CHILD FEEDING PRACTICES AND THEIR CORRELATES IN ETHIOPIA

BY

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Abstract

The 2000 Ethiopian Demographic and Health Survey data are employed to asses correlates of child feeding practices, and nutritional status of child using logistic regression model. Breast-feeding is nearly universal about 81% of children aged 0 – 36 months were breast-feeding at the time the study but the introduction of complementary foods much to early, only 54 percent of the index children under the age of 6 months are exclusively breast-fed. The first milk (colostrums) is an ideal food for newly born child and the children should fed but less than 50 percent (46.8%) were fed colostrums. Breast milk is not sufficient for children after 6 months of age and additional food should be given; however, 42.5 percent of the study children aged 6 and 11 months received complementary foods. The study also found that 54 percent of children were stunted.

There is considerable variation in the prevalence of malnutrition by region. Among regions, Afar, Amhara, Tigray regions have the highest prevalence of malnutrition where as Addis Ababa and Diredawa have the lowest prevalence of malnutrition.

The result of logistic analysis found the selected demographic and socio-economic factors that have the significant effect on child feeding and child malnutrition. Predictors of child feeding variables include maternal education,

place of delivery and mothers' age, and predictors of child malnutrition in Ethiopia are child's birth interval, mothers' education, number of other under five children within a household, region and child feeding practices. Children of longer birth interval are less likely to be malnourished. Children whose mother are more educated and children who live in Addis Ababa are tend to be better nourished than other children. Sex of child had no effect on child malnutrition even though female children are somewhat more malnourished than male children of their counterpart.

Chapter One

Introduction

1.1 Background of the Study

Child morbidity and mortality are major worldwide problems, particularly in developing countries. The major cause of child morbidity in these countries are diarrhea, measles, malaria, and acute respiratory infections and malnutrition. Disease coupled with malnutrition contribute to high level of mortality (WHO, 1998). One-third to one-half of childhood mortality can be attributed to malnutrition (Pelletier, 1994).

Malnutrition is the outcome of inadequate dietary intake both in terms of quality and quantity of foods, and inappropriate feeding practices. Inappropriate child feeding practices have serious negative consequence on the health, nutrition, growth and development of children. Studies on child feeding practice revealed that undesirable child feeding practice was found to be a major cause for the declining of childhood nutritional status after six months of age (Wallece, et al., 1990). The supplementation of breast milk at age six months of life is an acceptable practice since breast milk is no longer sufficient beyond six months of age to sustain the growing child.

Introduction of complementary food before age 4-6 months of a child is an undesirable practice because breast milk alone is sufficient for a child for the first six

months of life. It is safe, uncontaminated and contains all nutrients required by the child for normal growth. Generally, breast-feeding a child exclusively for the first four to six months improves the nutritional status and health of the child. It is also expected to minimize the chance of getting infectious diseases (CSA, 1999).

On the other hand, the use of other foods as substitute for breast milk has a bad effect on the life of children. A study by the Ethiopian Nutrition Institute (ENI) found an increased risk of infant morbidity and mortality associated with foods used as substitutes for breast milk (ENI, 1979). Evidences from many studies suggest that exclusive breast-feeding in early life protects against infections and reduces mortality, especially in developing countries where microbial contamination of foods and fluids is common (Feachem and Koblinsky, 1984). World Health Organization (WHO) recommends that children be exclusively breast fed for the first 4-6 months of life. However, in Ethiopia less than 50 percent of such children were exclusively breast fed (EDHS, 2000).

Several other nutrition studies on child feeding practices in Ethiopia also revealed that supplementary foods in this country are introduced much earlier than the recommended age of 4-6 months (Underwood and Hofvandar, 1982; CSA, 1992; Tesfaye Getaneh, et al. (1998). Butter, cow milk, cereal gruel, fang green water, tea, etc., are usually given as early as few days after birth when the infant is not physically ready and not carving for additional foods, so long as maternal milk is there.

Early supplementation can also inhibit the child's absorption of breast milk iron (Solomons et al. 1989), thus potentially resulting in iron deficiency. Besides, supplementary foods prepared under unhygienic conditions may increase the risk of getting food - borne diarrhea pathogens by the infants (WHO 1989). Moreover, when nutrient deficient fluids other than breast milk are given, the infant may become nutritionally disadvantageous, even if the items are prepared hygienically (Motarrjemi. et al., 1993 ;WHO, 1998).

On the other hand, prolonged exclusive breast-feeding and delayed introduction of complementary foods also contribute to high prevalence of growth faltering (Underwood and Hofvander, 1982). Delayed supplementation of breast-feeding is reported widely in Ethiopia (CSA, 1992; Gugsa, 1997; Hailu and Tessema, 1996), and thus can be a major factor that can contribute to low intake of nutrients and can cause a deterioration of the nutritional condition of children.

High percentage of households prepare supplementary foods from a single cereal (CSA, 1992: Hailu and Tessema, 1996), which may lead to the formulation of low quality diet. Other studies conducted in Urban Ethiopia by Geteneh, et al (1998) and Gugsa, (1997) showed that malnutrition occurred in children whose diet was made solely from cereal sources. Fruits and vegetables are rarely fed even in areas where these are relatively available. Despite the fact that weaning foods must be fed to a child several times a day (5-6 times) in small quantities, traditionally, Ethiopian children are fed less frequently, about 2-3 times (CSA, 1992).

Studies conducted in other African countries indicate that traditional weaning foods lead to under nutrition due to either feeding at less than adequate level of infection due to contaminated feeding (Walker, et al., 1989). Staple foods mainly cereals cooked in water in the form of porridge do not satisfy the increasing energy and other nutrient requirements as they are either too watery, have a very low energy density or too bulky and lack enough nutrients. As a result of inadequate food intake and frequent diarrhea, many children (6-24 months of age) experience weight - loss and impaired growth development (Hellstrom. A, et al., 1981; Hudson GJ, et al., 1980; Vansteenbergen et al., 1978; Walker et al., 1989).

Growth faltering occurs as a result of poor diets and/or recurrent infection which tend to increase the number of diarrhoeal episodes and susceptibility to certain infectious diseases (WHO, 1995). Studies found that poor growth is associated with delayed mental development (Pollitt. et al., 1993; Mendez, et al., 1999) and there is a relationship between impaired growth status and both poor school performance and reduced intellectual achievement (Martorell et al., 1992; Pan Americal Health Organization, 1998). Growth retardation in early childhood is also associated with significant functional impairment in adult life (WHO, 1995: Martorell et al., 1992) and reduced work capacity (Spur et al., 1977), thus, affecting economic productivity.

However, extensive research on child feeding practices and their correlates have not been carried out in the country. Only very few studies were done in Ethiopia. These studies focused on weaning practices of children and were carried out in small pockets of the country. Wolde (2000) had done a study in a Semi-urban sub-district

of Adigrat and Alemdon (1990) made a study on Infant feeding in Urban low-income households in one Kebele of Addis Ababa. What makes this study different is that it is larger in coverage (national level). Moreover, it assesses the factors correlated with child feeding practice in Ethiopia using the 2000 Demographic and Health Survey of Ethiopia. This study is also expected to provide an update on information on child malnutrition on the basis of the largest nationally representative nutritional survey.

1.2. Problem Statement

According to the Rural Nutrition Survey Report (1992) 64% of children aged 6-59 months were stunted and 47.7% under weight (low weight for age). Such level of stunting is among the highest in the world. The 1998 Health and Nutrition Survey report indicates that the level of malnutrition of children does not decline very significantly. Nearly half of children, (46 percent) under 3 years were stunted (EDHS) and stunting is associated with inappropriate feeding practices in early life. Stunting in childhood seems to lead to reduction in adult size and work capacity.

Malnutrition during childhood can also influence growth potential and risk of morbidity and mortality in later years of life. Malnourished children are more likely to grow into malnourished adults who face serious risks of disease and death (Vinod et al., 1999).

A number of factors affect child nutrition, either directly or indirectly. The most commonly cited factors are later and early introduction of complementary foods.

Early introduction of complementary foods in Ethiopia is widely practiced. For instance, the 2000 Demographic and Health Survey revealed that less than 50 percent of children were exclusively breast-fed. This early introduction of complementary food is disadvantageous to the child because it exposes the child to risk of diarrheal infection. The diarrheal diseases may lead the child to malnourishment and finally death.

A study done by (Afewerk et al, 1998) in Ethiopia revealed that Ethiopian supplementation has no nutritional benefits to the growth of infants. This could be due to reasons related to incorrect timing, poor quality diets, health factors (infection) food contamination, unhygienic food preparation.

In view of the fact that undesirable child feeding practices are prevalent in Ethiopia; this research attempts to examine the various possible factors and their contributions to the prevalence of inappropriate feeding practices in the country. Hence, it is expected that the results of this study will be helpful to the concerned bodies in order to overcome and improve the existing problems.

1.3 Significance of the study

The level of childhood malnutrition in Ethiopia is among the highest in the world. The Health and Nutrition Survey of 1983, 1992,1998 and the recent 2000 Demographic and Health Survey carried out by the Central Statistical Authority indicate that the level of stunting is very high, and the situation has not changed because stunting is associated with undesirable child feeding practices that is

practiced in the country. Early growth retardation results in impaired mental development, low school performance and high risk of child death.

Therefore, the findings of this research will be useful in identifying the major social and cultural factors contributing to undesirable child feeding practices of children under 3 years of age. The study will also contribute its part by filling the nutrition knowledge gap to facilitate institution of appropriate intervention measures using available local resources.

1.4 Objectives

A. General objective

The general objective of the thesis is to examine child feeding practices and nutritional status in children 0-3 years old, and to investigate the associated factors and determine if there is any correlation with malnutrition.

B. Specific objectives:

The aim of the study is to assess the child feeding practices in children 0-3 years old and identify influencing factors. The specific objectives of the thesis are as follows:

i) To examine the relationship between selected demographic variables (mother's age, birth order) and place of delivery, and time of first (immediate) breast-feeding.

ii) To examine the relationship between selected demographic variables (mother's age), place of residence and socio-economic (place of delivery and mother's educational level), place of residence and use of bottle-feeding.

iii) To examine the relationship between selected demographic variables (sex of child, household size and number of other under-five children within a household, birth order, birth interval and socio-economic characteristics (mother's education, mother's religion, mother's work status, frequency of feeding (number of feeds) place of residence and Region, and nutritional status of children using height for – age-Z-Score.

1.5 Literature's Review

Various literatures are consulted concerning child feeding practices and their correlates. The literature focused on the Demographic, Socio-economic and Cultural characteristics that determine Child Feeding Practices.

1.5.1 Demographic Factors

1.5.1.1 Sex of Child and Child Feeding Practices

Researchers from various societies have demonstrated that male deaths are higher compared to female deaths during the neonatal period due to biological reasons (Chen et al., 1981). However, sex differential in mortality, that shows higher deaths among female children than male children can be expected during childhood and adolescence period because of sex bias in health and nutrition related behavior favoring male children (Chen, et al., 1981). In some studies it was suggested that discrimination against girls in feeding and health care is responsible for poorer nutrition and higher mortality among girls than boys in many developing countries (Abey Koon, 1995; Pedley and Amin, 1991). A study by D'Souza and Chen (1980) in Bangladesh revealed that female post neonatal mortality rate that was 21 percent

higher than the male mortality rate because of the preferential treatment of male or advantages given to male infants by way of paternal care, feeding pattern, food distribution within the family and treatment of illness (especially where financial expenditure is involved).

A study undertaken in Ethiopia showed that there is sex differential in the nutritional status of children. For instance, the 1992 Rural Nutrition Survey revealed that the prevalence of stunting is a little bit higher for male children than for their female counterparts (65.7% and 62.7% for boys and girls respectively CSA (1993).

Similarly, study by Melaku et al., (1997) found that the sex of the child was significantly associated with chronic malnutrition. The same result was found by Knutsson et al., (1969) that there was longer duration of breast-feeding for male than for females. On the contrary, most studies based on an anthropometric data do not find a higher prevalence of malnutrition among girls (Sommerfert et al., 1998; Sommerfelt and Stewart 1994). The 1998 Health and Nutrition Survey results similarly showed that the proportion of stunted male children was slightly higher (53 percent) than females (50 percent) CSA, 1999). The 1998 Health Nutrition Survey result indicated that the proportion of wasted children was slightly higher among males compared to female children.

1.5.1.2 Age of Child and Child Feeding Practice

Child's age is one of the factors that can play important role in determining child feeding practices and nutritional status. A study on child nutrition in India showed that

stunting is considerably less common in the first six months of life, when most babies are fully breast-fed than at older ages, and prevalence of stunting increases rapidly upto 12-23 months of age, after which it increases more slowly (Vinod et al., 1999). Zolotkin (1991) and Kalez (1989) also that found wasting to be a more relative risk in children older than 24 months of age. Child's age is also sensitive to certain specific child's feeding practice. For instance, if a child were breastfed exclusively for the first six months of life, complementary foods along with breast milk have to be offered to the child beginning from the sixth month of age and gradual transition to adult food begins after twelve months of age.

1.5.1.3 Birth Interval of Child and Child Feeding Practice

Birth intervals are among many important factors affecting child-feeding practices. A short birth intervals means a mother becomes pregnant in short period of time and will give birth to many children that she cannot feed properly because she may have more children to care for. In connection to this, Underwood and his colleagues (1981) have the following points to say:

> **It is not only the youngest child who suffers when there are many children born close together frequently, and old baby must be prematurely weaned from the breast because a new baby is coming.**

This often results in malnutrition for the older child because the other available food is not sufficient for his proper growth.

Childbearing with short birth interval may also result in an enormous effect on the health and nutritional condition of the children, and it is expected that children born

too close together may not receive adequate care and sufficient feeding from the parents as required. In addition, the mother's health could suffer from short birth intervals and she is more vulnerable to infectious and other diseases. This implies that longer intervals between births are the best means of preventing children from malnutrition. Gray (1981) as cited in Sandral et al.,(1984) said that enhanced birth intervals have been associated with improvements in child survival. A study by Renata (1998) found that children closing interval of 4 or more years are 2.7 times less likely to be stunted than children less than 24 years younger than their previous siblings.

1.5.1.4 Birth Order of Child and Child Feeding Practice

Birth order of a child is another factor correlated with feeding practice of a child. Comparative studies conducted by Stewart (1994) in 22 countries indicated that in Sub-Saharan Africa countries, stunting is less common in birth order 2-3 than among children whose birth order is 6 or more. This problem comes from the more limited resources available in large families.

As the number of children increases within a household, competition for nutrition also increases, and one might expect that children of higher birth order would have a greater risk of stunting than would children of lower birth order. Vinod et al., (1999) found in India that children of birth order 4 or higher are considerably more likely to be stunted than are children of lower birth orders.

The study done by Melaku et al., (1997) in Ethiopia found that there was a high association between birth order of children and chronic malnutrition. It was also found by different related research that women who have higher parity breast -feed their penultimate child for a slightly shorter period than women of lower parity (Jaynti, 1986).

1.5.1.5 Maternal Age and Household Size and Child Feeding Practices

Research findings suggest that mother's age may affect the health and nutritional status of children. Vinod (1999) found in India that children born to younger mothers have a higher prevalence of stunting. Stunting of children to younger mothers implies that the younger women may have less experience in childcare and child feeding. The age of mother was also significantly correlated with the highest usage of the infant formula being used by the younger mothers between 21 and 25 years of age (Valerie et al., 1985), and younger women tend to have a somewhat shorter duration of breast feeding than older women (Jayinti, 1986), that is, breast feeding duration is positively correlated with maternal age (Smith, et al., 1993). Oni (1996) shows that first and second born children were receiving significantly more infant formula than children of higher birth order.

Haggerty et al., (1999) summarizing results from DHS comparative studies in different regions of the world showed that children of the older mothers were put to the breast- fed immediately compared with children of the younger mothers. This shows that the younger women because of less experience in breast-feeding, they do not start breast-feeding as immediate as the older women do. That is, comparatively

after birth, children of younger mothers are put to breast later than children of older women.

As the number of children increases within a household, competition for nutrition also increases, and one might expect that children of higher birth order would have a greater risk of stunting than those of lower birth order. Vinod et al., (1999) found in India that children of birth order 4 or higher are considerably more likely to be stunted than are children of lower birth order. The nutrient intake of a poor rural household may negatively be affected by an increase in family size, and the nutritional status of every member of a household may also adversely be affected by an increased household (Chaudhyury, 1986; Teshome et al., 1985 as cited in Nigussie, 1994).

1.5.2 Socio-Economic and Cultural Factors

1.5.2.1 Maternal Education and Child Feeding Practices

Children of educated mothers were given complementary foods more frequently and in more protected, cleaner settings than children of non-educated mothers (Guldan et al., 1993) and poorer and less well educated women rely exclusively on breast feeding for prolonged periods (Butz et al., 1982, as cited in Helen Ware, 1984). Educating women is an important asset to mothers on the premises that ignorance influences the efficiency in making use of foods or other related resources that are available to a household. Jellife, (1969) argues that efficiency in the utilization of already available household resources can be enhanced through education and, hence, acquisition of knowledge alone can have a positive impact even without changing a household's resource base. A study made in Bangladesh also showed

that maternal education was found to be a decisive factor of malnutrition (Bairgi 1980). A study conducted in Sidama Awraja of Ethiopia also revealed that maternal education was an important factor influencing the nutritional status of children in which under weight (low weight for age) is more than twice as high among children of mothers with no education compared to children of mothers with education (ENI, 1986). Similar results were found in the study carried out in other African countries. In a study by KOGI-Makau (1996) in Kenya, it was found that knowledge of the frequency of the feeding on nutritional status of children and maternal education correlated.

On the other hand, a study in Bugna Woreda, North Wollo Zone of Ethiopia, which gathered data on knowledge, attitude and practices (KAP) of mothers towards feeding their children aged 6 months to 5 years, showed that neither knowledge, practice nor attitude were found to have an association with the nutritional status of children in the study area (Michael, 2000). Similarly, review of literature on the relationship between maternal knowledge and the nutritional status of children led to the conclusion that there is no conclusive evidence that maternal nutritional knowledge has an advantage on the nutritional status of children. (Waihena, 1994).

Some studies have shown a positive relationship between knowledge and nutritional status, for example, Kogi-Makua (1992) found low nutritional awareness to be a risk indicator of nutritional status of household's members. Educated parents are likely to have an increasing awareness of modern values of nutrition, child rearing and food production and to realize the economic limitation (Jelliffe, 1982), and that a

mother with more schooling was less likely to have malnourished children (Helga et al., 1999). The study also found that more educated mothers started weaning at better recommended time than less educated mother and the mother's education was a strong positive predicator of whether she gave colostrums immediately after birth (Helga et al., 1999). Other studies on feeding practices and malnutrition in children showed that maternal education has an important effect on the use of colostrums and educated mothers are advocates for better feeding practices. Thus, one opportunity to improve child-feeding behavior lies in maternal education (Helga Pie Chulek, 1999).

Mother's education has also an effect on the prevalence and duration of breast-feeding. For instance, a study in Nigeria found that the prevalence of breast feeding among mothers with secondary education was high (94.4%) but was significantly less the case among mothers who had no education (98.9% (ONI, 1996). The 1998 Health and Nutrition Survey in Ethiopia also showed that maternal education and number of children breast-fed were inversely associated. The higher the educational level of the mothers, the lower the number of children breast-fed for longer duration (CSA, 1993). Similarly, another study done in Thailand indicated that higher proportions were breast among rural, less educated, lower status and poorer women compared to the case among urban, more educated, higher status and wealthier women (Knodel et al., 1982).

Bottle feeding was also significantly higher among children born to mothers with secondary education (74.1%) compared with those born to mothers who had primary

or no education (55.6%) and 56.6%) respectively. Children who were born to mothers with secondary education were given significantly more infant formula than those born to mothers with less education (ONI, 1996).

1.5.2.2 Culture and Child Feeding

Culture and food habit are other important factors that determine feeding practices in a society. In societies where there is wrong cultural belief and practices, it is likely that children are not adequately and properly fed (Cohen et al 1994; Rizvi, 1993). For instance, some people living in the Rift valley lakes (Abaya and Chamo) and the River Omo are avoiding eating fish (high protein rich food) because of cultural belief (Gugsa, 1998). Culturally, Oromo and Amhara mothers give non-lacteal feeds such as butter to grease the guts and warm water to clean the intestines of the newborn babies (Almedom, 1990), and because of food restriction (food taboos), in Hadiya Zone Southern part of Ethiopia, pregnant women avoid milk, cheese, linseeds and fatty meat (Tsegaye, 1998).

Mother's religion influences the feeding practices of a child. Certain foods are consumed by certain religious groups because of religion reasons. For instance, animal products such as milk, meat, eggs are not consumed by Orthodox Christian for nearly two months during fasting season, and this could have effect on the nutritional status of children (ENI, 1979). In a study by Mayling Simpson (1985) in Iran the respondents were asked why they breast feed their babies, most women responded that in Islamic law babies should be breast fed for two years, while others

explained that Iranian women bottle feed because of lactation failure but not by choice.

1.5.2.3 Mother's Work Status, Place of Residence and Place of Delivery

Initiation of breast-feeding can also be influenced by mothers involvement in work out –side the home (Leslie, 1988). Winikoff and Lakaran (1989) in their study on infant feeding pattern in Bangkom, Bogota, Nairobi and Semmarang also showed that bottle-feeding is associated with women's work away from home and early cessation of breast-feeding in these population (WHO, 1989). This may relate to the fact that mothers who work away from home tend to introduce supplementary foods or give formula foods to their children early.

On the other hand, research indicated that working for income may have indirect importance on a woman's capacity to engage in good complementary feeding practices. Women who work outside the home may enjoy greater prestige and self-esteem than do other women, though this phenomena is not universal (Mubarak et al., 1990 as cited in UNICEF, 1990). Besides, working outside the home may open women to new ideas and attitudes, though it is not clear that all these are conductive to better complementary feeding (Engle, 1992 as cited in WHO, 1998).

Some studies suggested that place of delivery was significantly correlated with infant formula usage. Those who deliver in the hospital tend to use the formula more than those delivering at home (Consminsky, 1985). In East/North Africa children whose mothers receive care from doctors, are less likely to be initiated to breast-

feeding immediately (Haggerty et al., 1998), because of the delay- in the rooming in after delivery, the newborn children received non-nutritive fluids in the hospital (Tigist, et al., 1996).

In contrast to this, a study by Kalu, (1997) in Nigeria found that more of urban births than rural births were fed colosturm. This is because more of urban deliveries took place at health institutions and thus, the urban mothers could have better opportunity to receive health and nutrition education by health workers that in turn would encourage them to breast feed. A study in Kenya also found that Hospital practices at the time of delivery appear generally supportive of breast -feeding with 80% of the children rooming-in with their mothers, and 75% of the mothers reporting they breast- fed in health facility. This suggests that contact with health workers could encourage mothers to breast feed their children (WiniKoff et al.: 1981).

Studies on breast-feeding duration between urban and rural women found that rural women are more likely to breast-feed longer than their counterpart urban women (WHO, 1981). Available research on child feeding in Thailand also indicates that prevalence and duration of breast feeding are declining first among the prosperous and better educated women, followed by urban poor, and lastly rural group (WHO, 1983). The median duration of breast-feeding is only four months for urban Thai women but exceeds a year and half for rural women (Kondel et al., 1982).

Geographical location of a population is important because it determines, in most cases, the availability of foods, health services and the cultural set up of an area in

terms of the types of food preferred and consumed by a certain group of people. For instance, a study by Majumder (1993) found that environmental conditions (the availability of safe water, sanitation and electricity) which can affect the health and nutritional status of children.

To sum up, reviewing of these different related literatures indicates that undesirable child feeding practices are the cause of child malnutrition, morbidity, poor growth and development of a child. The review of literatures also reveals that child feeding practices and their correlates as well as child feeding practices and nutritional status of children were not well addressed, particularly in the Ethiopian case at national level. Hence, assessing the problem of child feeding practices will be useful to alleviate child malnutrition.

1.6 The Study Hypotheses

In this study attempt will be made to test the following hypotheses:

- Children born after long birth intervals (more than 48 months) are less likely to be stunted than children born after short birth intervals
- As maternal education increases, child's bottle-feeding increases.
- Children born at health facilities are more likely to be bottle-fed.
- The higher the number of times the child feeds, the lower the risk of child malnutrition.
- As the mother's education increases, the risk of child malnutrition declines.
- As the number of other under five in the household increases, the risk of child malnutrition increases.
- Female children are more malnourished than their male counter parts.

Chapter Two

Definition of Concepts and Methodology

2.1 Definition of Concepts and Variables

1. In this study, the term "child" is used to include children 0 up to 36 months of age.
2. Child feeding practices refer to initiation of breast-feeding less than half an hour after birth; frequent, on demand feeding (including night feeds); exclusive breast-feeding for 6 moths of life; continued breast -feeding (at least up to the second year of life) including supplementation with locally available foods and appropriate foods from the age of around 6 months.
3. Exclusive breast-feeding is the consumption of breast milk as the only nutrient source
4. Urban area refers to locality that is considered to have urban status by ministry of Housing and Urban Development (CSA, 1993). An area with more than 2000 population and the livelihood the population is based on non-agricultural activities.
5. Complementary food-any nutrient-containing foods or liquids other than breast milk during the period of complementary feeding.
6. Appropriate complementary feeding when additional food is offered along with breast milk at about 6 months of life. The newly born child should be put to the breast and start within less than an hour after delivery.
7. Appropriate/optimal feeding practices will be classified into four age groups: 0-5 months (initiation of breast feeding, exclusive breast feeding), 6-8 months (breast

feeding plus gradual introduction of complementary feedings); 9-11 (the same, but increasing the amount and frequency of complementary feeding); and 12-36 months (continued breast feeding for as long as possible, gradual transition to family or adult diet).

8. Appropriate feeding practices also include giving of diversified nutritious food and feeding 2 times/ day 3-4 times/day and greater than 4 times/day at the age of 6-8 months, 9-11 and 12-36 months of age, respectively.
9. Bottle feeding is unhealthy practice because of potential adverse effects of contamination and over dilution of formula food with water

Measurements of child malnutrition are assessed based on three indices, namely, height-for age, weight- for- age and weight- for- height. Each of these indices provides somewhat different information about the nutritional status of children. The height- for- age index measures linear growth retardation among children, mainly indicating chronic malnutrition. The weight-for-height index measures body mass in relation to body height, primarily reflecting acute malnutrition. Weight-for-age reflects both chronic and acute malnutrition.

The computation of indices of child malnutrition involves comparison with an international reference population as recommended by the World Health Organization (Dibley et al., 1987). The reference population is the empirical finding that well nourished children in all populations follow very similar growth patterns (Habicht et al., 1974).

The three indicators of child malnutrition are expressed in terms of standard deviation units from the median in the international reference population. It is suggested that the measurements of a study population should be assessed in relation to the National Center for Health Statistics (NCHS) reference population in terms of standard deviation-z score and –2 standard deviation is taken from the median as cut off point between malnourished and normal children in the epidemiological study of childhood malnutrition. Children who are less than-2 and greater or equal to-2 standard deviations of the median value of NCHS/WHO international references. Wasting (low weight for height) is usually associated with the failure to receive adequate nutrition in the recent period just shortly before the survey and may be due to sudden food deprivation or recent episodes of illness, particularly diarrhea. Chronic malnutrition or stunting (low height-for-age) is associated with long term or cumulative effect of insufficient nutrition.

2.2 Variable Specification

As it is illustrated in Figure 1. Demographic Socio-cultural characteristics are thought to be proximate determinates of feeding practices;

In this study, the units of analysis are the last children 0 up to 36 months of age born to women aged 15-49.

1. The dependent variables

a) a) The dependent variable is child feeding outcome (time of first breast feeding, use of bottle feeding)

b) b) The dependent variables are chronic or stunting level of nutritional status (height-for- age)and wasting (Weight-for-height)

c) c) Independent Variables

The independent variable to be analyzed are of different categories since child-feeding practices is caused as a result of various factors. Therefore, the independent variables for this study are grouped into demographic and socio-cultural factors.

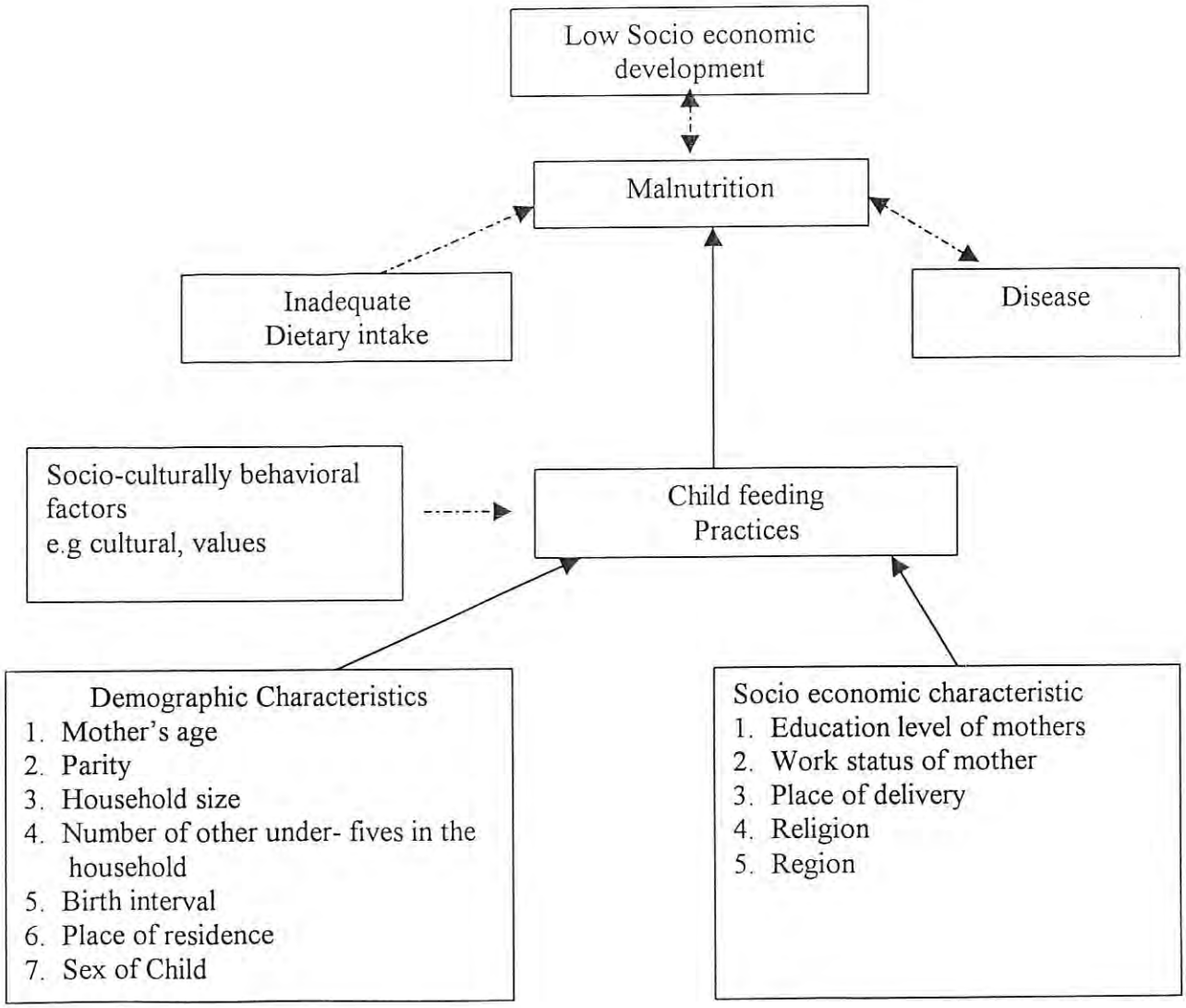
Demographic Variables

1. Mother's age = 5 year age group beginning from 15-19 to 45-49 used
2. Place of Residence = Two categories, (urban, rural)
2. Birth order = From first birth order to 8^{th} will be used
3. Birth interval = Three categories, short (< 24 months), medium (24-47 months), long (≥ 48 months)
4. Sex of child, two categories, (male, female)
5. Household size= Four categories (1-3, 4-6, 7-9 and 10^{+})
6. Number of other under -five children= Three categories, (1,2 and 3,≥ 4^{+})
7. Region = Eleven categories, (Tigray, Afar, Amhara, Oromia, Somalia, Benishangul-Gumuz, SNNPR, Gambella, Harari, Dire-Dawa Addis Ababa)

Socio-Economic Variables

8. Work status = Two categories, (Away from home, Home).
9. Religion= Four categories, (Orthodox, Other Christian, Muslim, Tradition, Other)
12. Education= Four categories (no education, primary education, incomplete secondary education and complete secondary or higher education)
13. Place of delivery = Two categories (Home, Hospital/clinic)

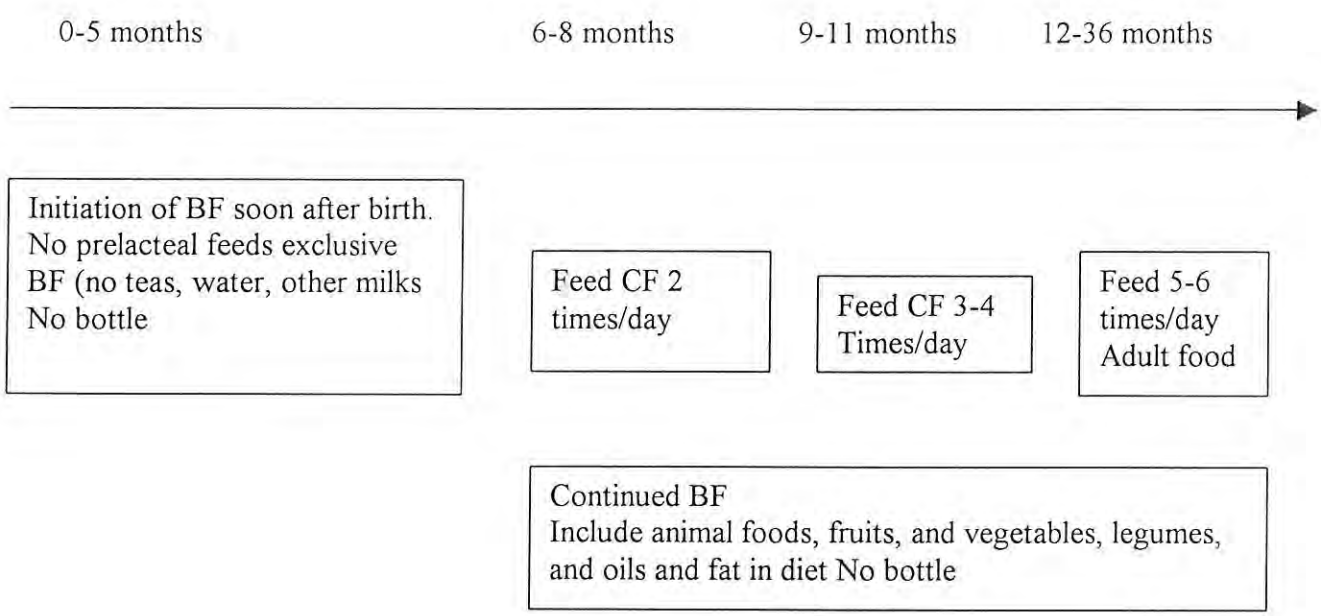
2.3 Analytical Framework



Adopted from UNICEF and modified by author

NB. Variables that are indicated by broken lines are not treated because the information is not collected or not available in EDHS. Variables indicated by non-broken lines are considered in this study.

THE CONTINUUM OF CHILD FEEDING



BF = Breast -Feeding
CF = Complementary Food

Source (Marie T. Ruel and Purnima Menon)

2.4. Materials and Methods

2.4.1 Source of Data

The data employed in this study are obtained from the Ethiopia Demographic and Health Survey (EDHS, 2000) which was carried out in 2000 and was designed to provide detailed information on fertility, family planning, infant and child mortality, maternal and child health and nutrition. The survey also collected information on knowledge of HIV/AIDS and other sexually transmitted infections. It covered 539 enumeration areas (EAS), 138 in urban areas and 401 in rural areas. A complete household listing operation was made in each selected EA, and a systematic sample of 27 household questionnaire, the women's questionnaire and the men's questionnaire. The survey was conducted by the Ethiopian Central Statistical Authority under the aegis of the ministry of Health. The survey covered nine regions namely, Tigray, Afar, Ahara, Oromia, Somalie, Benshangul Gumuz, SNNPR, Gambella, Harari and the two administrative council area of Addis Ababa and Dire Dawa.

A. Nutritional Status Assessment Using Anthropmetry

Cross- sectional data on the prevalence of child malnutrition were obtained from nationally representative nutrition survey included in the Ethiopia Demographic and Health Survey (EDHS) on child growth and malnutrition. Data on children's growth status was obtained by measuring weight and height. Weight was measured using Electronic Seca Scales. Height was measured using length board that is, their standing height (for children aged 24 months and older) or recumbent length (for

children under aged 24 months). Weight and height measurements were converted into weight-for-age, height-for-age, and weight-for-height percentage of standard for each child using the International Reference Population defined by the U.S. National Center for Health Statistics (NHCS) and as recommended by WHO and the U.S. Center for Disease Control and Prevention (CDC). The prevalence of stunting (low-height- for-age) and the prevalence of wasting (low- weight- for- height) is defined as the proportion of children that fall below-2 standard deviation (SD) of the United State National Center for Health Statistics/WHO international median value.

B. Assessment of Food Intake

The types of foods fed over the last 7 days and a 24-hour food intake recall was done for each index child. The mother was asked to describe all things to eat or drink and the number of meals/day that were given to that child during the previous 7 days including yesterday.

2.4.2. Method of Data Analysis

The data were analyzed using Statistical Package for Social Science (SPSS). The analysis began from descriptive statistics to summarize the essential features of data in easily interpretable forms. Next to the description of the data, the chi-square (x^2) was employed to assess if there are statistically significant association between the various child-feeding practices of the index child and socio-cultural, economic and demographic characteristics of the study population. Bivariate analysis was also used to show the association between child feeding practices, demographic and socio-cultural variables, and nutritional status of children.

After examining the effect of each variable on child feeding practices (on initiation of breast-feeding, and on use of bottle-feeding). The association of each variable with height for age and weight-for-height was tested using chi-square test. Multivariate analysis was used for the simultaneous testing of the significance of the most important predictors of child feeding practices and nutritional status of children using logistic regression.

In this study, bottle feeding, stunting and wasting are dependent variables. The response (dependent) variable in each model is a dichotomous (two category) variable that simply indicates whether a child is bottle-fed or not, whether a child is stunted or not and wasted or not (i e., whether the child is less than two standard deviations below the median of international reference population in terms height for-age and weight-for-height). The predicator variables are: mother's age in years (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49); sex of child (male, female); birth order (one, two, three, four or higher), birth interval in months (<24, 24-47, 48 $^{+}$); household size (1-3, 4-6, 7-9, 10^{+}); number of under -fives in the household (one, two, three or four); Region (Tigray, Afar, Amhara, Oromia, Somalie, Benshangul-Gumuz, Gambella, SNNRP, Harri, Dire Dawa, Addis Ababa); work status (Away from home, home); Religion (Orthodox, Other Christians, Muslims, Tradition, Other); mother's education (no education, primary, incomplete secondary, complete secondary or higher). Place of delivery (Home, Hospital/Clinic); place of residence (urban, rural)

Food group frequency (past 7 day)	=	Sum of (meat, poultry, fish, shellfish, eggs) 0 times in past 7 days =0 1 time in past 7 days =1 2-3 times in past 7 days =2 ≥4 times in past 7 days =3
Meal frequency past 24 hours	=	Food group frequency (sum of meat, poultry, fish, shell fish, eggs) 0 meals/day=0 1 time/day =1 2-3 times =2 ≥4 times =3
Food group frequency (past 7 days)	=	Local grains 0 times in past 7 days=0 1 time in past 7 days =1 2-3 times in past 7 days =2 ≥4 times in past 7 days =3
Meal frequency past 24 hours	=	Local grains 0 times/day =0 1 time/day =1 2-3 times/day= 2 ≥4 times =3

In this study, nutritional status assessment will be done only for children aged 12-36 months because stunting is mostly established around age one and increases rapidly up to age two and gradually increases beyond age two due to delayed introduction of complementary feeding, inadequate amount and lack of diversified diets. Secondly, children under one are excluded from this analysis because at this age children are mostly breast feed and this age is the age of early introduction of the complementary food. Hence, the true picture of stunting can not be observed. The main objective of this study is to assess the chronic or stunting level of nutritional status of children but wasting will also be analyzed so as to see what happened to the nutritional situation of children immediately before the survey.

2.5. Limitation of the Study

Since the data on child feeding practices was collected retrospectively, actual determination of child feeding practices might not be correct due to the errors that could occurred as a result of recall bias. Obtaining reliable information on causes of nutritional status is also difficult since malnutrition is a complex phenomenon. Low anthropometric status may result from a combination of nutritional factors such as deficiencies in protein or a variety of minerals and micro nutrients or from other infectious disease process (Allen 1994 as cited in Amyl Rice et al., 2000). In addition to this, questions such as what foods and when the child was introduced to complementary food, were not included, therefore in this study, time of introduction complementary period cannot be determined.

2.6. Organization of the Study

The study is composed of five chapters. Chapter one deals with the problem, and assess as the background to the study, and summarizes the review of related literatures. Chapter two focuses on objectives, hypothesis and methodology, and chapter three is on characteristics of the study area and study population. Chapters four and five contain the data, their presentation and analysis; summary and recommendation forwarded respectively.

Chapter Three

Characteristics of Study Area and Study Population

3.1 Characteristics of Study Area

Ethiopia is found in the horn of Africa, shares boundaries with Djibouti, Eritrea, Sudan, Kenya and Somalia. Topographically, Ethiopia is a country with great geographical diversity reaching the highest peak at Ras Dashen, which is 4,550 meters above sea level, down to the Afar Depression at 110 meters below sea level (CSA, 2000). The present territory of Ethiopian covers a total area of approximately 1,117,127 km^2. According to Ministry of Agriculture, about 66% of this land area is potentially useable for agricultural production (15% as cultivable land and 51% as grazing land) and about 12% for forests and shrubs (Seyoum, 1999).

Climatically, the country's temperature varies with the topography, reaching temperatures as high as 47 degree Celsius in the Afar Depression and as low as l0 degree Celsius in the highlands. According to the 1994 census, the size of the population was estimated to be 53.5 million of which 13.7 percent live in urban areas and the remaining 84.3% live in rural areas and the average annual population growth was 2.9 percent which reflects a rapid population growth in the country.

The economy is based on subsistence agriculture. Majority of the population is residing in rural areas and deriving its livelihood from agriculture. The population's

major settlement is concentrated in highland areas in the center and northern regions. There are about 80 different ethnic groups and 51% of the populations are orthodox and 33% are Muslims (EDHS, 2000).

Chronic food shortage has been prevalent in the country mainly caused by drought. The major famines have occurred in the country during the last three successive decades (1974, 1984/85, and 1994); significant percentage of the population approximately 50% (29 million people live below poverty line of one USD a day (Seyoum, 1999).

3.2 Child Malnutrition and Child Feeding

The major sources of information about child malnutrition are the surveys that were carried out in 1983, 1992, 1998 and the 2000 Demographic and Health Survey. According to those surveys; the prevalence of stunting for the nation as a whole was 59.8% in 1983, 64% in 1992, 52% in 1998 and 51% in 2000. The data showed that the incidence of stunting remained high from 1983 to 2000. This high prevalence of stunting in this country could be associated with long-term factors such as poverty, frequent infections and poor feeding practice.

Child feeding practices can overcome or enhance malnutrition. Exclusive breast-feeding for the first four to six months of a child's life generally enhances its nutritional levels, although the early introduction of supplements may undermine any benefits gained. The 1998 Health and Nutrition Survey contains data on breast-feeding pattern in Ethiopia. The survey result showed that the proportion of children who

were being breast-fed was higher in Amhara regions (95 %) whereas the lowest rate was observed in Addis Ababa (70%), CSA (1999). It was also found in the survey that only 32.8 %of children aged 0-59 months were reported to have been put to breast within less than an hour and 42% percent of children were given breast milk, more than 30 % fresh water and 15 %warm water immediately.

The findings of the survey indicate that there is undesirable feeding practices in Ethiopia. Initiation of breast -feeding within less than an hour after birth improves the child-mother bonding and provides the first milk which is the most nutritious food; however, large portion of the children were not given breast milk but- pre lacteal foods. However, the practices of giving pre lacteal foods to newborn children will lead to the risk of malnutrition and diarrhea.

3.3 Characteristics of Study Population

3.3.1 Mother's Characteristics

The age of the mothers ranged from 15 to 49, with the mean age of 28.52 years. Table3.1 presents the age of mothers at five years interval. Maternal education, presented as level of education attained number of years of schooling in four categories: those who never attended schools (no education) constitute 79.7%, primary (1-6) 12.8%, those who started but did not complete secondary education (8-12) 5.2% and those who completed secondary schools or higher 2.4% respectively. Majority of women had no education as shown in Table 3.2. Mother's religion is presented in Table 3.3. The main religions reported were Orthodox (43.2%), Muslim (38.1%), Protestant (14.7%) and other (4%) respectively.

Very small proportion (only 0.9 %) of the women reported their marital status as single and 95% as married, with the rest divorced or widowed. Most of the mothers had lived in rural areas (84%) and the remaining 16 % were living in urban centers.

For 19.7% of the women the index child was their first birth, for 17% it was the second and for 14.1% it was the third, for 21.4 percent it was the fourth or fifth, and for the remaining 26.9% the index child was their sixth or more birth (Table 3.1).

Table 3.1 Distribution of Women by Selected Characteristics

Age	Number of women	Percentage
15-19	386	6.6
20-24	1,376	23.7
25-29	1,640	28.2
30-34	1,137	19.5
35-39	856	14.7
40-44	234	5.7
45-49	93	1.6
Total	5,825	100%
Level of education		
No education	4,642	79.7
Primary	764	12.8
In complete secondary	300	5.2
Complete secondary or higher	137	2.4
Total	5,825	100.1%
Religion		
Orthodox	2,519	43.2
Muslim	2,219	38.1

Protestant	856	14.7
Other	431	4.0
Total	5,825	100%
Parity		
1	115	19.7
2	1,018	17.0
3	824	14.0
4-5	1,245	21.4
6+	1,588	26.9

Source: the 2000 Ethiopia Demographic and Health Survey

3.3.2 Child's Characteristics

A total of 5,825 children were included in the study. Children under six months of age constituted 16.8%, those between 6 and 11 months of children were 16.2% and 67% were between 12-36 months of age (Table 3.2)

9 out of every ten of the index children were born at home, the remaining 10% were born at a Hospital/Clinic (Table 3.3)

Table 3.2 percentage distribution of age of Children

Age	Number	Percent
0-5	979	16.8
6-11	944	16.2
12-36	3902	67.0
Total	5,825	100

Source: the 2000 Ethiopia Demographic and Health Survey

Table 3.3 percentage distribution of children by place of delivery

Place of delivery	Number	Percent
Home	5,240	90
Hospital/Clinic	585	100
Total	5,825	100

Source: the 2000 Ethiopia Demographic and Health Survey

3.4 Child Feeding

3.4.1 Breast -feeding

The practice of breast-feeding is almost universal in Ethiopia. Nearly 81% of children aged between 0-36 months were being breast-fed at the time of the survey. Out of the study children about 91 % between age 0 and 11 months were breast-feeding, 82% were breast feeding, between age 12 to 23 months while 68% of children between 24 and 36 months of age were breast feeding at the time of the survey(Table3.4). The newborn child should be put to the breast immediately after birth in order to provide the child with colostrum. Delaying the initiation of breast feeding increase the likelihood that a child will not receive colostrum instead prelacteal fluids (Haggerty, et al., 1999).

The provision of colostrum to new-born children can protect the neonates against certain early life diseases (Ezumezu,1993 as cited in Kalu. 1997). However more than fifty percent (53.2%) of children were not fed colostrum. Only about forty seven percent (46.8%) of children were given colostrum. This reflects that greater portion of

Children were getting highly nutritious and anti infectious disease food, thus, this might not expose the child to malnutrition and infectious diseases.

Breast milk improves the health and nutritional status of children and children should be breast-fed exclusively for the first six months of age. World Health Organization (WHO) estimates indicate that one million death a year could be prevent if all children were breast-fed for the first six monthss after delivery (Kalu 1997). However, out of the study children aged 0-5 months, about 56% were being given foods other than breast milk, contrary to recommended child feeding practices. On the other hand, breast milk alone is not sufficient to maintain the rapid growth and development of children, after six months, that is, complementary foods in addition to breast milk, are recommended from the age of 6 months onwards. In this study, fewer than fifty percent (42.5) of all children 6 to 9 months were given complementary foods.

3.4.2 Bottle Feeding

The practice of bottle feeding is dangerous to a child's health, and is not recommended at any age for children, particularly in developing countries because of the potentially adverse effects of contamination from water, utensils, and hand during preparation and storage of formula and other bottle-feeds, and the potential for over-dilution of instant formula with water, rendering bottle-feeding nutritionally inadequate (Haggerty et al., 1999). However, about eleven percent of children out of the study children age 0-36 months of aged were bottle-fed.

Though breast milk is regarded as an ideal feed for children, about twenty percent (19.8%) of children were not breast-fed throughout the ages from 0-36 months at the time of the survey. The common reasons for not breast-feeding include attainment of weaning age, that the mother became pregnant or mother ill and various reasons were given by the rest of the respondents as shown in Table 3.8

Table3.4 percentage of currently breast feeding

Age (months)	No	Yes	Total number of Children
0-11	9%	91%	2175
12-23	21.6%	78.4%	2296
24-36	32.3%	67.7%	1296

Source: the 2000 Ethiopia Demographic and Health Survey

Table 3.5 Percentage distribution of reasons for stopping breast-feeding

Reasons	Number	Percent
mother ill	122	2.1
child ill/weak	24	0.4
nipple /breast problem	17	0.3
not enough milk	14	1.4
mother working	62	1.1
child refused	80	1.4
weaning age	372	6.4
became pregnant	274	4.7
start to use contraceptive	5	0.1
others	25	0.41

Source: the 2000 Ethiopia Demographic and Health Survey

Chapter Four

Correlates of Child Feeding Practice

4.1 Social-Demographic Characteristics and Child Feeding Practices

4.1.1 Mother's age, Birth Order and Place of Delivery, and Time of First Breast Feeding

The timing of the initial breast-feeding among newly born children according to whether children were breast-fed immediately after birth (less than an hour) which represents the optimal practice is examined according to demographic variables (age of mother, birth order of child and place of delivery.

The child should be put to the breast immediately after birth in order to provide the most important first milk (colostrum) for a child, but less than fifty percent of newly born children started breast-feeding within less than an hour after birth as indicated in Table 4.1 The study found that there was significant association (x^2 = 17.761, P= 0.007) between the initiation of breast-feeding and age of mother even though the practice show no apparent pattern by age mother.

There is significant association between birth order of a child and first time breast feeding practice in which (x^2 = 13.103 and p= 0.022) higher percentage of children is reported for birth order 3-5 to initiate breast feeding within less than an hour after delivery even though great variation is observed between birth order and time of first breast feeding (Table 4.1). This finding is similar to the findings of the study made by

Haggerty et al., 1988. Older mothers breast-feed immediately after delivery compared with younger mothers.

Place of delivery appears to have no significant effect on the time to start breast-feeding after delivery (Table 4.1). About half of the mothers who delivered at a health facility start breast-feeding within less than an hour of delivery, and about the same proportion of those who delivered at home did so.

Table 4.1 Percentage Distribution of children time of by iniation breast-feeding by socio-demographic characteristics of mother

Characteristic	Time of first breast feeding			x^2	p-value
Age	<1 hour	≥1 hour	Total number of child		
15-19	42.8	57.2	362		
20-24	48.0	52	1,222		
25-29	50.9	49.1	1,496		
30-34	51.3	48.7	1,012	17.761	0.007
35-39	48.7	51.3	770		
40-44	41.6	58.4	320		
45-49	51.6	48.4	93		
Total	48.9%	51.10	5,275		
Birth order					
First birth	44.5	55.5	1014		
Second birth	49.2	50.8	925		
Third birth	51	49	749	13.103	0.022
4-5 birth	51	49	1,134		
6-7 birth	50.4	49.6	825		
8^+ birth	47	53	628		
Total	48.9	51.1	5,275		
Place of delivery					
Home	48.8	51.2	494		
Hospital/Clinic	49.9	51.1	499	0.216	0.642
Total	48.9	51.1	5,193		

Source : Computed by the Author from the 2000 Ethiopia Demographic and Health survey.

4.2 Demographic and Socio-Economic Characteristics the Mother and Bottle-Feeding Practices.

4.2.1 Mother's Age, Birth Order, Mother's Place of Residence, Place of Deliver and Mother's Education.

Table 4.2 shows the percentage of children bottle-fed by mother's age. Bottle-feeding practice shows statistical with mothers age significant (x^2= 41.018, P=0.000). The percentage of children bottle-fed was highest among children born to mothers of 15-19 years of age. This is possibly explained by the fact that younger mothers tend to have less expertise in child care and feeding than older women.

Percentage of bottle-fed children by birth order has shown statistically significant relationship. The prevalence of bottle-feeding is more prevalent among children of birth order one followed by those of second birth order. The prevalence declines with increasing birth order. This finding is supported by a study in Nigeria found that the first and the second born children were receiving more infant formula than children of higher birth order (ONI, 1996).

In this study, place of residence (Urban/Rural) was significantly associated with bottle feeding practice, and the importance of this variable on child feeding practice in was evident (WHO, 1981), rural women were more likely to breast feed than urban mothers. The need of urban mothers to work away from home. The easily availability of infant formula and milk products at market in urban centers and the higher income and purchasing power of urban mothers could result in early weaning,

The data in Table 4.2 showed that there was higher prevalence of bottle-feeding among children born in Hospital/Clinic (34.1%) than children born at home (7.5%). Place of delivery and bottle feeding practice are significantly associated (P= 0.000). Other studies have also confirmed the association between bottle-feeding and place of delivery.

The distribution of children bottle-fed according to maternal educational attainment also showed significant association (x^2 = 244.088, p= 0.002). The prevalence of bottle-feeding was highe (51.1%) among children born to mothers with secondary education and above compared with those born to mothers with incomplete secondary, primary and no education (25.3%, 13.5%, and 7.4% respectively). Studies conducted in Ethiopia and other countries also support this relationship (Aregai, 2000; Onl, 1996).

Table 4.2

Percentage Distribution of Children using Bottle-feeding with Nipple

Age	Drank bottle with nipple			x^2	P-Value
	Yes	No	Total number of children		
15-19	16.3	83.7	380		
20-24	11.2	88.8	1344		
25-29	11.2	88.8	1620	41.018	0.000
30-34	9.0	91.0	1128		
35-39	8.0	92.0	852		
40-44	4.8	95.2	333		

45-49	3.2	96.8	93		
Total	10.1	89.9	575750		
Place of residence					
Urban	29.7	70.3	890		
Rural	6.5	93.5	4542	441.99	0.000
Total	10.1	89.9	5750		
Place of delivery					
Home	7.5	92.5	5129		
Hospital/Clinic	34.1	65.9	531	375.444	0.000
Total	10	90.0	5660		
Mother's educational attainment					
No education	7.4	92.6	4595		
Primary	13.5	86.5	731		
Incomplete Secondary or higher	25.3	74.7	293		
Complete Secondary	51.1	48.9	131		
Total	10.0	89.9	5750		
Birth order					
First birth	16.4	83.6	1112		
Second birth	10.1	89.9	1002		
Third birth	9.2	90.8	819		
4-5	7.9	92.1	1236		
6-7	6.5	93.5	899	67.420	0.000
8^{+}	6.2	93.8	682		
Total			**5750**		

Source : Computed by the Author from the 2000 Ethiopia Demographic and Health survey.

4.3 Demographic, Socio-Economic and Child Feeding Characteristics, and Nutritional Status of Children Aged 12-36 Months

4.3.1 Demographic Characteristics

4.3.1.1 Sex of Children and Nutritional Status of Children

Table 4.3 shows that female children are a bit more stunted than male children whereas the prevalence of wasting is higher among male children than female children. There was no statistically significant association in the prevalence of stunting by sex of children (x^2 =0.315, p=0.575). This result confirms earlier findings other studies that stunting does not show any statistically significant gender differential (Nigussie, 1994, CSA, 1993 and 1998). The absence of gender difference in child nutritional status may imply that the preferential treatment given to male children is minimal.

4.3.1.2 Birth Order and Nutritional Status

The prevalence of stunting varies by birth order. The relationship between birth order of a child and stunting is significantly associated (Table 4.3). Children of lower birth order have lower percentage of stunting than children of higher birth order. Similar to stunting, the prevalence of wasting does vary with birth order of children. Birth order was also significantly associated with wasting or low weight for height. The higher risk of stunting and wasting among children of higher birth order may be explained by the factor that competition for nutritious diet increases as the number of siblings increase within a household. Nearly fifty four percent are stunted and about 16 percent are wasted. The higher prevalence of stunting than wasting shows that chronic malnutrition is more prevalent than acute malnutrition.

4.3.1.3 Birth Interval and Malnutrition Status

The percentage of stunted children decreases with an increase in the length of preceding birth interval (Table 4.3). Previous birth interval was also associated with the percentage of children stunted, but statistically significant difference was not found between length of preceding birth interval and wasting. The result also indicates that birth interval has more effect on stunting, which is not the case on wasting. The absence or little effect of birth interval may reflect the fact that wasting is mainly a result of acute malnutrition rather than chronic malnutrition. The result of the study confirm previous findings that the prevalence of chronic malnutrition is high in children born less than two years of birth interval compared to children born after birth interval of 4 or more years older (Forste, 1998).

4.3.1.4 Household Size and Nutritional Status

Variation in the level of stunting by household size shows that the nutritional status of children was slightly better among children of households with 1-3 members compared with children of those households with more than 3 members. The findings for wasting also indicate that the percentage of wasted children is lower among children of those households with more 3 members. No significant association was found between nutritional status (for stunting as well as wasting) and household size.

Significant association was found between nutritional status (for both stunting and wasting) and the number of other under-five children. Too large other under five

children in household means more competition among siblings for food and other basic needs (health care and treatment).

Table 4.3 presents the levels of stunting and wasting by rural urban residence. The percentage of stunting is considerably higher in rural areas (57.2%) than in urban areas (34.9%). The prevalence of wasting is also higher in rural areas (16.9%) than in urban areas (9.3%). There were significant differences between both stunting (p=0.000) and wasting (P=0.000) and place of residence (Urban/rural).

The percentage of chronically malnourished children was 53.7% /according to height for age and 15.8 percentage was wasted of children aged 12-36 months of age for Ethiopia as a whole. There is large variation in the prevalence of malnutrition among regions. The most affected regions by stunting were Tigray, Afar and Amhara regions and the regions least affected by stunting were Addis Ababa and Dire Dawa (Table 4.3). The most important reason for the lowest level of stunting in Addis Ababa and Dire Dawa, may be the fact that Addis Ababa and Dire Dawa are by far the economically most advanced regions. Women residing in these regions are urban mothers with comparatively higher literacy and higher income. While mothers in Tigray, Afar and Amhara are predominately rural mothers with little or no education, poorer and less well-educated women rely exclusively on breast-feeding for prolonged periods (Butzet al; 1982 as cited in Helen Ware, 1984). Prolonged exclusive breast-feeding beyond six months of age is not recommended since breast milk is insufficient to properly sustain child growth and development. Delayed supplementation of food along with breast milk after six months results in stunting

(low weight for age); for instance, a study made by Getahun et al., (1998) found that one among many other factors, was prolonged breast-feeding implicated as a risk factor of protein- energy malnutrition (PEM).

4.3.1.5 Maternal Education and Nutritional Status

Table 4.3 shows that mother's education has a significant effect on nutritional status of children. The percentage of children stunted among children of illiterate mother is 57.1 percent compared with only 7.4 percent among children of mothers who have completed secondary or higher education. The prevalence of wasting is also higher among children of mothers with no education (17.0%) than among children of mothers who completed Secondary or higher education (8.6%). Cross-tabulation result indicates that nutritional status of children (stunting P=0.000, and wasting, P=0.000) was significantly associated with maternal education. An important reason for the large influence of education may be that educated mothers are more knowledgeable about appropriate nutrition and sanitation in the household. Other studies found similar result (CSA, 1998, Vinod, 1999).

4.3.1.6 Mother's Work Status and Nutritional Status

Stunting was significantly higher in children whose mothers were working outside the home (Table 4.3). Women in less developed countries spend more of their time in collecting water, gathering fuel woods and working on subsistence agriculture; therefore, they could not have enough time to care and feed their children. This could bring negative effect on the nutritional status of their children.

4.3.1.7 Place of Delivery and Nutritional Status

Proportion of children delivered at health institutions (Hospital/Clinic) is less stunted than those children who were born at home. About 56 percent of children delivered at home were stunted while only about twenty nine percent of children born at health facilities were stunted. This is probably because children of educated mothers are more likely to use health facilities compared to those mothers with no education. Thus, they might make use of the advises of health professionals with regard to caring and feeding of their children properly and adequately.

4.3.1.8 Child Feeding and Nutritional Status

The mother was asked to describe all things to eat and drink that were given to the child during the preceding 7 days and 24 hours. Accordingly, analysis was done of differences in feeding in the last 24 hours by nutritional status of children. Children who received meat, poultry, fish, shellfish, eggs 4 or more times have better nutritional status than children who received these food items less than 4 times. Bivariate analysis also showed that feeding practice (frequency of meals such as meat, poultry, fish, shellfish, eggs) of children had no statistically significant association with child height for age –Z-score, that is, x^2 =5.822; P=0.121. The prevalence of wasting also declines as the number of (frequency) meals given to the child increased. The proportion amongwasting of children who were not given meat, fish, and shellfish eggs is higher (12.8%) than among children who received these foods 4 or more times. There was no significant association between child feeding frequency (of meat, fish, shell, fish, eggs) and wasting.

The child feeding practices (children given meat, fish, shellfish, and eggs in the previous 24 hours) and their nutritional status are associated significantly (x^2 = 43.012, p=0.000). In contrast to stunting, the child feeding practices and wasting are not statistically significant (x^2 =2.584, p = 0.460).

Analysis was also done on feeding of local grains in the last 24-hours. The bivariate findings indicate that there was no association between children feeding practices (local grains given in the for last 24-hours) and child height for-age. The percentage of stunting is high for children who received less than 4 times / day compared to children received made from local grains 4 or more times/day. Similarly, the level of wasting of children who received food made from local grain is higher among children who received less than 4 or more times/day. Child feeding practices (local grain food given in the last 24-hour) and weight-for- height (wasting) was statistically significant.

Findings from bivariate analyses of the association between child feeding practices and weight-for-age, and between child feeding practices weight-for-height are presented in Table 4.3. The child feeding practices (food made from local grains given in the preceding 7 days) had no association with stunting as well as with wast

Table 4.3

Demographic and Socio-Economic Characteristics and Nutritional Status of Children aged 12-36 months

Characteristics	Height for-age-Z score					Weight for height –Z-Score				
	<-2	≥-2	Total number of children	x^2	p-value	<-2	≥-2	Total number of children	x^2	p-value
Sex of child										
Male	53.3	46.7	1810			17.2	82.8	1834		
Female	54.1	50.5	1781	0.244	0.621	14.3	85.7	1809	15.605	0.18
Total	53.3	46.7	3582			15.8	84.2	3642		
Birth order										
First birth	47.3	52.7	673			11.6	88.4	682		
Second birth	51.2	48.8	629			16.6	83.4	638		
Third birth	54.5	45.5	541			15.4	84.6	553	13.069	0.023
4-5 birth	54.8	45.2	768		0.000	16.9	83.1	777		
6-7 birth	60.3	39.7	536			16.4	83.6	548		
8+ birth	56.3	46.3	435			18.7	81.3	445		
Total	53.7	46.3	3582			15.8	84.2	643		
Birth interval										
-Less than 24 months	58.3	41.7	568			17.0	83.0	582		
- 24-48 months	56.4	43.6	1743			17.1	82.9	1777		
48 months	50.7	49.3	594	25.823	0.000	15.4	84.6	598	0.991	0.609
Total	55.6	44.4	2905			16.1	83.3	2957		
Household size										
1-3	49.1	50.9	401				84.8	409	1.819	0.612
4-6	55.2	44.8	1867			15.2	83.8	1888		
7-9	53.5	46.6	1013	5.452	0.142	16.2	83.3	1040		
10^+	51.8	48.2	301			16.7	82.7	306		
Total	53.7	46.3	3582			173	84.2	3643		
						15.8				

Number of other under five children in a house hold										
1	49.0	51.0	1366			13.8	86.2	1388		
2	56.5	43.5	1759			17.3	82.7	1789		
3	58.7	41.3	392	22.693	0.000	14.2	85.8	401	11.527	0.009
4^{+}	47.7	52.3	65			24.6	75.4	65		
Total	53.7	46.3	3582			15.8	84.2	3643		

	<-2	≥-2	Total number of children	x^2	p-value	<-2	≥-2	Total number of children	x^2	p-value
Place of residence										
Urban	34.9	65.1	556			9.3	90.7	559		
Rural	57.2	42.8	3026	43.777	0.000	16.9	83.1	3084	20.721	0.000
Total	53.7	46.3	3582			15.8	84.1	3643		
Region										
Addis Ababa	31.3	68.7	166			6.0	94.0	166		
Afar	63.5	36.5	189			14.1	85.9	191		
Amhara	63.4	36.6	555			13.7	86.3	556		
Oromo	52.8	47.2	767			14.8	85.2	775		
Somalie	58.2	41.8	170			20.0	80.0	210		
Benshangul Gumz	47.4	52.6	251	137.647	0.000	23.9	76.1	259	46.984	0.000
SNNPR	56.1	43.9	512			15.6	84.4	513		
Gambela	42.9	57.1	212			22.6	77.4	212		
Harari	44.7	55.3	190			8.4	91.6	191		
Tigray	65.6	34.4	384			17.7	82.3	384		
DireDawa	33.3	66.7	186			16.1	83.9	186		
Total	53.7	46.3	3582			15.8	84.2	3643		
Last 7 days gave meat, poetry, fish, shellfish, eggs										
0	48.7	51.3	511			12.8	87.2	517		
1	47.2	52.8	360			11.9	88.1	363		
2-3	45.5	54.5	268			10.7	89.3	270		
≥4	28.9	71.1	38	5.822	0.121	10.5	89.5	38	2.584	0.460
Total	46.9	53.1	1177			12.9	87.1	11.85		

Last 24 hours gave meat, poultry, fish, shellfish, eggs										
0	57.0	43.0	2405			24.0	76.0	121		
1	54.2	45.8	277			19.8	80.2	364		
2-3	47.2	52.8	470	43.012	0.000	16.1	83.9	1843	20.423	0.000
≥4	41.9	58.1	430			12.1	87.8	1001		
Total	53.7	46.3	3582			15.6	84.4	3329		

Last 7 days gave local grains										
0	63.8	45.7	120			17.5	82.5	343		
1	54.3	46.8	359			18.4	81.6	38		
2-3	53.2	46.9	1870	1.764	0.622	18.4	81.6	212	2.409	0.491
4	53.1	46.8	994			15.4	84.6	3079		
Total	59.6	40.4	3280			15.8	84.2	3643		
Last 24 hours gave local grains										
0	39.7	63.3	302			12.8	87.2	517		
1	42.1	57.9	38			11.9	88.1	363		
2-3	47.6	52.4	208	6.920	0.0744	10.7	89.3	270	2.584	0.460
≥4	47.4	52.6	3034			10.5	89.5	38		
Total	46.7	53.3	3582			12.9	87.1	1188		

Material education										
No education										
Primary	57.1	42.9	2845			17.0	83.0	2906		
Incomplete	49.7	50.3	469			13.0	87.0	469		
Secondary	32.1	67.9	187	121.372	0.000	7.0	93.0	187	19.879	0.000
Complete										
Secondary and	7.4	92.6	81			8.6	91.0	81		
above	53.7	46.3	3582			15.8	84.2	3643		
Total										
Mother's work status										
At home	47.9	52.1	403			15.1	84.9	0.191	0.662	
A way	56.8	43.2	1881	10.730	0.001	16.0	84.0			
Total	55.3	44.7	2284			15.8	84.2			
Place of delivery										
Home	56.4	43.6	3222							
Hospital/Clinic	28.7	71.3	314	88.559	0.000					
Total	53.9	46.1	3536							

4.4 Multivariate Analysis

4.4.1 Multivariate Results of Bottle Feeding Practices

In the preceding section, chi-square analysis on the practice of bottle-feeding in children aged 0-36 months was analyzed with demographic and socio – economic variables. Place of delivery, maternal educational level and birth order were found to be significantly associated with the practice of bottle-feeding at biviarate analysis level.

In this section, logistic regression has been employed to assess the impact of a set of independent variables on the probability of bottle-feeding practice out comes. The set of variables that were included were mother's age, place of residence, place of delivery, maternal education and birth order.

Table 4.4 presents the result of logistic regression for bottle-feeding out come. For each of the predictor variables, the beta-coefficient (a rough index of magnitude and direction of influence on dependent variables in presented. A chi-square statistics is also presented indicating whether the magnitude of the effect on dependent variable is significantly different from zero. Based on this, place of residence and birth order are not significantly related to the out comes (bottle feeding) although in the earlier cross tabulation there had significant effects.

Controling for maternal characteristics influencing bottle-feeding of the child, the likelihood of child being bottle-fed increases with maternal age moving from age

group 15-19 to 20-24 and from 15-19 to 25-29. The risk ratio (Table 4.4) suggests that having mothers aged between 45-49 years decreases the probability of bottle-feeding for the child. The effect is that mothers aged 45-49 years are less likely to bottle feed their children. The chance of their bottle-feeding their children is reduced by a factor of 0.311 compared with the case of children to mothers aged 15-19 years. The importance of mothers age on bottle-feeding was evident in other studies. The usage of infant formula is more likely to be used by the younger mothers between 21 and 25 years of age (Hull et al., 1985). This is probably the fact that the younger mothers tend to have less knowledge about the importance of breast feeding and less experienced to breast-feed.

From the bivariate analysis, place of birth was statistically significant with bottle-feeding practices (Table 4.2). When this influence is examined by logistic regression analysis, birth that occurred in a hospital were less likely to be bottle-fed even after controlling for other demographic and socio-economic variables. Being born in a hospital/ clinic reduces the likelihood of being bottle-fed. A child born in a hospital is less likely to be bottle-fed the odds ratio being 0.633 compared to children delivered at home. Mothers having contact with health workers would encourage them to breast-feed; delivery at hospital is supportive of breast-feeding (Wini koff, et al., 1981).

The effects of maternal education on occurrence of bottle-feeding practice out come are presented in Table 4.4. The likelihood of the child being bottle-fed decreases with maternal education moving from no education to primary education.

Eventhough the effect of Incomplete and complete level of maternal education had no effect on bottle-feeding, it still shows a negative impact on bottle-feeding practices. As noted here; however, the negative effect of mother's education on bottle-feeding practices was not expected. Some previous studies found that educated mothers are more likely to bottle-feed their children than non-educated mother do (Oni , 1996). But a study by Alemdom (1990) in Ethiopia found that cultural and economic constraints militate against the use of commercial infant foods. The practice of bottle-feeding by mothers may be more related to their capacity to purchase infant formula rather than education.

Table 4.4 Results of Logistic Repression of Demographic and Socio-Economic factors on bottle-feeding practices

Characteristics	B	SE	Sig	Ex (B)
Mother's age				
15-19 years [Rc]			0.0200	1.000
20-24	1.0451	0.3090	0.007	2.8438
25-29	0.5591	0.2356	0.0176	1.7490
30-34	0.2497	0.2132	0.2414	1.2837
35-39	0.0328	0.2206	0.8816	1.0334
40-44	0.1310	0.2305	0.5697	1.1400
45-49	-1.1678	0.4798	0.0149	0.3111
Place of delivery				
Home [Rc]			0.0012	1.000
Hospital/clinic	-0.4579	0.1124	0.000	0.6326
Mother's education				
No education [Rc]		.	0.0095	1.000
Primary	-0.3604	0.1554	0.0204	0.6974

Incomplete Secondary education	-0.1823	0.1574	0.2469	0.8333
Complete Secondary education or higher	-0.1794	17.47	0.3045	0.8358

Source: Computed by the Author from the 2000 Ethiopia Demographic and Health Survey

Note: B- Regression Coefficient

S.E.- Standard Error

RC- Reference category

4.4.2 Multivariate Analysis of Nutritional Status of Children

Separate analysis was done for each of height-for-age and weight for height because each of those two anthropometric measures indicate a different type of nutritional status. Height for-age is an indicator of past nutrition whereas weight for height is an indicator of current nutritional status. The set of factors that emerged in the final step after eliminating less significant factors in logistic regression analysis (back ward elimination method was used) and the p-values less 0.05 are considered as significant as shown in Table 4.5. Among predictor variables, demographic variables (birth interval and number of other under five children in the house hold), socio-economic variables (maternal education level, Geographic variation (Region) and child Feeding practices (meat, poultry, fish, shell fish, eggs given in the last 24 hours) have statistical significant effect on child growth (stunting).

Among demographic factors, birth interval can be used as a good indicator of a child's nutritional status. It emerged as a significant factor that influenced height for age. The probability of occurrence of being stunted decreased by odd ratio of 0.746 moving from children of birth interval of less than 24 months to children of birth interval of 48 months or higher. The spacing of birth interval is important both for child's health and for the health of a mother. Longer birth interval decreases mother's exposure to infection and other diseases and improves child's survival (Gray,1981 as cited in Sandral, et al., 1984). In addition, a child cannot be frequently and properly fed by a mother if there is very close spacing of birth.

Number of other under five children within a household has a significant effect on child growth. Additional number of other under five children increases the likelihood of stunting among children within a household. The analysis of this study indicates that the nutritional status of children of households with no children other than the study child are less likely to be stunted than children from households that have additional children. The likelihood of being stunted increased by odd ratio of 1.305 times moving from households with no or one other under five children to households with two other under five also increased by likelihood of 0.546 and 0.416 moving from households with no or one other under five child to households with two to three and households with four or more other under five children. Too many under five children within a household increases competition between children for scarce household resource such as maternal time, attention, food and clothing, and children of high birth order increases children's exposure to malnutrition (Vinod K., et al., 1999).

The educational level of mother is important because it is a strong factor in influencing child growth. In this study, mixed finding were obtained that the effect maternal education was found to be both negative and positive on nutritional status (child growth), that is, moving from no education to primary education, education was negatively associated with nutritional status, which was not expected, whereas moving from no education to complete secondary to secondary education or higher, education had positive effect on nutritional status of children. The likelihood of occurrence of being stunted decreased by odd ratio of 0.199 from moving no education or higher. Children of mothers with no education are more likely to be stunted than children of more educated mothers. For example, educated mother gave complementary foods more frequently and in more protected, cleaner settings than non-educated mothers did (Guldan, et al., 1993). Better-educated parents are more likely to be better aware of modern nutrition and child rearing (Jelliffee, 1982) whereas low nutritional awareness to be a risk factor nutritional status of a household member (Kogi-Makua, 1992).

Region is closely linked to household environmental condition, such as the availability of safe water, sanitation and electricity, which in turn have been associated with the prevalence of various types of childhood diseases (Majumder 1993. In this study, Region shows a large effect on child growth, children living in Afar, Amhara and Tigray regions are more likely to be stunted than children living in Addis Ababa (Addis relatively has better access to health service, water, electricity, higher rate of literacy). This result is consistent with the previous the 1998 survey

where the highest rate of stunting was recorded in Amhara region (CSA, 1999); and a survey in Ethiopia found that the diet was deficient in calorie vitamin A and ascorbic acid in Tigray and Gondar (Selinus, et al., 1971 as cited in Adam sayles, 2000).

The analysis of the relation between the frequency of feeding (meet, poultry, fish, shellfish and eggs given in the last 24 hours) and the occurrence of stunting showed that after controlling other factors, children who had eaten 4 times or more /per day are less likely to be stunted than children who were not given.

The probability of occurrence of being stunted decreased by odd ratio of 0.683 moving from zero frequency of feeding to 4 times or higher given in the last 24 hours. Feeding children with sufficient amount and adequate number of meals /day improve the nutritional status of children.

The findings on wasting differ from the findings on stunting, and variables such as childbirth interval, number of other under five children within a household, maternal education, Region and the frequency of feeding had significant effects on stunting whereas all these and others variables had no effect on wasting. The lack of effects of those variables may reflect that wasting is primarily the result of acute malnutrition rather than chronic malnutrition.

Table 4.5 Result

of Logistic Regression of Demographic and Socio-Economic Factors on height for-age (stunting).

Characteristics	B	SE	sig	Ex (B)
Birth order				
< 24 months [Rc]			0.0089	1.000
24-47 months	0.0191	0.0757	0.8005	1.0193
≥ 48 months	-0.2928	1.0001	0.0034	0.7462
Number of other under five children in a Household				
0-1 [Rc]			0.244	1.000
2	0.2663	0.1262	0.0348	1.3051
3	0.4359	0.1573	0.0056	1.5464
>= 4	-0.8772	0.1357	0.0055	1.4159
Maternal education				
No education [Rc]			0.0019	1.000
Primary	0.7423	0.2303	0.013	2.1008
Incomplete secondary	0.0786	0.2860	0.7834	1.0818
Complete secondary or higher	-1.6130	0.5750	0.0050	0.1993
Number of meals	-0.2185	0.1455	0.0450	1.000
Given in the last 24 hours (meat, fish, shellfish, poultry, eggs)	-0.0246	0.1243	0.0105	1.2442
0 [Rc]	-0.3810	0.1274	0.000	1.0249
1			0.0028	0.6832
2-3				
>= 4				

Region	B	SE	Sig	Ex (B)
Addis Ababa [Rc]			0.000	1.000
Afar	0.5223	0.2423	0.0311	1.6859
Amhara	0.3967	0.1263	0.0017	1.4870
Oromia	0.0086	0.1255	0.9451	1.0087
Somalie	-0.1572	0.3889	0.6860	0.8545
Benshangul	-0.2278	0.1703	0.1810	0.7963
Gambella	-0.0166	0.1514	0.9125	0.9835
SNNPR	-0.0490	0.2532	0.8465	1.0502
Harari	-0.4121	0.2270	0.0696	0.6623
Tigray	0.5129	0.1375	0.0002	1.6702
DireDawa	-0.7169	0.2126	0.0007	0.4883

Source: Computed by the Author from the 2000 Ethiopia Demographic and Health Survey

Note: B- Regression Coefficient

S.E.- Standard Error

RC- Reference category

Chapter Five

Conclusion and Recommendation

5.1 Conclusion

In general, the objectives of the study were to identify demographic and socio-economic factors associated with child feeding practices. The study also examined the relationship between demographic, socio-economic and child feeding practices, and nutritional status of children aged 0-36 months. Data from the 2000 Demographic and Health Survey is used and 5825 children were involved in the analysis. Descriptive statistics was used so as to summarize the data. Bivariate and multivariate analyses were also employed to identify variables, that are thought to be important correlates of child feeding practices and nutritional status of children.

The dependent variables are child feeding practice outcomes (time of breast feeding and bottle feeding practice) and chronic or stunting level of nutritional status of children (height -for –age). The independent variables for this study include mothers' age, place of residence, birth order, birth interval, sex of the child, household size, number of under five children within a household, region, mothers' work status, mothers' education, place of delivery and child feeding (the types of foods given in the last 7 days and number of meals given in the last 24 hours).

The study found that nearly eighty one percent of children out of all index children aged 0 – 36 months were breast-feeding at the time of the survey. The prevalence of breast feeding practice varied with age of a child. Among the study children, about ninety one percent of the children between 0 – 11 months, 78.4% and 67.7% children aged between 24 and 36 months were being breast fed respectively during the time of the study. The first breast milk is an ideal food for the newly born child but in this study only about 47% of children were fed colostrums. It is also recommended that a child should be exclusively breast fed for the first 4-6 months of life and around six months the child should be introduced to complementary foods along with breast milk; however, in this study, less than fifty percent (42.5%) children aged 6 to 9 months were receiving complementary foods.

At bivariate level of analysis, predictor variables such as mother's age, place of residence, maternal education, and birth order were found to have statistical significant variation on the dependent variable, that is bottle-feeding practice. The prevalence of bottle feeding is more prevalent among children born from young mothers and children born of the first and second birth order, that means, prevalence of bottle feeding declines with increasing birth order. Place of residence (Urban and non-urban) is associated with differences in the practice of bottle-feeding. Urban mothers and mothers who worked away from home are more likely to bottle feed their children than their of rural and non-working mothers counterparts. Higher percentage children of educated mothers were also found to be bottle fed than those born from less educated mothers. Place of delivery was statistically significant with bottle feeding practice outcomes. More children delivered in Hospital/clinic were bottle fed

than those delivered at home (34.1% Vs. 7.5%) and the prevalence of bottle feeding was higher among children born to mothers with secondary or higher education compared to children born from less educated mothers. Bivariate analysis was also done for time of first breast feeding (initiation of breast feeding) and mothers' age and birth order were statistically significant with time of first breast-feeding.

At multivariate level of analysis, logistic regression has been used to examine how sets of factors are related to bottle-feeding practice outcomes. Consequently, mothers' age, place of delivery and mothers' education continue to be as principal determinants of bottle-feeding practices. Maternal age is significantly associated with bottle-feeding practices. Mixed results were found. Younger mothers are more likely to bottle feed their children than older mothers do. Logistic regression analysis found that mothers in the age group between 20-24 years were found to have positive association with bottle-feeding practices while mothers aged between 45 – 49 years appeared to be negatively associated with practice of bottle-feeding.

Place of delivery and maternal education were also found to be negatively associated with bottle-feeding outcomes. Being born in a Hospital/clinic reduces the risk of the probability of being bottle-fed. Maternal education at bivariate analysis was significantly associated with bottle-feeding. The logistic regression model also selected primary and incomplete secondary education of mothers as causes of bottle-feeding practices, and it reduces the odd bottle-feeding practices. But secondary or higher education of mothers had no significant association with bottle-feeding. The forward hypothesis was that as maternal education increases, the practice of bottle-

feeding increases. The result was found in contrast to the hypothesis that maternal education was negatively correlated with bottle-feeding. In some previous studies, increasing years of education found to be associated with higher bottle-feeding practices. Contrarily, in this study, education of mothers has shown a significant negative effect on the use of bottle-feeding. Primary and incomplete secondary level of maternal education significantly decreased the likelihood of bottle-feeding of children. The completed or higher level of mothers' education had a negative impact on bottle-feeding practice outcomes though the relationship was not significant. This non-significant effect of completed or higher education on bottle-feeding may be the fact that the small number of women who completed secondary or higher education among the respondents.

In this study, the second dependent variable is chronic malnutrition or stunting (height-for-age). In addition to stunting, wasting (weight-for –height) was also analyzed to see what happened the nutritional situation of children just immediately before the survey. Separate analysis was done for each of height-for-age and weight-for-height. Bivariate and multivariate analyses were carried out for both height-for age and weight-for height.

At the level of bivariate analysis, among demographic variables (birth order, birth interval, number of order under five children within a households, socio-economic variable (maternal education, place of residence, region, place of delivery and child feeding (last 24-hours given meat poultry, fish, shell fish eggs) were found to have statically significant with height-for-age. Fewer independent variables were found

statistically associated with weight-for-height than height-for-age. These independent variables which were associated with weight-for –height include birth order, number of other under five children, mother's education, region, place of residence, child feeding (last 24-hour gave meat, poultry, fish, shell fish, eggs).

At the level of multivariate analysis, logistic regression (backward step-wise logistic regression strategy) at 5% level of significance was used to select the most important correlates on nutritional status of children. All independent variables were included at this stage of regression analysis whether they were found statistically significant or not significant at the level of bivariate analysis.

Separate analysis was also done at logistic analysis level for each of height-for-age (stunting) and weight for height (wasting). Consequently, birth interval, number of other under five children, mother's education, region, child feeding practice (the last 24-hours given meat, poultry, fish, shellfish- eggs) were found to be correlated with height-for age whereas no predictor variable was not found to be correlated with weight-for-height (wasting) at the level of logistic regression analysis.

Birth interval is among the most significant causes of stunting (height-for-age). Longer birth interval reduced odds of being stunted. Children being born after 48 months or higher are less likely to be stunted than children born less 24 months of birth interval. Children born after longer birth interval (48 months) are less likely to stunted than children born after short birth interval (24 months) was forwarded as hypothesis. The hypothesis is accepted by the result that long birth interval reduced

the level of stunting. Studies in the past found that lengthening of birth improves the nutritional status and health of children.

In households where there are many other under five children, the provision of adequate and quality of nutritious foods and health care will not be possible mostly by many of those household who have scarce resources and this may increase more competition among children in such households. In this study, the size of other under five children are found to be negatively correlated with nutritional status of children. It was forwarded as hypothesis that as number of under five children within a household increases, the risk of child malnutrition increases. The hypothesis was found to be accepted by the result that households that have additional under five children other than the study child increase the risk of stunting (height-for-age). Sex of the child variable was also proposed as hypothesis; however, the result showed that the sex of the child had no statistically significant effect on stunting.

Controlling other maternal characteristics, maternal education has a positive significant effect on child feeding practices and on the height for-age. Lower height for-age-z score appeared to occur significantly in children of mothers with no education compared with children of mother with completed secondary or higher education. This is mainly related to the fact that education increases mothers' knowledge, their ability to make use of the health care system and the effective use of the household's resource. As education of mothers increases, the risk of malnutrition declines was one of the forward hypotheses. Thus, the result was found in line with the expectation and the hypothesis was accepted.

Similar to other studies, the prevalence of undesirable feeding practices especially feeding children inadequately and less frequently found to be an important cause of poor growth. Improper feeding lowers significantly height-for-age z-score for children who received less than 4 times /day. Nutritional status is fundamentally determined by amount and quality of food given to child. This study found that higher frequencies of feeding of children were found to have negative effect stunting. Among the hypotheses, as number of meals increases, the risk of malnutrition reduces, was forwarded as hypothesis and the hypothesis was accepted by the result that increasing frequency meals reduced level of stunting.

One finding of the study was that the region was another predictor of malnutrition and the region has shown significant association with nutritional status of children. Accordingly, children living in Addis Ababa experience relatively less nutritional problem than children living in Afar, Amhara, and Tigray regions. This may be related to the fact that children of mothers living in Addis Ababa could have better access to health services, information and high rate of literacy. Thus, this might have enabled mothers to feed and care for their children properly.

5.2 Recomendation

The following are the recommendations for prevention and alleviation of undesirable child feeding practices and child malnutrition:

1. The study revealed that maternal education was found to have a statistical significant effect on bottle-feeding practice outcomes. Maternal education reduces

the practice of bottle-feeding. Besides, maternal education is an important variable associated with height –for-age (stunting) that reduces the likelihood of being stunted children. With increased level of education, mothers are more likely to feed and care for children properly. This suggests that an education of mother can play a significant role in alleviating the practice of undesirable child feeding practices and child malnutrition. Therefore, educating of mother is an important strategy of preventing and alleviating undesirable child feeding and child malnutrition.

However, it demands great effort to change attitude towards education of mother in the society.

2. The results of the regression analysis also showed a strong association of birth interval with height-for-age even after controlling the effects of other demographic variables. The lengthening of birth interval minimizes the problem of child malnutrition. This result stresses that the importance of longer birth interval in reducing child malnutrition through birth control.

Therefore, this situation requires an effective integrated family planning program with nutrition education in order improve child's health and nutrition through effective and active participation of policy makers and non-governmental organization.

3. The study revealed the prevalence of a large variation in chronic malnutrition or stunting between Addis Ababa and other regions (particularly Afar, Tigray and Amhara) were observed. This may be related to the fact that more social and health services are better concentrated in Addis than other regions. Reducing magnitude of undesirable child feeding practices with appropriate measure is of great importance in reducing the problem of child malnutrition. Therefore, further research is required to investigate the root causes of undesirable child feeding practice and malnutrition in different regions of the country.

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Declaration

I, the undersigned declare that this thesis is my original work, has not been presented for a degree in any university and that all sources of the material used for this thesis have been duly acknowledged.

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Signature _____

Place and date of submission

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