/Diluted	2.000	1.136

Most common reasons for giving top feed were-Breast milk was inadequate (28), as advised by relatives (8) or both (4). Few other reasons were- Mother had no time, mother couldn't follow diet required during breastfeeding, excessive crying of baby and working mother (2 each).

8 babies were started with complementary feeds at 5 months age, 2 at 5.5 mths age and 2 each at 2.5 and 3 mths age.

Regarding "Following of hygienic practices while feeding" all mothers who were giving top feeds or complementary feeds scored 3 or 4 out of maximum score of 4.

≥6 months age group

In this category caretakers of all children were mothers except two, in which case mother had expired. Relatives were taking care of child in these cases. Almost all mothers had only 1 live child of < 1 year age. There were 6 cases where there were 2 children of < 1 yr age.

Breastfeeding after birth

In 8% cases breastfeeding was stopped before 6 months of age. Out of these 14 cases the causes were 'inadequate breast milk' (6 cases), 'mother sick' (4), 'working mother' (2) and 'baby not sucking well' (2). 8 of these 14 were fed on diluted cow milk and the rest on undiluted cow milk.

88% were never given any prelacteal feed. 5.4% received ghutti, 4.4% honey and 1.1% each received honey-ginger and medicated water respectively.

69.6% mothers exclusively breastfed their babies till 6 months age. Rest of them were given water, top milk, early complementary feeds, ghutti etc (singly or in various combinations) with or without breast

milk till 6 months age. Out of these cases in 10.9% cases top milk was given undiluted while it was diluted in 7.6% cases. 14 cases completely stopped breastfeeding before 6 months age while 10 stopped after 6 months but before 1 year age. Rest of infants were on breast feeding till the time of interview.

If we take all infants (360), 19.4% were started top milk (excluding milk as a part of complementary feed) at some time during this period, both scenarios are not justifiable. Most common reason (70 cases) was ‘Breast milk was not enough for baby’, ‘as advised by others’ (16), both in 10 cases and ‘Sickness of mother’ (10).

If we consider feeding of top milk and water, bottle feeding was seen overall in 30.4% cases while katori/spoon feeding was seen in 15.2% cases. 48 mothers had 1-2 bottles for feeding at home, while 8 of them had 3-5 bottles at home. None had more than 5 bottles at home for use. Only 10 of these boiled the bottle/nipple as per recommendations.

Complementary feeding

116 (63%) mothers started complementary feeds at 6 months age, 6 babies before 6 mths age, 38 between 6-8 mths age while 24(13%) were yet to start it.

Table 8: Reasons of early or delayed starting of complementary feeds in ≥6 mths age group

Categories	Frequency per category	Percentage (%)
Started at time.	106.000	68.478
Didn't know time to start.	26.000	14.13
Didn't know time to start, Milk acceptance was good, felt milk was sufficient.	2.000	01.087
Didn't know time to start, didn't know what to start.	2.000	01.087
Felt milk was sufficient.	2.000	01.087
Going to start in few days.	2.000	01.087
Milk acceptance was good, can't digest solid foods.	4.000	02.174
Mother expired.	2.000	1.087
Vomits.	12.000	06.522
Vomits, Milk acceptance was good.	2.000	01.087
Vomits, Milk acceptance was good, Didn't know time to start.	4.000	02.174

Table 9: Food item with which complementary feeds was started

Mode	Mode frequency	Categories	Frequency per category	Percentage (%)
Cerelac	24	Cerelac	48.000	26.087
		Dal	16.000	8.696
		Dal-Milk	2.000	1.087
		DaL-Rice	4.000	2.174
		Dal, Khichdi	2.000	1.087
		Dahi	2.000	1.087
		Dalia	4.000	2.174
		Dalia, Sooji, Cerelac	2.000	1.087
		Dal ka paani, Cerelac	2.000	1.087
		Dal ka paani	18.000	9.783
		Dal ka pani, Soup	6.000	3.261
		Halwa	2.000	1.087
		Kheer	2.000	1.087
		Kheer, Cerelac	2.000	1.087
		Khichdi	14.000	7.609
		Khichdi, Cerelac	2.000	1.087
		Not Started yet	24.000	13.043
		Oats	2.000	1.087
		Porridge	2.000	1.087
		Potato, Khichdi	2.000	1.087
		Rice-Curd	2.000	1.087
		Rice-Milk	8.000	4.348
		Sooji	6.000	3.261
		Sooji, Dalia, Rice-Milk	4.000	2.174
		Soup	2.000	1.087
		Sooji, Dal	2.000	1.087
		Dalia	2.000	1.087

Minimum meal frequency: 57.6%.

Percentage of infants receiving complementary feeds who received adequate amount of food item/feed in the last 24 hrs: 50%.

Percentage of infants receiving complementary feeds who received correct consistency of food item/feed in the last 24 hrs: 63.7%.

Minimum dietary diversity: 16.3% Out of total 160 infants on complementary feeds 56 (35%) were also given commercial weaning foods like cerelac. 10infants were exclusively on these commercial weaning foods and were not on any homemade food products. 26.25% (of the total infants on complementary feeds) were frequently given commercial non weaning packed food items like biscuit, namkeen etc.

Minimal acceptable diet

Breastfed children (6-11 mths age)-12.5%.

Non-Breastfed children (6-11 mths age)-33.33%.

The caretakers of infants were asked about the below mentioned food fads (including others).

Banana, curd causes cold and cough/Rice caused cold and cough/Ghee is heavy to digest, causes cough/Gur (jaggery) is hot to give/Only liquid foods like dal water, rice water good for children/Wheat/daliya/moti sooji heavy for kids/Maggi/biscuits/marketed foods help in weight gain/Milk is whole, complete food till 1 year of age/Dal/pulses causes indigestion/Vegetables choke in food pipe/Solid/thick consistency food cannot be given to kids/Sour foods cannot be given, causes cold/Others (specify).

The result/distribution can be seen in Table 10.

Table 10: Food fads (≥6 mths group)

Categories	Frequency per category	Percentage (%)
NO complementary feeds started	24.000	13.043
NO Fads	34.000	18.478
Banana & curd cause cold, Gur is hot, Sour foods	2.000	1.087
Banana & curd cause cold, Rice causes cold, Sour foods	2.000	1.087
Banana & curd cause cold, Solid food can't be given	8.000	4.348
Banana & curd cause cold, Sour foods	10.000	5.435
Banana & curd cause cold, Sour foods, Vegetables can choke	4.000	2.174
Dal cause indigestion, Sour foods	2.000	1.087
Ghee is heavy	4.000	2.174
Ghee is heavy, Sour foods	2.000	1.087
Gur is hot, Sour foods	6.000	3.261
Ghee, Vegetables can choke, Sour foods, Dal causes indigestion, Solid food can't be given	2.000	1.087
Milk is complete food, Dal cause indigestion, Sour foods	4.000	2.174
Milk is complete food, Sour foods	4.000	2.174
Non-Veg, Sour foods	8.000	4.348
Only liquid foods good	2.000	1.087
Only liquid foods good, Solid food can't be given, Vegetables can choke	2.000	1.087
Rice causes cold	4.000	2.174
Rice causes cold, Maggi is healthy, Sour foods	2.000	1.087
Rice causes cold, Sour foods	2.000	1.087
Solid food can't be given, Milk is complete food	2.000	1.087
Sour foods	30.000	16.304
Sour foods, Milk is complete food	2.000	1.087
Vegetables can choke, banana & curd causes cold	4.000	2.174
Vegetables can choke	4.000	2.174
Vegetables can choke, banana & curd causes cold	2.000	1.087
Vegetables can choke, Sour foods	4.000	2.174
Vegetables can choke, Sour foods, Dal cause indigestion	2.000	1.087
Sour foods, Curd causes cold	6.000	3.261

Following questions were asked regarding hygienic practices while preparing for/giving top milk or complementary feeds.

- Washing caregivers' and children's hands before food preparation and eating.
- Storing foods safely and serving foods immediately after preparation.
- Using clean utensils to prepare and serve food/Using clean cups and bowls when feeding children.
- Avoiding the use of feeding bottles, which are difficult to keep clean.

Hygienic practices were considered to be correct if at least 3 of the four questions asked were correct. Only in 6 cases the score was less than 3. Only 2 mothers knew about the need of extra complementary feed during/after any acute illness and she gave 1 extra feed during the illness of her baby.

Discussion

In our study during pregnancy, 11.11% and 57.78% mothers got no information regarding breastfeeding and complementary feeding respectively. Doctors (75% and 38.33%), relatives (67.22% and 27.44%) and friends (32.22% and 13.89%) in various combinations were the most common source of information regarding breastfeeding and complementary feeding respectively. Clearly mothers had very less information regarding complementary feeding and this lacunae needs to be seriously pursued by the policy makers. After delivery mother received breastfeeding advice and encouragement from healthcare staff and relatives in 90% cases each. Relatives (66%) also contributed to a significant proportion.

In our study 55.5% of mothers breastfed their babies within 1 hour of birth which is slightly higher than the national, state and district data (41.5%, 40.6% and 37% respectively) ^[2] but similar to Parashar *et al.* ^[27]. UNICEF data on this indicator is 43% for Bangladesh, 50 % for Thailand and 38% in Nigeria ^[28]. Other studies give values of 36% ^[29] and 57% ^[30]. 99% babies were breastfed within 1 day of birth in our study which is higher than national (81.4%) and Himachal (80.7%) data ^[2].

In our study prelacteal feeds were given in 14.6% cases in <6 mths group and 12% in 6-12mths group. Most common food items used as prelacteal feeds were ghutti, honey and medicated water. National and state data give us the readings of 21.1% and 20.4% respectively ^[2]. Parashar *et al.* also found honey and ghutti as most common prelacteal feeds in shimla district but the prevalence of prelacteal feeds in his study was 49.8% ^[27].

65% of total mothers in our study exclusively breastfed their babies till 6 months age. (60.22% in <6 mths group and 69.6% in ≥6 mths group). National and state data ^[2] shows that percentage of children less than 6 months who are exclusively breast fed is 55% and 67.2%. Various other studies show a value of 50% and 34% ^[29, 30]. Percentage of children ever breastfed was 100% in our study as comparison to national and state levels of 95% and 94.3% respectively. 5% mothers stopped breastfeeding before 6 months (national and state levels are 4.5% and 4.6% respectively). Majority of infants who were not exclusively breast fed till 6 months age were given cow milk or water. Most common reasons of starting top milk (not as a part of complementary feeds) at any age of life was 'Inadequate/Insufficient breast milk' or 'as advised by relatives'. Most common milk used was cow milk. Only in 6 cases powder milk and in 2 case buffalo milk was used. Among 360 cases, for feeding of liquids (milk, water etc.) 25.5% were using bottles and 17.22% were using Katori/spoon. In < 6 months group, 20.45% used bottles while 19.32% used Katori/Spoon for feeding (against national and state statistics of 12% and 10.8%). Majority had only 1-2 bottles for feeding purposes. Only 2 mothers each had 5 and 15 bottles respectively. Out of total of 92 mothers using bottles, only 8 sterilised the bottle and its nipple by boiling for recommended duration in water.

Complementary feeding

116(63%) mothers started complementary feeds at 6 months age, 6 babies before 6 mths age, 38 between 6-8 mths age while 24(13%) were yet to start it. Study done by Devyani *et al.* give us a value of 34% as percentage of mothers who started complementary feeds at 6 mths age ^[30]. Cerelac (48 cases) was the most common food item which was used as first complementary food followed by dal and dal ka paani (26 each) and kchichdi (18). Cerelac was the most frequently mentioned commercial food in various other studies ^[32, 33]. 126 out of 360 mothers had one or the other food fad, among which most common were that sour foods, banana and curd can cause cough/cold and that vegetables given to the child can choke in food pipe. Similar findings were seen by S. Lodha *et al.* ^[34].

None of food items used to start complementary feeds consisted of a minimum of 4 food items as per WHO recommendations.

Minimum meal frequency (MMF) in our study 57.6% (for 6 to 11 mths age). MMF (both breastfed and non-breastfed) of India and Himachal is 35.9% and 49% respectively (for 6-23 mths age group). Patel *et al.* and Khan *et al.* observed MMF in 41.5% and 48.6% of children, respectively ^[9, 34]. Percentage of infants receiving complementary feeds who received adequate amount and correct consistency of food item/feed in the last 24 hrs was 50% and 63.7% respectively. Minimum dietary diversity (MDD) in our study (6-11 mths age) was 16.3%. National and state data on MDD (6-23 mths age) states 22% and 27.6% respectively. Study by Indrapal *et al.* ^[29] show MDD value of 31% for 6-11 mths age group while Bentley *et al.*'s study in Mumbai observed that only 13% of children aged 6-23 months were meeting minimum dietary diversity, while 43% had minimum meal frequency ^[31]. Minimal acceptable diet (MAD) in our study was calculated as 12.5% in breastfed children (6-11 mths age) and 33.33% in non-breastfed children (6-11 mths age). MAD values (6-23 mths age) for India and Himachal respectively are 8.7% and 11.2% in breastfed children and 14.3% and 9.9% in non-breast fed children. Khan *et al.*, and Bentley *et al.* found a prevalence of MAD among children 6-23 months at 19.7% and 5%, respectively ^[35, 31].

In majority of cases mothers followed correct hygienic practices.

98 infants were fed plain water. In 18 cases plain water was started before 6 months age which is not justifiable. In 8 cases breastfeeds were stopped due to some reason and thereby giving water to them could be justified as they were on top milk. In 14 cases, infants were both on breast milk and top milk.

Considering the breast milk production was less, giving water to them can still be justified. A detailed dietary history with exact amounts has to be taken to confirm the above statements. The amount of water given in 24 hours ranged from 5 to 500 ml which is well within the daily amount recommended by WHO.

Conclusion and Recommendations

The various information/indicators assessed for this population were poor. Exclusive breast feeding up to 6 months is very less. A large percentage of population is interested in starting animal milk or water especially after 6 mths of life. Starting of animal milk or water to a breastfed infant and complementary feeds is not justifiable. There is very poor knowledge of not using the bottle for feeding and how to sterilize it. Worst part is that the knowledge of people on complementary feeding, especially minimum required dietary diversity is poorest. A large number of people have various wrong food notions or fads. There is a need to properly assess the complementary feeding practices at every contact with the health system. The care givers should be informed and counseled about the quantity and quality of feeds to be given to their children. Otherwise, these visits will only be missed opportunities to tackle under nutrition in children. There is need to explore the factors that are responsible for suboptimum feeding practice of mothers and socio-cultural means of ensuring optimum practice. Carefully designed, culturally sensitive counseling and awareness raising are essential. The emphasis during training and the knowledge and focus of the Anganwadi Workers and Accredited Social Health Activists workers is disproportionately on breastfeeding than age-appropriate complementary feeding^[36, 37]. These lacunae in the health system should be investigated and addressed.

Finding of this study will be useful to health planners and health policy makers working in government and non-government organizations working in the field of health and nutrition for context-tailored interventions that can be assessed and adopted to improve the practices of mothers about infant and young child feeding.

Limitations

Non-inclusion of 1-2 yrs age group children and selection bias due to clinic-based nature of study limits its representativeness.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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