

CHAPTER 1

INTRODUCTION



1.1. BACKGROUND:

Breast feeding of infants is an almost universal characteristics of human societies because the value of breast milk for infants feeding is indisputable. In ancient hindu medicine the value was stressed and in mothers who did not have sufficient milk, wet nurse feeding was advised. Now all over the world, situation is changing, most mothers would not like to nurse their babies probably because of socio-cultural and socio-economic factors. But breast feeding has inherent advantages over artificial feeding. Human milk contains sufficient quantities of all the essential constituents for proper growth in the first few months of life(1).

Exclusive breast feeding can support adequate infant growth throughout the first 4 to 6 months of life. During this time infants need only human milk, which can sustain their nutritional requirements, digestive abilities and ability to resist infectious diseases(2).

Several studies have been stressing on the importance of breast feeding in many countries of the world and have proved beneficial qualities like:

A. Nutritional value

After delivery, the composition of breast milk changes in three phases: colostrum, transitional milk, and mature milk.

Colostrum:

The major secretion of the breast is yellowish and sticky during the first week of lactation is colostrum. Colostrum has more protein, secretory immunoglobulin A, white blood cells, less fat, higher level of vitamins and more sodium and zinc which can fulfill the nutritional requirement of infants as well as defense against dangerous infections(3).

Transitional milk:

Transitional milk appears by 7 to 10 days after lactation begins. It is secreted during the period that the milk is changing from colostrum to mature milk. The composition changes to meet the infant's needs. Immunoglobulin and proteins decrease while lactose, fat and calories increase. The vitamin content is approximately the same as that mature milk(3).

Mature milk:

After the first 2 weeks of lactation, mature milk replaces transitional milk. Because breast milk is bluish and not as thick as colostrum. It contains approximately 20 kcal/ounce and nutrient sufficient to meet the infant's needs.

Table 1. Comparison of mature human and unmodified cow's milk:

Constituents	Cow's milk	Human milk
Total protein	3.5	1.1
Casein	2.8	0.4
Protein in lactoserum (Whey)	0.6	0.7
Betalactoglobulin	0.37	-
Alpha-lacto albumin	0.18	0-35
Immunoglobulin total	0.05	0.1-0.15
Other proteins	0.13	6.2

(protein content in g/100 ml: mature milk) (4).

1. Protein:

Unmodified cow's milk has about three times more protein than human milk. Most of this protein is casein and much less soluble whey protein. The higher proportion of casein forms a relatively tough curd in the infant's stomach and less digestible. Human milk has less total protein but a much higher proportion of the soluble whey protein. This forms a softer curd which is more easily digested and absorbed. Breast milk contains a high level of taurine which is important for bile formation and brain development (3,4).

2. Fat:

In breast milk fat is in the form of unsaturated fatty acid. It is absorbed much more readily by the infants than the saturated fat of cow's milk due to the presence of a lipase enzyme (4).

3. Lactose:

This sugar is the only carbohydrate in milk. The amount in human milk does not vary much and is higher than cow's milk. In addition to providing an easily digestible source of energy, some lactose is converted in the intestine to lactic acid. Lactic acid helps to prevent the growth of undesirable bacteria and probably helps in the absorption of the calcium and other minerals(4).

4. Minerals:

Human milk contains much less calcium than cow's milk and it has only a small amount of iron. However, about 75 % of the iron in human milk is absorbed compared with only 4 % to 5 % from other foods. Human milk also contains less sodium, potassium, phosphorous and chloride than cow's milk. So the renal solute load in breast milk is less than cow's milk(4).

5. Vitamins:

If the mother's diet is adequate, all the vitamins that are needed by the infant during the first four to six months are supplied by breast milk. Although there are only small amounts of vitamin D in milk fat it can however be activated in breast fed infants if their skin is exposed to sunlight(3,4).

B. Anti-infective properties of breast milk

Only breast milk has anti-infective properties to protect the infant against infections particularly diarrhoea and ARI diseases in the early months. In addition, breast fed infants have a better chance of survival than bottle fed infant. The following are the anti-infective properties of human milk:

a. Clean:

It is never strictly sterile, as there will be some contamination from the nipple but these bacteria have no time to multiply as the milk is consumed immediately. In a poor environment, it is extremely difficult to make a hygienic formula in home where there is limited fuel, water and utensils. Bottles and teats are difficult to clean and again bacteria quickly multiplies in any milk residue left in them. The prepared formula may be left in a warm place before being fed to the infant and again bacteria can multiply. Flies and dust can settle on the teats or feeding utensils thus increasing the opportunity for contamination. The milk can or package may not be kept closed when it is not in use so contamination is likely. The person preparing the feedings may not have clean hands before mixing the formula. Water used to prepare the feedings may not have been boiled(5). Thus formula fed infants may have more chance to get malnutrition and infectious diseases than those breast fed infants.

b. Immunoglobulin:

Particularly secretory IgA is present in large amount in colostrum and to lesser extent in mature human milk. SIgA is not absorbed but acts in the intestine against certain bacteria e.g. E. coli and viruses(6).

c. Lactoferrin:

This is an iron binding protein found in human milk. Because it renders the iron in its bound form, iron will not be available to certain harmful intestinal bacteria which needs for their growth.

d. Lysozyme:

This enzyme is present in a concentration several thousands times higher than that found in cow's milk. This breaks down certain harmful bacteria and also protects against various viruses.

e. White blood cells:

During the first two weeks, breast milk contains up to 4000 white blood cells per ml. These cells appear to provide secretory SIgA, lactoferrin, lysozyme and interferon. Interferon is a substance which may inhibit the activities of certain viruses.

f. The bifidus factor:

This is a nitrogen containing carbohydrate which is necessary for the growth of specific bacteria called lactobacillus bifidus. In breast fed infants these bacteria dominate the bacterial flora in the intestines and produce lactic acid from some of the milk lactose. This acid discourages the growth of harmful bacteria and parasites and makes the stools acidic(5,6).

C. Psychological

Breast feeding establishes a close and happy contact between mother and child. Besides this, breast feeding creates a healthy environment to strengthen the emotional bonding between the child and mother. This bonding is crucial to the emotional, physical and psychological growth and development of the child(7).

D. Prolactin in breast milk

This suppresses ovulation, therefore breast feeding has a greater impact on birth spacing in developing countries. Exclusive breast feeding tends to increase the period of infertility after delivery. We know the hormonal mechanisms which are initiated by the stimulus of sucking on the nipples during breast feeding. This prevents ovulation and conception. There are numerous studies showing that the temporary contraceptive effect of breast feeding is strong and may in

early times have been an important factor in limiting population growth in many societies(8).

E. Far less expensive

Bottle-feeds are often too diluted because the mother makes the milk formula last as long as possible because it is expensive. Costs on formula milk, bottle and teats are actually spent budget as well as costs on the treatment of diarrhoea. The money spent by the family can be saved if the baby is fed breast milk. Therefore, planning for exclusive breast feeding also helps to develop socio-economic status of the family. Furthermore, at the national level, breast feeding saves foreign exchange used for importing formula. At the same time the families as well as the government save a large amount of money which could be spent on treatment of children who becomes sick as a result of bottle feeding. Therefore, the use of infant formula may affect the national as well as the family finances. There are the reasons why breast feeding can be the most cost effective alternative to bottle feeding(9).

2.1. RATIONALE:

Specific practices such as bottle feeding contribute heavily to malnutrition. The primary cause of malnutrition is recurrent diarrhoea which thrives in poor communities due to lack of drinking water and unhygienic environmental practic-

es(10). UNICEF estimated that 190 million children under the age of 5 are chronically malnourished, locked early into a pattern of ill health and poor growth and development. ARI and diarrhoea account for 6.5 million (43%) and 5 million (33%) of deaths per year(11) in the world. About 137,000 die annually before they reach the age of 5 in Nepal. Diarrhoea disease kills 45,000 and Acute Respiratory Infections(ARI) kills another 40,000 each year. Breast feeding could prevent many of these deaths and more by imparting natural immunity to babies. Several studies have shown that exclusive breast feeding can break the vicious cycle of malnutrition and infectious diseases(12). In 1984, UNICEF launched a GOBI-FF Global promotion program through MCH service to promote the infant's health. BFHI program was launched by the UNICEF and WHO in 1989 to promote exclusive breast feeding(12).

Table 2. Percentage of exclusively breast fed infants by rural and urban region of Nepal(12):

Age categories	Rural (%)	Urban (%)
0 - 30 days	89	73
31 - 60 days	76	47
61 - 90 days	58	30
91 - 120 days	38	20
0 - 120 days	60	39

According to the data of breast feeding survey (1992) on breast feeding status in rural and urban areas of central

development region of Nepal, development pattern of total infants less than 4 months of age conducted by UNICEF. At the age of one month, about 89 % of rural infants and 73 % of urban infants were breast fed. However, in the second months of life, the percentage of breast fed infants dropped down to 76% and 47% in rural and urban areas respectively. At 3 months of age 58% and 30% in rural and urban areas respectively and at 4 months of age 38% of rural and 20% of urban infants were breast fed exclusively. So from 0 to 4 months of life about 60% of rural and 39% of urban mothers were breast fed exclusively. That is why, this study was conducted in urban area of eastern region to find out the effect of exclusive and non exclusive breast fed infants on weight gain and morbidity in the urban community.

Table 3. Percentage of exclusive breast fed infants age 0-4 months by sex(12).

Sex	Rural	Urban
Male	60	40
Female	60	39

The same study also showed that no gender difference can be observed in proportion to the exclusive breast feeding rates (Table 3).

Table 4. The socio economic indicators of Nepal which lead to increase the burden of illness in the community(13).

Per capita income	US \$ 170/head/Year
Literacy rate	25.6 %
Female literacy	13.0 %
Male literacy	38.0 %
Safe water	42.0 % of population
Adequate sanitation	6.0 % of population
Growth rate	2.6 %
Birth rate	9.3 %

Table 5. According to the eighth five year plan of Nepal's health policy the following target is expected to be achieved by 2000(13).

Health indicators	Present situation	Target by 2000
Infant Mortality Rate	102 per 1000	80 per 1000
Maternal M. Rate	800 per 100,000	750 per 100000
Mortality under 5 children	165 per 1000	130 per 1000
Total fertility	5.8	4.5
Life expectancy	54	61
EBF in infants from 0 to 4 months	60% & 39 % Rural and urban	100% in Rural & Urban

Low per capita income, high birth and growth rate along with low literacy rate are related to inadequate safe drinking water (1982-1991) and inadequate sanitation (1988-1991) played a vital role in increasing the burden of illness in the community of Nepal, such as Infant mortality, Maternal mortality rate etc. The health policy of Nepalese Government will strive, between now and the year 2000, toward the target

of reducing infant mortality from 102 per thousand to 80 per thousand, reducing mortality of children under 5 from 165 per thousand to 130 per thousand, reducing total fertility from 5.8 to 4.5, reducing maternal mortality from 800 to 750 per one million and increasing life expectancy from 54 to 61 years. Promotion of breast feeding is one of the components of basic government plan. It is included in promotion of health services through health education and information for increase awareness of breast feeding.

In Nepal, however, mothers who have low educational level and low family income usually choose any sort of milk like cow's milk and semi-solid food instead of high quality milk formula. Improper selection of breast milk substitutes and unsafe environmental sanitation may lead to poor weight gain and infectious diseases due to inadequacy of nutrient intake and bacterial contamination.

Furthermore, in developing countries like Nepal exclusive breast feeding is very important due to the high prevalence of malnutrition and infectious diseases. The IMR remains very high 180/ 1000 live birth. Rapid growth of the population as well as poor environmental sanitation are major health problems (1989-90) (14) of Nepal. However, there was a apparent trend in breast feeding i.e a decline in duration of exclusive breast feeding. In Urban areas, it was commonly

found that formula and cow's milk were given when mothers perceived their milk to be insufficient. Besides this, difficult delivery, economic condition, mothers working time and availability of the breast milk substitutes were the reasons of above mentioned two trends(15). In Nepal, thus exclusive breast feeding is very important, because inadequate complementation of breast milk can not fully satisfy energy requirements, thereby reducing the resistance of the body beyond the first few months of life and greatly contributing to cycles of protein energy malnutrition and infectious diseases. If present mothers and potential mothers have breast fed their babies exclusively then it can help to support in family as well as country's economic condition, control in birth rate, decrease in morbidity and mortality rate and can increased literacy rate in both female and male.

This study aims to identify the impact of breast feeding on growth and infectious morbidity in infants. Weight gain, incidence of diarrhoea and ARI will be compared between exclusive and non exclusive breast fed infants aged 0 to 4 months. If the result of this study can show a positive impact on weight gain in infants as well as in decreasing the morbidity due to ARI and diarrhoea, then this can be influenced to potential mothers in considering exclusive breast feeding. In addition, it can help to change and

strengthen local health policy to promote exclusive breast feeding on a wider scale.