# CHILD CARE PRACTICES IN HOUSEHOLDS WITH MALNOURISHED CHILDREN AND THOSE WITH WELL NOURISHED CHILDREN IN A SLUM AREA OF ADDIS ABABA, ETHIOPIA



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8/99

## DECLARATION

I, **GUGSA ABATE TESSEMA** hereby declare that this thesis is my original work and has not been presented for a degree in any other university.

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Date 7 September 1998

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# DEDICATION

This thesis is dedicated to my wife, Meseret Seife, and our son, Bisrat Gugsa.

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# ABBREVIATIONS

ACCN\SCN.....Administrative committee on coordination-Subcommittee on Nutrition

ANP.....Applied Nutrition Programme

CSA.....Central Statistical Authority

ECSA.....East, Central and Southern Africa (Food and Nutrition Cooperation)

EHNRI.....Ethiopian Health and Nutrition Research Institute

HFA.....Height-for-age

NCHS.....National Centre for Health Statistics

NGOs.....Non-Governemtal Organizations

PEM.....Protein Energy Malnutrition

SD.....Standard deviation

UNU.....United Nations University

WFA.....weight-for-age

WFH.....Weight-for-height

# DEFINITIONS

**Dependency ratio...** The proportion of people who are below fifteen and above sixty five years of age in the study households.

**Household...** All the people who had lived together for more than three months and operated as a unit, including such members as unrelated servants and relatives who share food from the same pot and share the same sources of livelihood.

**Household size...**The total number of people living in a household during the study period, including unrelated servants, labourers and relatives. This does not include guests and residents in transit.

***Injera*...**A pan cake like leavened bread. The commonest Ethiopian traditional fermented food made from cereals flour.

***Injera fetifit*...** *Injera* mixed with sauce made from legumes flour or meat

***Kebele*...**The lowest administrative unit in the urban context by which urban dwellers are administered.

**Malnourished child...** In this study, a malnourished child is a child whose weight-for-age index is below -2 Z-scores of the National Centre for Health Statistics (NCHS) reference.

**Malnourished household...** A household in which at least one of the children less than three years of age was under weight (below -2 Z-scores).

**Malnutrition...** For the purpose of this study it is defined as a state of nutrition where the weight-for-age index is below -2 Z-scores of the National Centre for Health Statistics (NCHS) reference.

**Slums...**Areas in a city or town where Poor environmental sanitation, badly-built and overcrowded houses/buildings as well as low socio-economic community group are found.

**Well nourished household...**A household in which none of the children less than three years of age was underweight (weight-for-age) below -2 Z-scores.

**Well nourished child...** For the purpose of this study, a well nourished child is defined as a child whose weight-for-age index is above -2 Z-score of the National Centre for Health Statistics (NCHS) reference.

***Woreda...***An administrative unit equivalent to a district.

## ABSTRACT

Child care practices play a great role in the prevalence of childhood malnutrition in the slum environments. In a cross-sectional study carried out in four purposively selected slum kebeles of Addis Ababa, nutritional status of 758 children aged 6 to 36 months was measured and subsequently classified into malnourished and well nourished group. Child feeding practices of systematically selected mothers of the two groups of children were compared with the view of identifying practices that contribute to child nutrition insecurity in the area.

The study established that majority of the mothers in both groups of households had initiated breastfeeding (i.e 99.5% in malnourished and 98.4% in the well nourished group ($p>0.05$), and no significant difference was found either in the median or mean duration of breastfeeding. Significantly more mothers (23.9%) in the malnourished households exclusively breastfed beyond four months of age than those (7.3%) in the well nourished households ($p<0.05$).

At 4-6 months of age, a significantly higher number of mothers in well nourished households (58.8%) had started supplementation than those in malnourished households (42.7%) ($p<0.001$). The mean age of commencement of supplementation was significantly higher in the malnourished group (4.9 $\pm$2.9 months) than in the well nourished group (4.2 $\pm$2.4 months). Significantly more mothers ($p<0.01$) in well nourished households (14.1%) fed enriched porridge than those in the malnourished households (5.2%). The mean feeding frequency was significantly higher in the well nourished group (4 times) than in the malnourished group (3.4 times) ($p<0.01$). More mothers in the malnourished group (29.6%) practised bottle feeding of porridge than those in the well nourished group (3.3%) ($p<0.01$).

Food withholding habits and the prevalence of immunization had no significant influence on child nutrition. However, morbidity status of the child's mother, health facility based management of children with diarrhoea had a significant ($p<0.05$) bearing on nutritional status of children. Also, stagnant water in the compound, child waste inside the house, storage of cooked foods for more than 24 hours ($p<0.001$), poor handling of food ($p<0.001$) and drinking water ($p<0.001$), and serving food with dirty hands ($p<0.05$) had a significant bearing on child nutrition.

It is concluded that exclusive breastfeeding beyond four months, feeding low quality diet with a frequency of less than four times and giving porridge with feeding bottle and failure to take children with diarrhoea to hospitals/clinics are the principal risk factors associated with the nutritional status of children in the study area. Moreover, the presence of stagnant water in compounds and faecal matter inside the house, prolonged holding of cooked foods, poor handling of drinking water and foods were other areas of concern which had deleterious effects on the nutritional well being of children. Demonstrative and sustained nutrition and health education focusing on appropriate child feeding, household hygiene and sanitation practices is recommended together with initiation of income generating projects with a view of empowerment of those families whose monthly income is below 251 *Birr*.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Definition of Child Care

Child care practices. as defined by Engle (1996) refers to the behaviours of the caregivers in the households which translate food security and health care resources into a child's growth and development. This mainly includes behaviours like breastfeeding and determining when a child is ready for supplementary feeding, preparing high quality complementary foods and the level of feeding frequencies. The other aspects that the concept of child care encompasses are health seeking practices which in turn include taking a child to health services for immunization and an ill child for treatment. and encouraging child to eat during the event of illness rather than withholding food. As Zeitlin (1991) explained. care giving behaviours can go upto providing shelter. supervision to child's toilet. protecting from exposure to pathogens. and providing a relatively safe environment and a clean place for a child to play.

## 1.2 Statement of the Problem

In many developing countries urbanization is taking place at a very rapid rate. Since cities are often seen as an escape from the poverty of rural areas (Engle and Menon, 1996), usually the rural poor migrate to the cities looking for employment opportunities (Judit, 1987).

Slums (low grade and congested residential areas) have emerged in cities because of the rural-urban migration. Popkin and Bisgrove (1988) estimated that between 30-60% of urban residents in developing countries live in slum settlements. The World Bank survey of 1978, revealed that, 79% of the population of Addis Ababa lives in congested slum areas (Harpham *et al.*, 1988).

Studies which address nutritional problems have found that malnutrition poses a serious health problem in the slums (Khanjansthiti and Wray, 1970; Jha, 1985; Basta, 1977). One study in a Nairobi slum by Waihenya *et al.*, 1996, where 86.2% of the preschoolers were reported to have been stunted, provides a good basis for understanding that slum children are most vulnerable to malnutrition. Hofvander and Eksmyer (1970), who found about a 3% prevalence of severe PEM, reported that PEM is the main nutritional problem for young children in the slums of Addis Ababa.

The high occurrence of malnutrition in the urban slums is mainly due to the fact that such areas constitute an environment that can negatively influence child health. For example, life in a slum area is mainly characterized by over-crowding, poor housing conditions, poor drainage and lack of proper sanitation (Manciaux, 1984). Each of these conditions may, in some way, have negative effects on child care since such environments entail risk of infections and parasitic infestations (Herpham et al., 1988).

Mothers in urban slums are often forced to be on jobs to complement the family income. This may have implications on child care practices as they may start early supplementation and/or stop breast feeding and leave their children in the custody of siblings. High maternal morbidity which is known to influence child care and increase nutritional risk in children (Engle and Menon, 1996; Winkvist, 1995) is also particularly common in the slums (Herpham, 1988). Relatively large family size, low level of education, single motherhood as well as low income and unemployment are common features among families in the slums (Manciaux, 1984; Harpham *et al.*, 1988). These may influence the provisions of adequate care to children.

Poor economic status, some socio-cultural factors, infection and parasitic infestation, inadequate child care practices which may be influenced by one or a combination of the first three factors have been implicated to be the factors which cause malnutrition. The above three groups of factors have been much researched upon while in recent years child care has received increased attention. Despite many nutritional studies in the urban and rural areas of Ethiopia, little is known about attributes of child care practices that are associated with the nutritional status of young children in the urban slums. This study, therefore, was intended to demonstrate the child care practices that are contribute to nutrition insecurity among infants and young children in slum areas of Addis Ababa.

## 1.3 General Objective

The main objective of this study was to establish risk factors that influence the nutritional status of children by comparing child care practices between households having well nourished children and those with malnourished children in slums of Addis Ababa.

## 1.4 The Following Specific Objectives Were Formulated:

1. To determine the nutritional status of children (6-36 months of age) in an urban slum area of Addis Ababa and identify households with malnourished children and those with well nourished children. THe purpose is stratifying.
2. To determine whether some (selected) demographic and socio-economic characteristics of households, namely, household size, income, per capita calorie and protein consumption, maternal age, occupation and education level as well as dependency ratio, education level of the heads of the household and number of siblings are different or similar between the two types of households. These variables were selected as they are known to influence child care practices.
3. To determine child feeding practices (mean/median duration of breastfeeding, complementation, number of meals per day and method of feeding) of households of malnourished children and those with well nourished Children and subsequently establish whether there is any difference between the two groups of households.

4. To determine the level of sanitation and hygiene behaviours in both types of households and establish whether there is a difference between the two groups.
5. To determine the prevalence of illnesses and establish the morbidity status of children and their caregivers in the two groups of households.
6. To determine the level of health seeking behaviours for children in both groups of households, namely, immunization rates, health facility utilization rates, dietary practices in the event of sickness, and establish if there is any differences between the two groups.
7. To establish child care variables that are associated with the nutritional status of children in the study area.

## 1.5 Study Hypotheses

The data were examined to test the following hypotheses.

1. There is no difference in child feeding practices between households with well nourished children and those with malnourished children.
2. There is no difference in health seeking behaviours between households with well nourished children and households with malnourished children.
3. There is no difference in hygiene related behaviours between households with malnourished children and households of well nourished children.

## 1.6 Expected Benefits

Nutrition Planning and advice to the community need to be grounded in sound information and knowledge of practices that contribute to malnutrition. Therefore, the findings of this study are expected to enrich the knowledge of nutritionists, health personnels and other interested parties in the area of nutrition and provide information to policy makers to take intervention actions to alleviate the prevalence of malnutrition in the slum areas.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1. World View of Malnutrition

WHO estimates that malnutrition was associated with over half (55%) of all child deaths that occurred in developing countries in 1995 (UNICEF. 1998). In many developing countries malnutrition is a common problem among pre-school children. It has been reported to be 30-60% as shown by weight-for-age index (Philip *et al.*, 1981).

In different countries. studies which address nutritional problems have usually found that malnutrition is prevalent in urban slums. For instance, protein-calorie malnutrition at the age of six months has been recorded from the slum areas of Nairobi (Waihenya *et al.*, 1996) and Bangkok (Khanjansthiti and Wray, 1974). A study comparing nutrition and health factors in planned residential quarters with those in urban slums in Manila, Philippines, showed that, in the slums, the frequency of low-weight was five times higher, infant mortality was three times higher, the prevalence of severe and moderate malnutrition and anaemia was twice as high as in the prosperous part of the city (Basta, 1977). In a study in slum areas of Bombay, 10% of pre-school children were found to be vitamin A deficient while 20% were having protein-calorie malnutrition (Jha, 1985). In New Delhi, 40 to 55% of slum children suffer from various grades of malnutrition (Nelson,1978).

## 2.2 Level of Malnutrition in Ethiopia

Like in other developing countries malnutrition continues to be serious public health problem in Ethiopia. According to UNICEF (1998) and Central Statistical Authority (CSA) (1992), the prevalence of underweight, stunting and wasting among preschool children (6-59 months) is 47.7%, 64.2% and 8.0% respectively. The level of stunting is among the highest in the world (UNICEF, State of the World's Children. 1998).

A study conducted among children below 5 years of age in Addis Ababa showed 31.5% underweight and 20.4% stunting (Wolde-Michael and Demeke. 1985). According to CSA (1992) the proportions of underweight, stunted and wasted preschool children in Addis Ababa are 33.3%, 55.5% and 5.1% respectively. Comparing the results obtained in 1985 with the ones of 1992, it was noted that the level of malnutrition in Addis Ababa is increasing, especially stunting which is a direct reflection of chronic poverty.

Jembere (1985) has reported low level of health status and malnutrition among children in *Kebele* 41 which is one of the most congested parts of Addis Ababa. A study undertaken in a slum of Addis Ababa had found a prevalence of severe PEM to be less than 3% and the on set of malnutrition among infants of the slum was earlier and more severely affected as compared with their rural counter parts (Hofvander and Eksmyer, 1970).

The cause of malnutrition varies from country to country depending on the economic, ecological, sociological and other factors. In Ethiopia, the most serious nutritional problems are mainly due to low intake of foods in general.

## 2.3 Child Care Practices and Their Prevalence

### 2.3.1 Breastfeeding and Weaning Practices

The initiation of breastfeeding rates is reported to be above 90% in a range of countries in Africa, Asia and Latin America (Armstrong, 1995).

A study conducted in Cuba by Amador *et al.* (1992) showed that the proportion of infants who exclusively breastfed upto three months of age was 12%. In Srilanka, about 25% of the mothers in urban areas begin giving semi-solid foods after the fourth month and 80-100% of the mothers introduce solid foods by the age of 12 months (Tontisirin and Yamborisut, 1995).

The initiation rate of breastfeeding in Addis Ababa is reported to be 99.2% while the national estimate was 99.8% (Central Statistical Authority, 1992). Late introduction of weaning foods is one of the potentially poor feeding practices among the Ethiopian communities. The Central Statistical Authority (CSA) revealed in 1992 that a very large proportion of infants are exclusively breastfed beyond the recommended age for complementation. Delayed supplementation

makes it difficult to meet energy and nutrient requirements. According to CSA, the median duration of exclusive breastfeeding for Addis Ababa was 7 months where as the national median duration was 7.1 months. The same survey reported that the median duration of general breastfeeding was 25.3 and 25.1 months for Ethiopia and it's capital respectively.

Greiner (1995) recommended that complementation of breast milk should start at six months of age. According to this author, if it started before six months in poor settings, it would probably have a negative effect on the growth of infants. Cameron and Hofvander (1983) suggested that breast milk on its own is sufficient until four to six months of age and infants need additional foods by the age of four to six months to make sure that the young child continues to have enough nutrients including energy and protein. A study in Honduras showed that by six months of age there was no difference in growth rates between those children who received complementary foods at four months of age and those who continued exclusive breastfeeding until the age of six months (Cohen *et al.*, 1994). The researchers thus recommended that complementation should begin at the age of six months.

Studies conducted in Ghana showed that growth of many children improved when breastfeeding on demand continued upto the second year (Brakohiapa *et al.*, 1988). In Burkina Faso, a case-control study

indicated that malnourished children (between 12 to 36 months of age) were more likely to be receiving no breast milk than the adequately nourished children. A study carried out in China found positive associations between nutritional status and extended breastfeeding (between 12 and 47 months of age) (Taren and Chen, 1993). Greiner (1995) also recommends that breastfeeding should be continued up to the second year.

Many authors submit that frequent feeding can improve the dietary intake of young children. For instance, Brown *et al.* (1995) showed that the total daily amount consumed by children significantly increased when the number of meals rose from three to four. Thus, the researchers recommended that children be given at least four meals per day. Mitzner *et al.* (1984) and Cameron and Hofvander (1983) also recommended that children older than six months should be fed four to six times in a day.

### 2.3.2 Dietary Care During Illness

Parental food withholding is considered as one of the factors that reduce food intake of children during illness. Martinez and Tomkins (1995) noted that for centuries, the dietary advice of health providers for treating diarrhoea consisted of food reduction or fasting, and then reintroduction of foods during the recovery period. According to the authors, promotion of this practice was meant as a strategy to avoid the problem of malabsorption, reduce stool volume

and duration of diarrhoea. Martinez and Tomkins (1995), and Necla *et al.* (1988) also observed that the severity of diarrhoea among children who received breast milk was less than those who stopped breastfeeding during diarrhoea. Children with diarrhoea need increased amounts of protein and calories because they can absorb useful quantities of nutrients from the food they ingest.

Currently, however, it is recommended that breastfeeding and/or feeding other foods during episodes of diarrhoea or any other illnesses should be encouraged (Martinez and Tomkins, 1995 and Necla *et al.*, 1988). A study conducted in Turkey showed that a large proportion of parents (78.8%) fasted their babies due to the belief that nutrition would increase the severity and duration of diarrhoea (Necla *et al.*, 1988). According to the same study, 16.4% of parents stopped breastfeeding, while 59% gave diluted cow milk. In Thailand food is withheld from children with diarrhoea until it ceases (Tontisirin and Yamborisut, 1995).

### 2.3.3 Hygienic Practices and Sanitary Condition

It is evident from many studies that environmental sanitation plays an important role on the nutritional status of children. A study conducted in Jamaica, for instance, confirmed that poor housing and poor sanitary conditions adversely affected the nutritional status of children (Powell and Grantham-McGregor, 1985). A similar finding was obtained in india by Gopaldas *et al.*, (1988). It has been

suggested that such an association may be due to the greater frequency of infectious diseases.

Unhygienic feeding techniques can affect the nutritional status of a child. The use of the cup and or spoon is recommended since these utensils unlike the bottle do not pose the risk of contamination (Mitzner *et al.*, 1984). A household study in Peru by Black *et al.* (1995) found that food served with a cup and spoon almost never had high levels of faecal organisms, while same kind of food given in feeding bottles had greater rates of contamination. The practice of the more hygienic feeding with a spoon or cup varies from one community or socio-economic group to another.

Cameron and Hofvander (1983) recommended that freshly cooked foods should be fed to children in order to reduce the problem of contamination by pathogenic microorganisms. The same studies from Peru, indicated that increased duration in storage of cooked foods increases the level of contamination even in foods that initially were free from contamination. The authors suggested that foods that have been kept over night should not be given to children unless they have been stored at refrigeration temperature.

## 2.4 Factors Affecting Child Care Practices and Nutritional Status of Children

Factors which influence child care practices include mother's/caregiver's status of health, education and employment as

well as household size and economic conditions. All these factors in relation to child care and nutritional status of children will be discussed in succeeding sections.

### 2.4.1 Household Size

Large family size are expected to adversely affect nutritional status. Aguillon *et al.* (1982) and Ballweg (1972) found that large family size adversely affected the nutritional status of children. This was attributed to the inability of mothers to provide adequate care for their young children, especially where there was more than one pre-school child in the family. However, in some cases more care may be given to children in large families. Gopaldas *et al.* (1988), for example, reported that toddlers from large families had better nutritional status than those from medium sized or small families. In this study, it was hypothesized that in large families there is a greater likelihood of adult women being available to care for young children. It, therefore, appears that the effect of household size on child care is dependent on the age of caregivers and hence their maturity and the number of children to be taken care of.

### 2.4.2 Maternal/caregiver's Health

According to Engle and Menon (1996) the caregivers health and nutritional status has an impact on the quality of care given to children. Engle (1996) explained that almost half of all women in developing countries have poor health due to low intake of iron and

such condition can reduce caregiver's ability to take care of children. When caregivers are ill, they are less able to give appropriate care to infants and young children. Winkvist (1995) reported that mothers with poor dietary intake, low haemoglobin levels, and low vitamin $B_6$ status spent less time on child care, were less responsive to their infants and use siblings as alternate caregivers. In Kenya, lower maternal calorie intake was associated with less physical contact with young children (Winkvist, A., 1995). Engle and Menon (1996) also noted that mothers with anaemia interacted less often with their infants.

### 2.4.3 Maternal/Caregiver's Education

The level of education, knowledge and beliefs of child caregivers are important determinants of children's growth and development (Engle and Menon, 1996). The importance of the mother's education in relation to the nutrition and general well-being of the child has been emphasized by different investigators. For instance, Engle (1996) argues that education for women is one of the most important resources which enable them to provide appropriate care to their children. She suggested that educated mothers may make better use of health services, provide better child care including feeding, have more hygienic household practices and may have higher status in the family and more control of family resources. Studies in Libya and the Philippines indicated a decreased incidence of malnutrition among young children with an increase in the level of education of

mothers (Popkin, 1980 and Aguillon et al., 1982). Bhuiya *et al.* (1986) and Devdas *et al.* (1980) demonstrated that the number of years of education of mothers had a definite relationship with the proportion of malnourished children and related this to the fact that children's mean daily intake of nutrients increased with the increase in the mothers' education level. Another study by Smith *et al.* (1983) reported that mothers' education were associated with the long term well being of children as shown by height for age.

On the contrary, a study undertaken in urban Libya also showed that illiterate mothers practised breastfeeding for a significantly longer time than those with post-primary education which resulted in poor nutritional status (Bredan *et al.*, 1988). According to this study, education had significant negative effect on the duration of breastfeeding. Studies in Africa indicated that higher level of education of mothers is associated with fewer months of breastfeeding (Armstrong, 1995).

In conclusion, for the most part, increase in maternal and caregiver's education has been linked with improved care practices as well as better nutritional status of children.

### 2.4.4 Maternal Employment

Although maternal employment enhances a household's accessibility to income it may have negative effects on the nutritional status of children by reducing mother's time for child care.

A study conducted in urban Libya reported shorter duration of breastfeeding for employed mothers than that of housewifes (Bredan *et al.*, 1988). Another study carried out in India revealed that all mothers of the most malnourished children worked outside their home (Grewal *et al.*, 1973). Similarly, Abbi *et al.* (1991) and Gopaldas *et al.* (1988) found that the children of working mothers had significantly poor nutritional status than those whose mothers stayed at home.

In contrast, however, a study conducted in peri urban Nairobi did not show any relationship between maternal employment and children's nutritional status (Mwanthi, 1990). In reviewing the available studies, Leslie *et al.* (1988) reported that there was no proven relationship between maternal employment and child nutritional status. Van Esterik *et al.* (1981) has also reported that employment outside the home is not a major reason for not initiating breastfeeding, starting bottle feeding, or terminating breastfeeding. A review of studies on child care and women's work showed that mothers who are not working are better able to ensure frequent meals and to monitor intra household food distribution to ensure that children get their fair share (Leslie et al,1988). According to Engle (1996), multiple demands on caregiver's time for income earning and other workloads are other constraints to child care giving behaviours. On the other hand, mothers who are working outside home may be better able to purchase the more expensive foods for their infants and young children (Leslie *et al.*, 1988).

Therefore, as the above review of literature shows, to date there is no conclusive evidence as to how maternal employment influences child care and nutritional status.

## 2.5 Child care in Urban Settings

Children in slum areas, especially of female headed families are often separated from adult care. This has been explained by the fact that mothers in those slums, have to work outside their place of residence and so have to rely on surrogate mothers or child minders (Khanjansthiti and Wray, 1974).

Harpham *et al.* (1988) also mentions that poor maternal health and malnutrition is particularly common in closely spaced families of slum environments. Thus, many mothers in these areas are found to provide less care to their children.

Decreased breastfeeding, early introduction of bottle feeding and breast milk substitute are common practices in the slums (Harpham *et al.*, 1988). According to Harpham *et al.*, substitutes for breast milk are often given by working mothers and many caregivers in urban areas.

Another observation is that, although, use of health care facilities or immunization coverage is higher for urban areas, it is very low among urban slums of Africa and Asia (Engles and Menon, 1996). It has been noted that time and resources available to the care giver

and educational level of the care giver are the major constraints in the use of health services and timely immunization.

## 2.6 Gaps in Knowledge

Child care practices play a great role in influencing the nutritional status of infants and young children (UNICEF. 1998). Studies that have been undertaken in slums of Addis Ababa have managed to determine the rates of malnutrition. However. attributes of child care practices that contributed to the risk of malnutrition have not yet been studied. Therefore.this study aspires to fill gaps in knowledge by identifying child care practices that have potential risk factors to the nutritional status of children in the slum area of Addis Ababa.

# CHAPTER THREE

# STUDY SETTING AND METHODOLOGY

## 3.1 Study Setting

### 3.1.1 Description of the Study Area

Addis Ababa is one of the fourteen regions of Ethiopia with current population of over two million. of which, according to the 1994 census, 48.4% are males and 51.6% are females. The city of Addis Ababa is administratively divided into six zones which in turn are divided into 28 *woredas* (districts). *Woredas* are subdivided into 305 administrative units called *kebeles*. Each *kebele* has an average population of 5000 people. At zonal. *woreda* and *kebele* level there is a council to administer the affairs of the respective administrative units.

According to the world Bank survey of 1978 (Harpham et al., 1988), majority of the population of Addis Ababa (79%) live in low grade and congested areas. These areas fit into the category of city slum. A slum refers to an area in a city or town where badly -built, old, deteriorated and over-crowded houses/buildings are found.

In 1978, World Bank identified seven *kebeles* as typical slums and the most congested parts of Addis Ababa (Jembere, 1985). An integrated urban development project with a nutrition intervention component operates in three of the seven *kebeles*.

### 3.1.1.1 Population

According to the 1994 census, the population of these *kebeles* is estimated to be 7529, 4879, 9011 and 3293 for *kebele* 31, 34, 44 and 45 respectively. The population composition of the study *kebeles* is heterogenous, various ethnic groups with different languages and cultural backgrounds. Heterogeneity is not only in ethnicity, but also in religion. Majority of the people are orthodox christians (79.8%) and muslims (16.5%) with a few catholics,protestants and others (3.7%) (CSA, 1994).

### 3.1.1.2 Environmental Sanitation

Sanitation in the study area is very poor as there is no sewerage in many parts of these *kebeles*. All the study *kebeles* lack toilets, piped water and garbage collection systems. The houses which are congested are poorly built and many are unfit for human habitation. Many parts of these kebeles are inaccessible by vehicles and can only be approached by narrow footpaths.

## 3.2 Methodology

### 3.2.1 Study Design

This was a cross sectional type of study, comparative in nature, and with descriptive and analytical components.

### 3.2.2 Sampling Frame and Sample Size Determination

The sampling frame was all households in the study area with children between the ages of 6-36 months.

For the purpose of sample size determination, the following statistical formula for comparative studies was used, as recommended by Fisher *et al.*, (1991), .

$$n = \frac{2z^2(pq)}{d^2}$$

Where:

n = the desired sample size for each group

z = the standard normal deviate, set at 1.96, which corresponds to the 95% confidence level, at an alpha level of 0.05

p = the proportion of households with adequate child care practices, since there was no existing data on the proportion of households with adequate child care in the target population, the value of p as suggested by Fisher *et al.* (1991) was taken as 0.5.

q = the proportion of households expected to have inadequate child care practices (q=1-p).

d = 0.1 (the approximate test difference in child care practices between the two groups of households which is significant at an alpha level of 0.05).

Based on this the value of q was determined as:

$q = 1 - 0.5 = 0.5$

Putting the values in the formula, the sample size was calculated as:

$$n_1 = n_2 = \frac{2(1.96)^2 x 0.5 x .05}{(0.1)^2} = 192$$

No allowance for attrition was made as the estimate taken for the proportion of households with adequate child care was maximum (p=0.5). The calculated sample size was taken care of by checking each questionnaire for completeness and consistence immediately after return from interview.

### 3.2.3 Sampling Procedures

The study was carried out in the four *kebeles* without the intervention programme out of the seven *kebeles*. All the four *kebeles* are located in *woreda* 3, and are named *Kebele* 31, *Kebele* 34, *Kebele* 44, and *Kebele* 45. The other three *kebeles* were excluded from the study because it is highly probable that the socio -economic situation as well as child care practices of families in these *kebeles* have been influenced by the existing integrated programme and this may bias the results of the study.

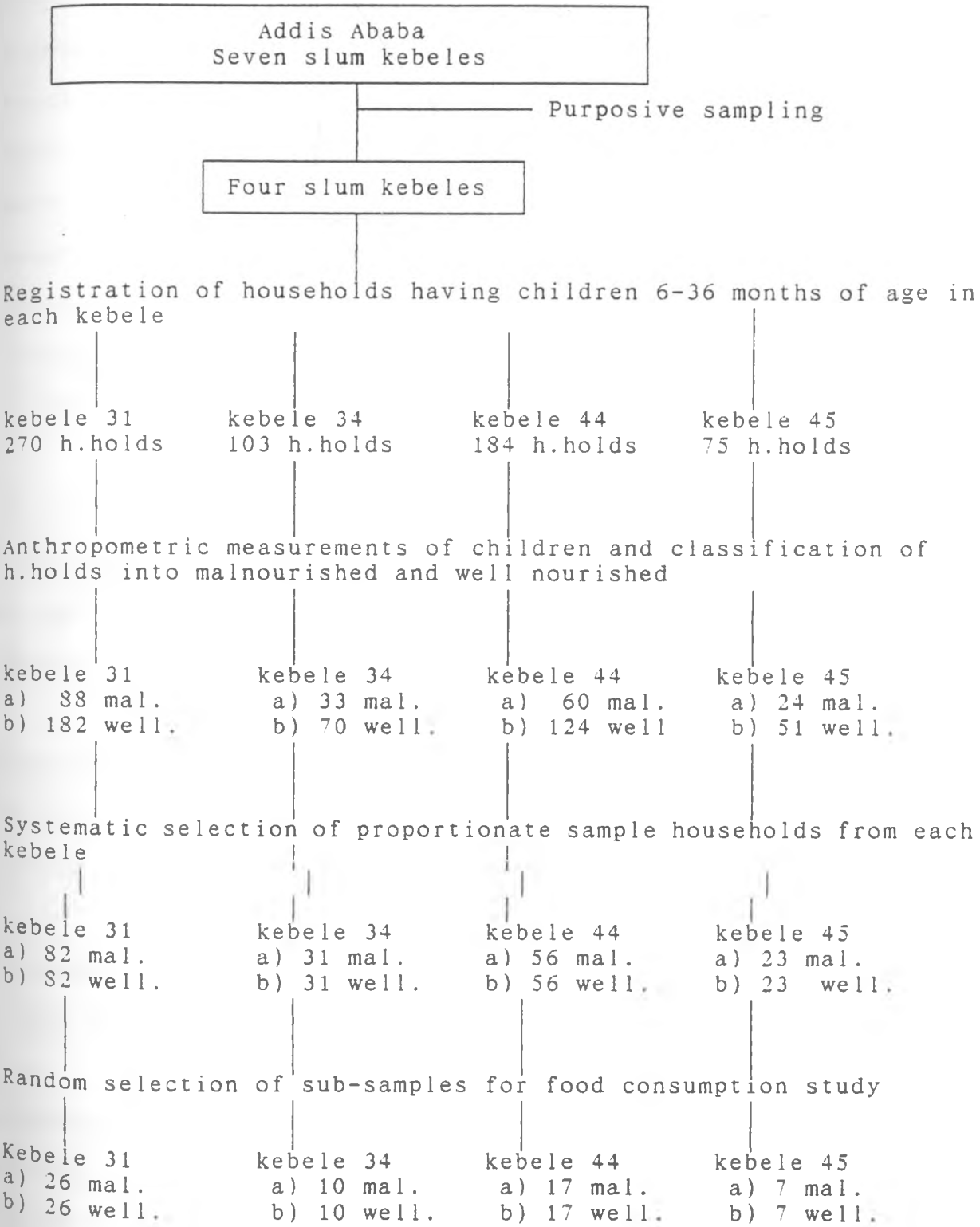
The sampling is schematically presented in Figure 1. A preliminary survey for identification and registration of all households with children of 6-36 months of age was carried out. Six hundred and thirty two households were identified in all the four kebeles. All of these households were given an identification number.

Anthropometric measurements (weight and height), were taken, and the specific age and sex of children of 6-36 months of age were recorded. These were used to classify the children as either well-nourished or malnourished. Households where the child's weight-for-age index was below -2 Z-score of the National Centre for Health Statistics (NCHS) reference were classified as malnourished while those with indices above -2 Z-score of the same reference were classified as well-nourished households. A register of each set of households was developed and used as the sampling frame. The desired sample size was selected for each group using systematic sampling method. Thus for the purpose of this study, a malnourished household was a household in which at least one child aged less than three years was underweight (below -2 Z-score) while a well nourished household meant that none of the children of same age cohort were underweight.

Out of the total of 632 registered households, 205 (32.4%) had malnourished children while the rest (427) had well nourished children. For each type of household the proportionate sampling (for each kebele) was calculated to give a total of 192 children (i.e 384 in total) since the *kebeles* had different number of households (Figure 1). The study households were then identified by systematic sampling. For each household interview on child care was made in relation to the youngest child.

A sub-sample of 60 households which is more than the minimum sample size (50 cases) recommended by Fisher et al.(1991) were selected from each group for household per capita calorie and protein intake assessment. A proportional sample size was drawn from the list of the total sample household set for each kebele. Simple random selection was carried out to identify the households. After selection of the sample from each respective kebele, interviews on demographic, socio-economic as well as child care practices and food consumption were conducted.

Figure 1: Flow chart showing the sampling procedure



### 3.2.4 Study Instruments

#### 3.2.4.1 Questionnaire

A questionnaire comprising of four parts was used in the study. The first part contained questions on selected socio-demographic and socio-economic characteristics of the study households. The second part sought information on child care attributes. The third part constituted a form on which child anthropometric measurements; which included weight, height, age and sex of the child were recorded. The fourth part of the questionnaire dealt with the dietary aspect of the study.

#### 3.2.4.2 Equipment

A salter spring balance weighing scale which could take a maximum of 25 kg and with a precision of 0.1 kg was used to take children's weight.

Locally made wooden height/length measuring boards with a precision of 0.1 cm were used for measurement of the children's height and length.

A Poyear kitchen scale, Model PS-68, (with a maximum capacity of 1 kg) was used to weigh cooked and raw food items.

Fluid measuring cylinders graduated in millilitres of capacity 1000 ml, 500 ml, and 100 ml, were used in the dietary assessment part of the study.

### 3.2.5 Procedures of Conducting the Survey

#### 3.2.5.1 Training of Field Assistants and Pre-testing

Two female field assistants were recruited to assist the researcher in data collection. Both were residents of the study area. They had completed grade twelve and had experience in data collection. The assistants were trained for five days on how to administer the questionnaire, take weight, height and dietary ingredient measurements. They were required to participate in the pre-testing of the study instruments for seven days in order to further their practical experience.

Pre-testing of the study instruments was undertaken to examine the appropriateness of the study instruments including the questionnaire, scales and height/length measuring board. It was undertaken in a low-income *kebele* considered to be similar in all aspects to the study area. The questionnaire was administered to 25 mothers (purposively selected) with children between 6-36 months of age. Appropriate modification was then done on the questionnaire.

### 3.2.5.2 Obtained Permission

prior to the start of the actual data collection, the researcher obtained permission to carry out the study from the department of Social Services. Thereafter, the researcher made clear the purpose of the study to the respective *kebele* leaders. Through announcements made by the *kebele* officials, the parents in each kebele were informed of the study and were requested to assist the interviewers by offering the required information. Subsequently, data collection for the definitive survey was launched.

### 3.2.5.3 Determination of Nutritional Status

The first stage of data collection involved collection of anthropometric data to determine the nutritional status of the target children. This process facilitated polarization of households into two groups; the well nourished households and the malnourished households.

Age and sex as well as weight and height measurements of 758 children were recorded. Procedures explained in WHO, (1983) were followed to determine the age of the study children. Determination of child age is crucial because it is combined to form WFA and HFA indices of nutritional status. For more than 84% of the children, age was obtained from immunization cards. The age for the rest of children was determined by questioning the mother about the month of the year in which the child was born and a calender of events.

The weight and height data were collected based on the methods described in United Nations. (1986). Before taking the weight of each child, scales were adjusted by bringing the scale pointer back to the zero mark. The scale accuracy was also regularly checked against a known weight (a two kilogramme iron bar) before the weight of each child was taken. Each child was weighed with minimum clothing and with no footwear. The weight was recorded to the nearest 0.1 kg. Two successive readings were taken for each child and the mean of the two weights determined and recorded as the child's weight.

For children who were two years of age and above, a vertical measuring board with an accuracy of 0.1 cm was used to take the children's stature or height. The children were made to stand barefooted on the flat board with their hands hanging loosely at the sides ensuring both feet were parallel and with the heels, buttocks, shoulders and back of head touching the upright scale (United Nations, 1986). The head was held comfortably erect,with the lower border of the orbit of the eye in the same horizontal plane as the external canal of the ear. The arms were hanging loosely at the sides. The headpiece of the measuring device was gently lowered to make contact with the top of the head and precautions taken to ensure children looked straight ahead. The child's height was then read to the nearest 0.1 cm. Two readings were made for each child and an average height recorded.

For children under two years of age, recumbent length measurement was carried out with a wooden length-board. The child was made to lie on the board positioning the head firmly against the fixed headboard, with the eyes looking vertically at right angle. Firm gentle pressure was applied to extend the knees, and to make the feet flexed at right angles to the lower legs. The upright sliding footpiece was moved to make firm contact with heels and the length was recorded to the nearest 0.1 cm. At least two measurements were also made and average length value was recorded.

As part of household classification process, the anthropometric data were processed and analyzed in Addis Ababa where the survey was carried out. The data were entered and processed using a computer at the Ethiopian Health and Nutrition Research Institute (EHNRI). By use of the Anthro package, Z-scores were generated and the number of malnourished and well nourished children were determined among the total children in the four *kebeles*. The Weight-For-Age (WFA) index was used to classify the children into the categories of malnourished and well nourished.

Explanation is given below why the weight-for-age index was chosen. The weight and height measurements in combination with age of individuals are used to derive indices like length-for-age, weight-for-age, and weight-for-length for assessing nutritional status (ACC/SCN, 1990).

Weight-for-length is used to indicate the problem of wasting which usually occurs in low prevalence in non-emergency situations as compared to stunting and underweight. On the other hand, length -for-age indicates the prevalence of stunting which can arise as a result of past growth failure, while weight-for-age detects both the current and past growth failure. Weight-for-age may help to indicate wasting of tissue mass without deficient skeletal growth; stunted skeletal growth without tissue wasting; or a combination of stunting and wasting (Mitzner et al., 1984).

Children may have stunted growth due to long-term inadequate care or wasting which may have risen from recent caring constraints such as infectious diseases. In this study, therefore,weight-for age was chosen as the index to identify children who have got malnutrition due to long or short term reasons.

### 3.2.5.4 Questionnaire Administered to Mothers

After the children were classified as malnourished and well - nourished. data were collected from sampled households of both groups through interviewing of mothers or caregivers of the index children. Information on child care including breastfeeding, complementation with types of weaning foods, frequency of feeding, immunization, morbidity, type of care given during sickness and food withholding was obtained. Data were also collected on the environmental sanitation and household hygiene practices. General information on household demographic and socio-economic

characteristics was also gathered.

### 3.2.5.5 Food consumption Measurements

Food intake measurements were done to determine the mean per capita calorie and protein availability to both groups of household. This can help in finding out the level of household food availability as it has a direct linkage with household care giving behaviours and nutritional status of children (Engle, 1996). Food intake data were collected from the randomly selected sub-sample households using a single 24-hour recall method. This method is appropriate for assessing the average usual intake of nutrients for a group population provided that the sample is representative of the population under study and if all days of the week are proportionately included in the survey (Gibson,1990).

Procedures mentioned in Gibson (1990) were followed during the time of data collection on food intake. Respondents were made to recall and tell all meals consumed by the household during the preceding 24 hours. They were asked to show the amount of each ingredient used to prepare the meal using household measures and food models. Detailed descriptions of all meals and ingredients were recorded using a form designed for this purpose (Appendix 5). Values of household measures of each ingredient were converted into grams and/or millilitres.

The amount of calorie and protein content of each food ingredient was calculated using the Ethiopian Food Composition Table prepared by Agren and Gibson (1969); and ECSA (1988).

The total calorie and protein consumption of the household during the previous 24 hours were obtained by adding the amount of calories and protein derived from all the ingredients ingested. The per capita consumption of the household was determined by dividing the total calorie and protein by the number of household members who ate all the meals.

### 3.2.5.6 Data Validity and Reliability

The questionnaire was validated through pre-testing. The assistants were closely supervised during pre-testing and early stages of the actual survey by the researcher. Probing questions were asked to reduce errors arising from respondent memory lapses. Each completed questionnaire was checked immediately after return from interview to ascertain that all questions had been answered correctly and consistently. A two kilogramme iron bar was used to regularly check scale accuracy and make sure measurements are correct. Immunization card was also used to check whether the child is fully immunized or not and to ascertain the age of the child.

### 3.2.6 Data Entry, Cleaning and Analysis

The anthropometric data entry and processing was done at the Ethiopian Health and Nutrition Research Institute (EHNRI), Addis Ababa. The data on demographic ,socio-economic and child care practices were entered, cleaned and analyzed using a computer at the Applied Nutrition Programme (ANP), Kabete campus, Nairobi. The following programmes were used for data entry, cleaning and analysis.

(a) the Anthro programme was employed to convert raw anthropometric data (the weights and heights of 758 children) into nutritional indices and compare them with the National Centre for Health Statistics (NCHS) reference figures. By use of the Anthro package the study children were classified into categories of malnourished and well nourished.

(b) the data were entered and cleaned in the Dbase III+ software.

(c) graphs on some descriptive information were done using harvard graphics version 3.

(d) the Statistical Package for Social Scientists (SPSS) was mainly used for data analysis. Using this package, comparison of the various parameters of child care practices in the two groups of households (malnourished and well nourished) was done by administering chi-square and t-test at P value less than 0.05 level of significance.

(e) In the case of analysis of data on dietary intakes the t-test was used to compare the mean per capita calorie and protein availability between the two groups of households.

(f) Odds ratio was applied to rank child care attributes according to their contribution to children's nutrition insecurity.

### 3.2.7 Limitations

It should be remembered that data obtained through a survey having a retrospective component are not without limitations. Most questions in this study required recalling of past events (time of supplementation, duration of general breastfeeding, etc.) and are thus prone to errors in reporting due to memory lapse. Furthermore, some doubtful responses may occur as some respondents do not report the truth.

# CHAPTER FOUR

# RESULTS

## Introduction

This chapter presents both the descriptive and analytical results where data on demographic, socio-economic and child care practices of two types of households (i.e well nourished and malnourished households) were compared. The chapter also depicts information on the nutritional status of infants and young children in the study area.

## 4.1 Age and Sex Composition of Children in the Study Area

Figure 2 presents the age and sex distribution of children from whom anthropometric data were obtained. Out of the 758 children surveyed, 51.2% were male and 48.8% were female. There were more females in the age group 6-12 months, while the number of males was greater than that of females among the rest of the age categories (i.e 13-24 and 25-36 months).

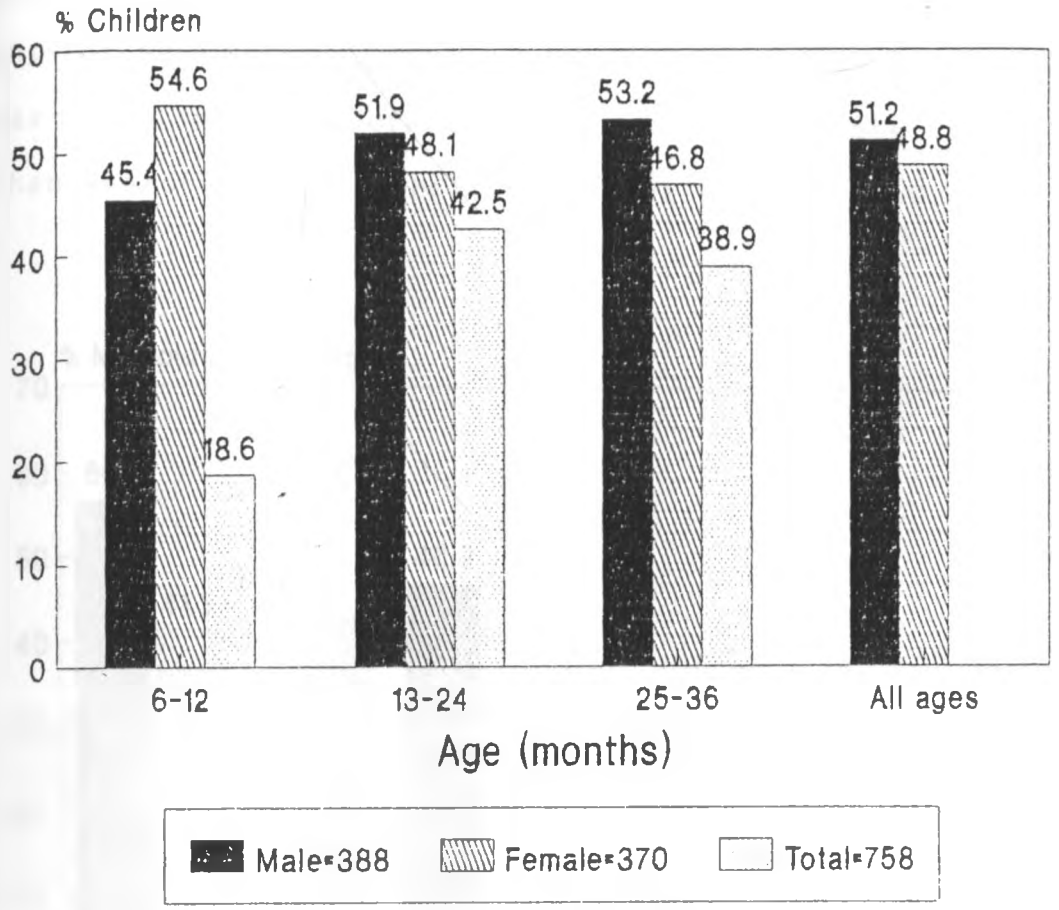



Figure 2: Distribution of Surveyed Children by Age and Sex.

## 4.2 Nutritional Status of Children in the Study Area

The prevalence of malnutrition among children in each *kebele* as measured by the weight-for-age (WFA), height-for-age (HFA) and weight-for-height (WFH) Z-score is shown in Figure 3. A significantly higher prevalence of underweight and stunting was observed in *kebele* 31 than was observed in the other three kebeles ($p<0.01$).

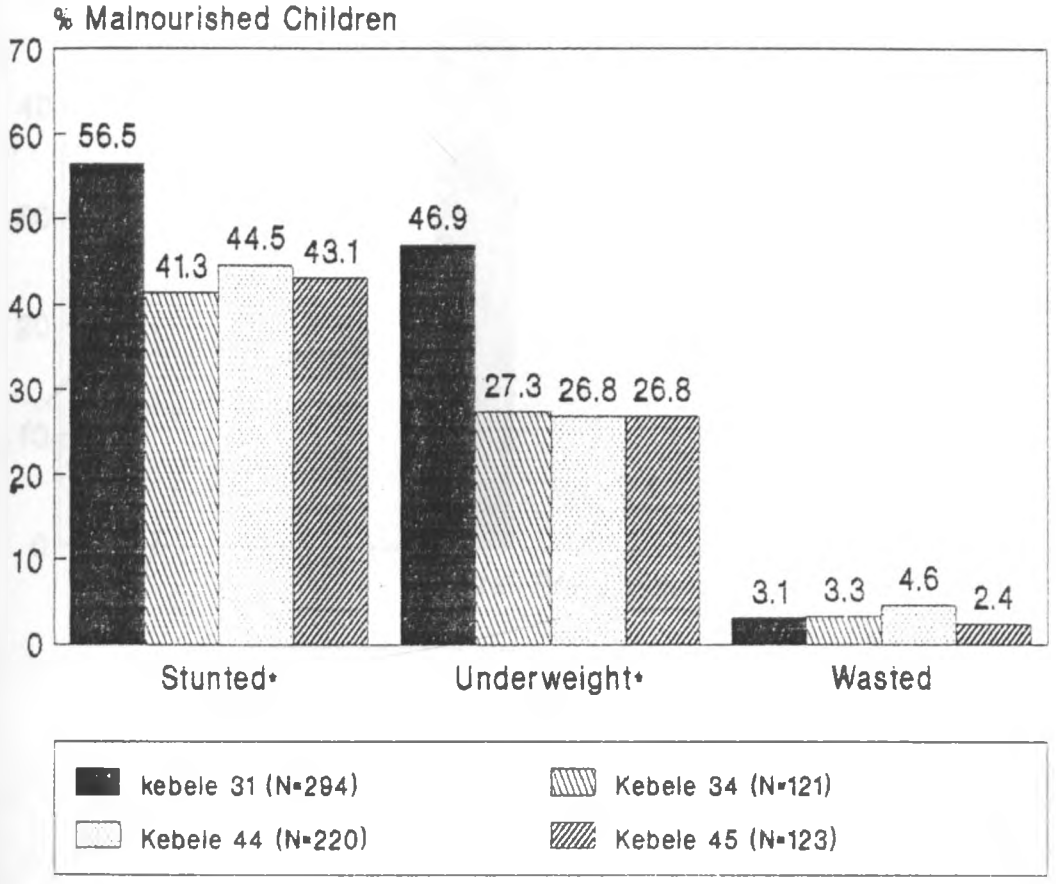



Figure 3: Distribution of Malnourished Children by Study Area. (<-2 SD)

For the four *kebeles* covered in the study.as shown in Figure 4. slightly over a third (34.7%) of the children were underweight (low weight-for-age). nearly a half (48.4%) were stunted (low height-for-age).and a small number (3.4%) were wasted (low weight-for-height).

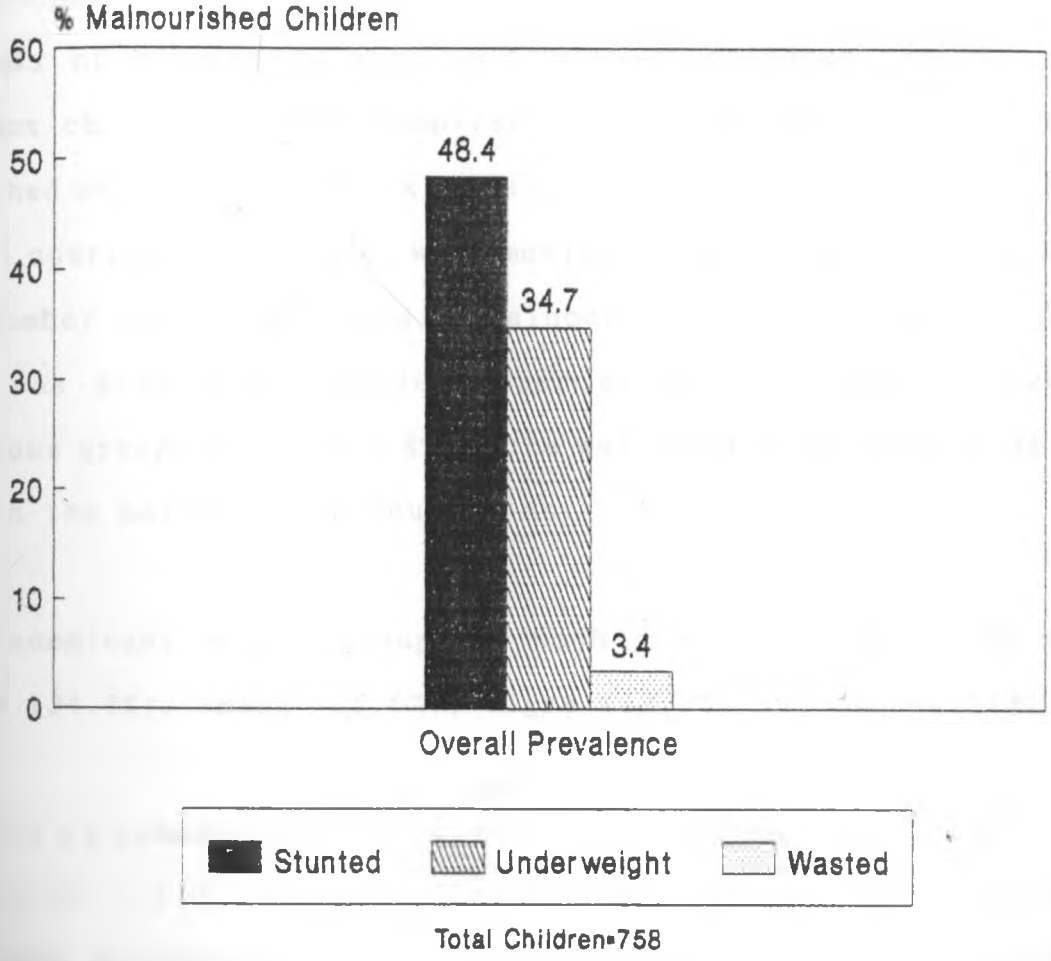



Figure 4: Overall Prevalence of Malnutrition in the Study Area (<-2 SD)

## 4.3 Demographic Characteristics of the Sample Households

There were a total of 2435 people in the 384 sampled households, 1203 (49.4%) in the well nourished group and 1232 (50.6%) in the malnourished group. Although not significant, a higher proportion of heads of households with malnourished children (86.9%) were orthodox christians when compared with those heads who had well nourished children (78.7%). A significantly higher proportion (20%) in well nourished households were moslems compared with about a half this number (10.3%) who were in malnourished households ($p<0.05$). There was also a negligible number of catholic and protestant religious groups who were 2.8% in the well nourished households and 1.6% in the malnourished households.

The predominant ethnic groups in both groups of households were Gurage (34.5%), Amara (25.0%), Tigre (22.9%) and Orromo (13.0).

The male to female ratios in both households were practically the same (i.e, 1:1.2 in malnourished households and 1:1.3 in well nourished households. Majority of the household heads in both malnourished and well nourished households (i.e 71% and 79% respectively) were married.

The proportion of persons below 15 years and above 65 years of age in both households were practically the same and close to a half of the population (i.e. 47.9% and 45.1% in malnourished and well nourished households respectively). Consequently the dependency ratios for malnourished (1:09) and that of well nourished households (1:08) were practically the same.

T-tests were done to find out if there were significant differences between the two types of households in terms of the demographic variables presented in Table 1. Heads of households in well nourished group had spent significantly more years in school (5.4 $\pm$4.6) than heads of household in the malnourished group (4.3 $\pm$4.3) ($p<0.03$). Most of the demographic characteristics in the two types of households, namely household size, age of mother and head of household, and education level of mother were not significantly different (Table 1). However, relatively higher values were obtained for the well nourished household group.

The mean number of under five children in the malnourished households (1.6 $\pm$0.7) was slightly higher than in the well nourished group (1.5 $\pm$0.6), but not significantly different ($p> 0.05$). The results

indicate that the two study groups were similar in all the demographic attributes that were assessed apart from education of heads of household. Heads of well nourished households had more years of education.

Table 1: Selected Demographic Characteristics

| Characteristics | Malnourished Households N=192 | | Well nourished Households N=192 | |
|---|---|---|---|---|
| Mean h.h.size | 6.2 | ±2.6 | 6.5 | ±2.6 |
| Mean h.h.head age yrs | 40.9 | ±11.3 | 42.8 | ±11.5 |
| Mean mothers age yrs | 29.7 | ±7.5 | 30.6 | ±8.3 |
| Mean h.h head educ. yrs | 4.3 | ±4.3 | 5.4 | ±4.6* |
| Mean mothers educ. yrs | 4.6 | ±4.1 | 5.3 | ±4.3 |
| Mean no.< 5 children | 1.6 | ±0.7 | 1.5 | ±0.6 |

h.h = household
educ = education
* t-test significance at p<0.05.

## 4.4 Socio-economic Characteristics of the Sample Households

### 4.4.1 Housing Conditions and Toilet Facilities

Poor housing is an indicator of economic status. The roofs of all houses in all study households were made of corrugated iron sheets. Only about a third (31.8%) of the houses in the well nourished households and about a quarter (24.2%) in the malnourished households had roofs with worn out corrugated sheet. However, the difference

was not statistically significant ($p>0.05$). On the other hand, most (i.e.91.4% and 94.9% of the malnourished and well nourished households respectively) had walls made of wood and mud while the rest of the houses in both groups were constructed with stone/block or bricks. The difference.however, was not significant ($p=0.29$). More malnourished households (61%) had only one room than well nourished households which were 47%. About a half (53%) in the well nourished group of households and about a third (39%) in the malnourished group of households had two or more rooms. The number of households with two rooms was significantly higher in the well nourished households when compared with the number in the malnourished group ($p=0.01$).

Although the difference was not significant, the number of households which had toilets was slightly higher in the well nourished households (65.6%) than that of those in the malnourished group (61.0%). Most of the households (i.e 88.0% in the malnourished types of households and 84.0% in the well nourished types of households) had private toilet. A small number in both types of households had communal types of toilets.

In view of these results the two groups of households were not the same in housing conditions. The well nourished group had better houses with more rooms and better types of floor.

Table 2: Distribution of Households by Housing Condition and Toilet Facility

| Variables | Malnourished households (N=192) | Well nourished households (N=192) | $X^2$ | P value |
|---|---|---|---|---|
| A) Floor | | | | |
| mud | 112 (58.3)+ | 81 (42.2)* | 9.4 | 0.002 |
| cement/wooden | 80 (41.7) | 111 (57.8) | | |
| A) Roof | | | | |
| Worn out | 47 (24.2) | 61 (31.8) | 2.2 | 0.14 |
| Not worn out | 145 (75.8) | 131 (68.2) | | |
| B) Wall type | | | | |
| wood & mud | 176 (91.7) | 182 (94.8) | 1.0 | 0.3 |
| stone\block/ bricks | 16 (8.3) | 10 (5.2) | | |
| C) No. of rooms | | | | |
| one | 117 (61.0) | 90 (47.0)* | 7.1 | 0.01 |
| two or more | 75 (39.0) | 102 (53.0) | | |
| D) Toilet | | | | |
| yes | 117 (61.0) | 126 (65.6) | 0.7 | 0.4 |
| no | 75 (39.0) | 66 (34.4) | | |

+ Figures in parentheses are percentages
* $X^2$ significance at $P<0.05$

### 4.4.2 Household Income

The monthly income of the sample households ranged from *Birr* 28 to 1070 and 50 to 1500 for the malnourished and well nourished groups respectively. The lowest income (28 *Birr*) was found amongst the malnourished group and the highest (1500 *Birr*) in the well nourished group. The average monthly income of the malnourished and well nourished households was *Birr* 219 and 353 which is equivalent to

32 and 52 U.S dollars, respectively. As shown in Table 3, the proportion of households earning a monthly income of less than or equal to 250 *Birr* was significantly higher (p=0.00001) in the malnourished households (71.4%) than in the well nourished households (46.3%). The proportion of households which earned an income of more than 250 *Birr* was significantly higher (p=0.001) in the well nourished households (12.0%) than in the malnourished households (3.1%). Therefore, it is at 250 *Birr* that income makes a difference in the nutritional status of households in the study area. The results on household income indicated that the well nourished households were comparatively of a higher income group.

Table 3: Distribution of Malnourished and Well Nourished Households by Income. (In Ethiopian Birr)

| Household income *Birr*/month | Malnourished households N=192 | Well nourished households N=192 | $X^2$ | P value |
|---|---|---|---|---|
| ≤250 | 137 (71.4)+ | 89 (46.3%)* | 23.8 | 0.00001 |
| 251-600 | 49 (25.5) | 80 (41.7)* | 10.5 | 0.001 |
| >600 | 6 (3.1) | 23 (12.0)* | 9.6 | 0.002 |
| Total | 192 (100.0) | 192 (100.0) | | |

+ Figures in parentheses are percentages
1 US $ is equivalent to Birr 6.75
* $X^2$ significance at P<0.05

### 4.4.3 Household Food Availability

Results of the 24-hour recall on household per capita calorie and protein intake are given in Table 4 and 5 respectively. The daily per capita calorie intake ranged from 527 to 3023 and 640 to 3181 for malnourished and well nourished households respectively.

The mean per capita calorie intake of the well nourished households (1838.9 ±576) was significantly higher (p=0.005) than in malnourished households which was 1553.3 ±493. The mean daily per capita calorie intake of the malnourished households is found to be less than the Ethiopian national per capita supply estimated by World Bank in 1980 which was 1754 k/cal.

Although not significant, the proportion of households known to have a daily per capita calorie intake of less than 1500 was higher in the malnourished households (47.4%) than in well nourished households where it was 31.6%. On the other hand, the proportion of households which had a daily per capita calorie intake of above 2000 was significantly higher in the well nourished households (36.8%) than in malnourished households where it was 13.6%).

Table 4 : Distribution of Households by Daily Per Capita Calorie Intake.

| Per capita calorie intake | Malnourished n=59 | Well nourished n=57 | $X^2$ | P value |
|---|---|---|---|---|
| ≤ 1500 | 28 (47.4)+ | 18 (31.6) | 2.43 | 0.1 |
| 1501-2000 | 23 (39.0) | 18 (31.6) | 0.4 | 0.5 |
| ≥2000 | 8 (13.6) | 21 (36.8) | 7.2* | 0.007 |
| Total | 59 (100.0) | 57 (100.0) | | |
| Mean per capita intake | 1553.3 ±493 | 1838.9 ±576** | | |

+ Figures in parentheses are percentages
** t-test significance at p<0.05
* $X^2$ significance at P<0.05

The ranges of per capita protein intake among the malnourished group and well nourished group were 21-95 grams and 21-109 grams respectively. The mean per capita protein intake of the well nourished households (55±19 gram) was significantly higher than that of malnourished households (46.2 ±16) (p=0.009).The proportion of households with a daily per capita intake of less than or equal to 40 grams was slightly higher in malnourished households (36.6%) than in well nourished households which was 28.1%. A slightly higher proportion in well nourished households (12.3%) had a daily per capita protein intake of more than 80 grams than those households in the malnourished type where this was 3.4%. About 60% of the households in both study groups had a daily per capita protein intake of 41-80 grams.

The results on household food availability indicated that the level of food availability is relatively higher in the well nourished households compared with those households of malnourished as measured by mean per capita calorie and protein intake.

**Table 5: Distribution of Households by Daily Per capita Protein Intake**

| Per capita protein intake (gram) | Malnourished n=59 | Well nourished n=57 | $X^2$ | P Value |
|---|---|---|---|---|
| ≤ 40 | 21 (36.6)+ | 16 (28.1) | 0.45 | 0.5 |
| 41-80 | 36 (60.0) | 34 (59.6) | 0.02 | 0.9 |
| ≥ 80 | 2 (3.4)++ | 7 (12.3)* | 3.2 | 0.07 |
| Total | 59 (100.0) | 57 (100.0) | | |
| Mean per capita intake | 46.2 +16 | 55 +19)** | | |

+ Figures in parentheses are percentages
** T-test significance at p< 0.05
++ Fisher exact result
* $X^2$ significance at P<0.05

### 4.4.4 Maternal Employment

The types of occupations of mothers in the malnourished households as well as those in the well nourished households is shown in Figure 5. The proportion of mothers who worked outside their home at the time of interview was significantly higher in the malnourished type of households (36%) than that of those in the well nourished group (25%) (p=0.02). In both study groups, mothers who worked outside home were engaged either in salaried or self employment and the rest in casual/daily labour. A significantly higher proportion of mothers in the malnourished households (21.4%) were engaged in casual/daily labour compared to those in the well nourished group who were 9.4%. On the other hand, even though not significant (p=0.18), a higher proportion of housewife mothers in the well nourished households (21.2%) were self employed at home than those in the malnourished households (13.5%).

As shown by the results of the types of occupations of mothers, employment outside home is more common among the mothers with malnourished children than those mothers who had well nourished children.

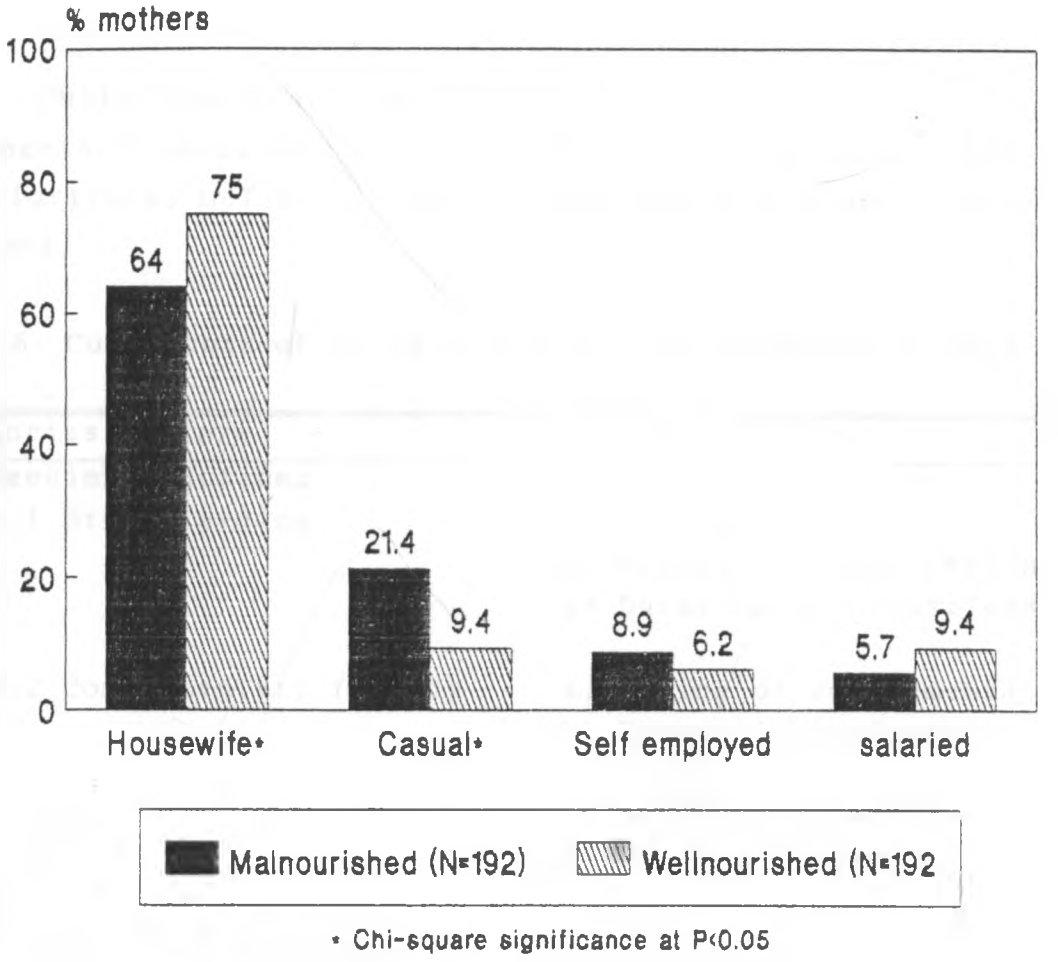



Figure 5: Distribution of Households by Maternal Occupation and by Household Type

## 4.5 Child Care Practices

Components of child care practices which were examined in this study are illustrated in Table 6. Each of these are discussed in succeeding sections.

Table 6: Components of Child Care Practices Examined in This Study

| Categories of care | Activities |
|---|---|
| 1. Feeding practices | |
| 1.1 Breastfeeding | a) Initiation<br>b) Exclusive breastfeeding<br>c) Duration of breastfeeding |
| 1.2 Complementary feeding | a) Timing of complementation<br>b) Types of complementary foods<br>c) Method of feeding<br>d) Feeding frequency |
| 2. Health seeking practices | a) immunization<br>b) Treatment of diarrhoea (service utilization)<br>c) Withholding of food |
| 3. Sanitation and Hygiene practices | a) Cooked food storage time<br>b) Hand washing during feeding<br>c) Home and the environment sanitation<br>d) Availabilities of sanitation facilities (water & Toilet) |
| 4. Child minding | a) type of Persons involved in child food preparation, feeding and providing care. |

### 4.5.1 Child Feeding Practices

#### 4.5.1.1 Breastfeeding

Both groups of households had invariably initiated breastfeeding as a great majority of the mothers (99.5% in malnourished households and 98.4% in well nourished households) had at some time breastfed their children. About the same proportion of mothers, (about two thirds i.e 66.7% and 65.1% in the malnourished households and well nourished households respectively) had practised exclusive breastfeeding for the first three months of life (Table 7). However, a significantly higher proportion of mothers in the malnourished households (23.9%) had practised exclusive breastfeeding up to 4-6 months than had mothers in the well nourished households (7.3%) (p=0.0001). Further, the proportion of mothers in the malnourished households (11.0%) continued exclusive breastfeeding beyond six months was significantly higher than in well nourished households (4.2%) (p=0.02).

Table 7: Distribution of Mothers by Duration of Exclusive Breastfeeding

| Age exclusive Bf practised | Malnourished group (N=192) | Well nourished group (N=192) | $X^2$ | p value |
|---|---|---|---|---|
| < 4 | 128 (66.7)+ | 125 (65.1) | 0.05 | .83 |
| 4-6 | 46 (23.9) | 14 (7.3)* | 18.9 | .0001 |
| 7-9 | 21 (11.0) | 8 (4.2)* | 5.4 | .02 |

+ Figures in parentheses are percentages
* $X^2$ significance at P<0.05

A significantly higher proportion of households in the malnourished type of households (84.8%) which exclusively breastfed for more than four months earned ≤250 *Birr* than those households in the well nourished type of households which was 50.0% (Table 8).

Table 8: Distribution of Households in Which Children Were Exclusively Breastfed for More than Four Months by Income

| Household income *Birr*/month | Malnourished households n=46 | Well nourished households n=14 | $X^2$ | P value |
|---|---|---|---|---|
| ≤250 | 39 (84.8)+ | 7 (50.0) | 5.44 | 0.01 |
| ≥251 | 7 (15.2) | 7 (50.0) | | |
| Total | 46 (100.0) | 14 (100.0) | | |

+ Figure in parentheses are percentages

A majority of households and almost equal numbers (i.e 61.9% and 56.5% in well nourished and malnourished groups of households respectively) which had reported to have breastfed the index child reported that they had already stopped breastfeeding.

There was no significant difference in mean duration of breastfeeding between the two types of households (i.e 18.2 ±10.1 and 16.8 ±10.4 months in malnourished and well nourished households respectively). However, a relatively higher median duration of breastfeeding was observed among the households of malnourished group (22.5 months ) than that among the well nourished households (15 months).

There was no significant difference in distribution of cessation of breastfeeding by age of child in both malnourished and well nourished groups of households (Table 9). In both groups of households, the highest number (about a third) stopped breastfeeding between 13-24 months while close to a quarter each in both groups stopped breastfeeding between 0-6 and 25-36 months. It is important to note that more mothers in well nourished households stopped breastfeeding at early ages (i.e after 0-6 and 7-12 months)

THe result indicated that the two groups of mothers were not the same in the duration of exclusive breastfeeding as the malnourished group continued for a longer period. However, the two were not different in the length of general breastfeeding.

Table 9: Distribution of Children by Age at Which Breastfeeding Ceased

| Age BF stopped | malnourished group (n=108) | Well nourished group (n=117) | $X^2$ | P value |
|---|---|---|---|---|
| 0-6 | 23 (21.3)* | 29 (24.8) | 0.21 | 0.64 |
| 7-12 | 18 (16.7) | 25 (21.4) | 0.53 | 0.47 |
| 13-24 | 39 (36.1) | 36 (30.7) | 0.50 | 0.48 |
| 25-36 | 28 (25.9) | 27 (23.1) | 0.12 | 0.73 |
| Total | 108 (100.0) | 117 (100.0) | | |
| Mean Duration | 18.2 +10.1 | 16.8 +10.4 | t=0.95 | p=0.34 |

* Figures in parentheses are percentages.

### 4.5.1.2 Complementary Feeding

Table 10 shows the distribution of households by the age at which supplementary foods were introduced. About a third of the households in both types of households (i.e. 33.3 and 34.8% in malnourished and well nourished groups respectively) had started supplementary feeding within the first 3 months of life. At the time of interview all mothers in both groups of the study households had already started supplementary feeding. After the end of the third month of life, the proportion of households that initiated supplementary feeding (as shown in Table 10) was significantly higher in the malnourished group than the well nourished group. At four to six months of age, a significantly higher number of mothers in well nourished households (57.8%) had started supplementation than had mothers in malnourished households who were 42.7% (p=0.004). On the other hand, there was a significantly higher number of mothers in the malnourished households (11.0%) who practised very late introduction of food (at 10 months and above) than there were mothers in well nourished households who were 4.2% (p=0.02).

The mean age at which supplementation was started in malnourished households (4.9 ±2.9 months) was significantly higher than in the well nourished households which was 4.2 ±2.4 months (p=0.02).

Table 10: Distribution of Households by Age at Which Supplementation Started.

| Age supp. started (months) | Malnourished N=192 | Well nourished N=192 | $X^2$ | P value |
|---|---|---|---|---|
| < 4 | 64 (33.3)+ | 67 (34.8) | .05 | .83 |
| 4 - 6 | 82 (42.7) | 111 (57.8)* | 8.2 | .004 |
| 7 - 9 | 25 (13.0) | 6 (3.2)* | 11.4 | .001 |
| ≥ 10 | 21 (11.0) | 8 (4.2)* | 5.4 | .02 |
| Total | 192 (100.0) | 192 (100.0) | | |
| Mean age supp. started | 4.9 ±2.9** | 4.2 ±2.4 | t=2.3 | p=0.02 |

+ Figures in parenthesis are percentages
** t-test Significance at p<0.05
* $X^2$ significance at P<0.05

4.5.1.3 Types of Supplementary Foods, Feeding Frequency and Method of Feeding

The proportion of mothers giving different foods was significantly different between the two types of households for only enriched and non-enriched porridge (p<0.05). There were significantly fewer mothers in well nourished households (1.6%) who fed non-enriched porridge than there were in malnourished group of households (8.9%) (P<0.01) (Table 11). On the other hand, there were significantly more mothers in well nourished households (14.1%) who fed enriched porridge than there were in malnourished households who constituted 5.2% (p<0.01).

Cow milk was fed by most mothers as first food (i.e 48.4 and 47.9% in malnourished and well nourished groups of households respectively) and close to 10% fed bread and tea. Mashed potatoes were fed by more mothers in well nourished households (16%) than in malnourished households where about 10% did, although no significant difference was observed.

Table 11: Distribution of children by Type of First Foods Given at the Time of Weaning.

| Type of weaning foods | Malnourished group N=192 | Well nourished group N=192 | $X^2$ | P value |
|---|---|---|---|---|
| cow milk | 93 (48.4)+ | 92 (47.9) | .00 | 1.0 |
| bread+tea | 21 (10.9) | 16 (8.3) | .48 | .49 |
| mashed potato | 19 (9.9) | 31 (16.1) | 2.78 | .09 |
| porridge (not enriched) | 17 (8.9)* | 3 (1.6)** | 8.91 | .003 |
| canned milk | 15 (7.8) | 25 (13.0) | 2.26 | .13 |
| *injera fetifit* | 13 (6.8) | 5 (2.6) | 2.86 | .09 |
| porridge (enriched) | 10 (5.2)* | 27 (14.1) | 7.66 | .006 |
| others | 11 (5.7) | 11 (5.7) | .05 | .83 |

+ Figures in parenthesis are percentages
percentages do not add up to 100 because some children consumed more than one type of food
Others:- Boiled flax water, fenugreek water, rice, orange juice and banana
** Fisher exact result
* $X^2$ significance at P<0.05

As shown in Figure 6, a significantly higher proportion of households in the malnourished group (53.6%) had fed children 1 to 3 times than had households in the well nourished group (26.5%) ($p<0.001$). However, the proportion of households which had fed 4 times was significantly higher in the well nourished group (48.3%) than in the malnourished group (34.5%) ($p<0.05$). Further, the proportion of households with a daily feeding frequency of more than or equal to 5 times was significantly higher in the well nourished households (25.2%) than in malnourished households which was 11.9% ($p<0.05$).

The mean feeding frequency among children in the well nourished households (4 times) was significantly ($p<0.01$) higher than in the malnourished households where this was 3.4 times.

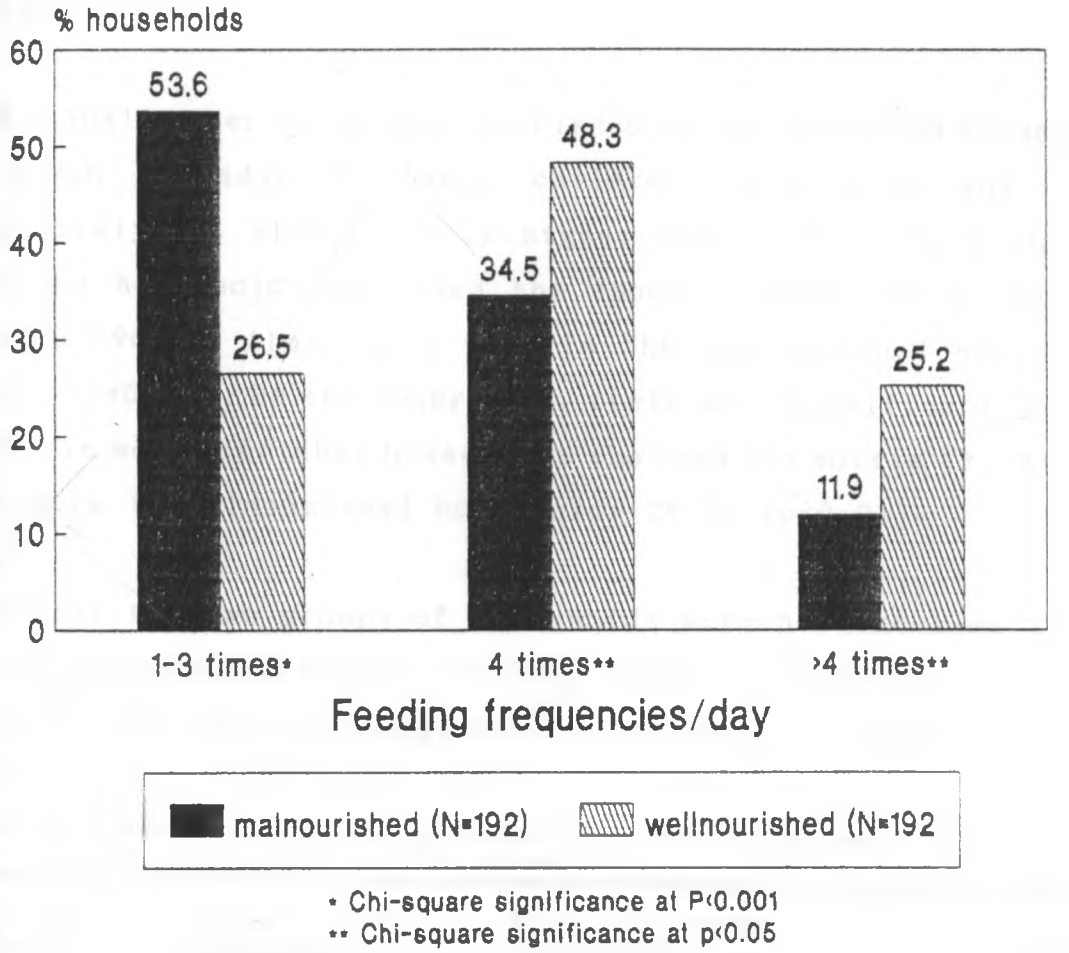



Figure 6: Distribution of Households by Feeding Frequency of Children

The number of households which used the bottle to feed milk was practically the same (i.e 70% in well nourished and 73% in malnourished groups of households) (Table 12). About third (30%) of the households in the well nourished type and slightly more than a quarter (27%) of the malnourished type of households used a spoon to feed milk.

Almost equal number of the well nourished and malnourished households had given porridge to their children (i.e 14.1% and 15.6% respectively). A significantly higher number of mothers in well nourished households had used the spoon to feed their children porridge (96.7%) than there were in the malnourished households (70.4%) ($p<0.01$). On the other hand, there were significantly fewer mothers in well nourished households who used the bottle (3.3%) than there were in malnourished households 29.6% ($p<0.01$).

In general the two groups of households were not the same in the types of supplementary foods, feeding frequency and method of feeding as the malnourished households provide low quality diet with a lesser frequency using feeding bottle.

**Table 12: Distribution of Households by Methods Used to Feed Milk and Porridge to Children**

| Feeding method | Malnourished households | Well nourished households | $X^2$ | p value |
|---|---|---|---|---|
| Milk | n=108 | n=117 | | |
| Spoon | 29 (26.9)+ | 35 (29.9) | | |
| Bottle | 79 (73.1) | 82 (70.1) | 0.13 | 0.7 |
| Total | 108 (100.0) | 117 (100.0) | | |
| Porridge | n=27 | n=30 | | |
| Spoon | 19 (70.4) | 29 (96.7) | | |
| Bottle | 8 (29.6)** | 1 (3.3)* | 5.54 | 0.009 |
| Total | 27 (100.0) | 30 (100.0) | | |

+ Figures in parentheses are percentages
* Fisher exact result
** $X^2$ significance at $P<0.05$

### 4.5.2 Health Seeking Practices

#### 4.5.2.1 Immunization

The proportion of children in the malnourished group who had been fully immunized for age (80.1%) was not significantly different ($P>0.05$) from that of the well nourished group of children (77.8%).

#### 4.5.2.2 Child Morbidity

There were significantly more children in the malnourished households (74.2%) who had been ill in the last 7 days prior to the survey than there were in the well nourished households where these were 42.9% ($P<0.0001$).

Diarrhoea was the most prevalent among the reported illnesses in both groups of children. The proportion of those with diarrhoea in malnourished households (47.4%) was significantly higher than in well nourished households where these were 26.5% ($P<0.001$). Likewise, significantly more children in malnourished households (13.5%) suffered fever than in the well nourished households where this was found to be 4.2% ($p=0.002$). There was also a significantly higher prevalence of other infections (eye, ear and skin diseases) in malnourished households (14.7%) than there was in well nourished households where this was 4.1% ($p=0.0008$). Coughing and vomiting were the other two main illnesses reported in both groups of children. There was, however, no significant difference in their distribution between the two groups of households (Table 13).

The result on child morbidity indicated that there were high prevalence of illness among the malnourished children when compared to the well nourished children.

Table 13: Distribution of Children by Reported Illnesses

| Illnesses | Malnourished N=192 | Well nourished N=192 | $X^2$ | p value |
|---|---|---|---|---|
| Diarrhoea | 91 (47.4)* | 51 (26.5)+ | 17.0 | .0003 |
| Coughing | 42 (21.9) | 58 (30.2) | 3.0 | .08 |
| Vomiting | 24 (12.5) | 14 (7.3) | 2.4 | .12 |
| Fever | 26 (13.5)* | 8 (4.2) | 9.3 | .002 |
| Others | 28 (14.7)* | 8 (4.1) | 11.1 | .0008 |

+ Figures in parenthesis are percentages.
* $X^2$ significance at P<0.05
Percentages do not add up to 100 because some children suffered from more than one type of illness
Others- Eye, ear and skin diseases.

### 4.5.2.3 Treatment of Diarrhoea and Feeding Practice During Diarrhoea.

Table 14 displays the distribution of households by types of diarrhoea treatment across the two study groups. As shown in the table, the proportion of households who took their children to hospitals/clinics during the time of diarrhoea episode was significantly higher in the well nourished households (76.0%) than in the households of malnourished children where it was 58.9% (p<0.05). On the other hand, there was no significant difference in utilization of ORS between the two types of households.

Similarly, the prevalence of home treatment of diarrhoea was the same in the two study groups.

Table 14: Distribution of Households by Types of Diarrhoea Treatment

| Type of treatment | Malnourished group (N=192) | Well nourished group (N=192) | $X^2$ | P-value |
|---|---|---|---|---|
| Hospital/ clinic | 113 (58.9)+ | 146 (76.0)* | 12.2 | 0.0004 |
| Home ** treatment | 64 (33.3) | 51 (26.5) | 1.8 | 0.18 |
| ORS | 49 (25.5) | 50 (26.0) | 0.0 | 1.0 |

+ Figures in parentheses are percentages
* $X^2$ significance at $P<0.05$
Percentages do not add up to 100 because some households used more than one type of treatment
** Home treatment-gave tea, boiled rice water, plain water & boiled flax water

The proportion of mother in the malnourished households who reported to have withheld food when their children had diarrhoea (38.5%) was not significantly different from that observed in well nourished households (40.1%). The distribution of households by the type of food withheld is presented in Table 15. The data shows that fruits and/or vegetables, cow milk and injera were the three commonest foods withheld. With the exception of porridge and/or potato, more mothers in the well nourished households withheld the foods listed in Table 15 than did mothers in malnourished households.

In the case of porridge and/or potato, however, it was withheld by relatively more households in the malnourished than that of the well nourished households.

Table 15: Distribution of Households by Types of Food Withheld During Diarrhoea

| Food withheld | Malnourished households N=192 | Well nourished households N=192 | $X^2$ | P-value |
|---|---|---|---|---|
| Fruits/ vegetables | 37 (19.3)* | 45 (23.4) | 0.76 | 0.38 |
| Cow milk | 27 (14.1) | 34 (17.7) | 0.7 | 0.4 |
| Injera | 21 (10.9) | 24 (12.5) | 0.1 | 0.75 |
| Porridge/ potato | 6 (3.1) | 2 (1.0) | 1.15 | 0.28+ |
| Meat/eggs | 2 (1.0) | 6 (3.1) | 1.15 | 0.28+ |
| Fat | 1 (0.5) | 6 (3.1) | 2.33 | 0.12+ |

* Figures in parentheses are percentages
percentages do not add up to 100 as some households were withheld more than one type of food
+ Fisher exact results

### 4.5.2.4 Morbidity Status of Mothers

The distribution of mothers by the type of reported illnesses is presented in Table 16. A significantly higher proportion of mothers (54.2%) of malnourished children had been ill one week prior to the date of interview than that of mothers of well nourished children who were 33.9% ($p<0.001$).

As shown in the Table, significantly higher proportion of mothers (41.1%) in malnourished households had suffered headache than had mothers in well nourished group who were 26.6% ($p=0.003$). Coughing was another illness which was significantly more prevalent among mothers in malnourished households (13.0%) than in well nourished

households (4.2%) (p=0.004). On the other hand, the proportion of mothers who were reported to have been sick due to gastrointestinal problems in both groups was practically the same (i.e. 14.6% in malnourished households and 13.8% in well nourished households).

Table 16: Distribution of Mothers by Reported Illness

| Illness | malnourished N=192 | well nourished N=192 | $X^2$ | p-value |
|---|---|---|---|---|
| Headache | 79 (41.1)* | 51 (26.6)+ | 8.48 | 0.003 |
| GI problem | 28 (14.6) | 22 (11.5) | 0.6 | 0.44 |
| Coughing | 25 (13.0)* | 8 (4.2) | 8.5 | 0.004 |
| Others | 18 (9.4) | 16 (8.3) | 0.03 | 0.86 |

+ Figure in parentheses are percentages. * X2 significance at P<0.05
Percentages do not add up to 100 because some mothers reported to have suffered from more than one type of illness.

### 4.5.3 Sanitation and Household Hygiene Practices

#### 4.5.3.1 Water Availability

The distribution of households by the type of water availability in both types of households is presented in (Table 17). Tap water was the only source of water in the study area. A significantly higher proportion of households in the malnourished group (75.3%) than that in the well nourished households (65.2%) had to purchase water from neighbours (p<0.05). A slightly smaller proportion (11%) of malnourished households had water from their own tap than had households of well nourished which were about 17%. The proportion of malnourished households which obtained water from communal taps (13.5%) was slightly smaller than the proportion in the well nourished types of households which was 17.7%.

A significantly higher proportion of households in the malnourished type of households (31.7%) did not cover water containers compared to those in the well nourished type of households which was about 15.2% (p=0.0001).

Table 17: Distribution of Households by Water Availability

| water availability | Malnourished group (N=192) | Well nourished group (N=192) | $X^2$ | P value |
|---|---|---|---|---|
| private tap | 21 (11.0)+ | 33 (17.2) | 2.6 | 0.1 |
| communal tap | 26 (13.5) | 34 (17.7) | 0.9 | 0.3 |
| purchased from neighbours | 145 (75.5)* | 125 (65.1) | 4.5 | 0.03 |
| Total | 192 (100.0) | 192 (100.0) | | |

+ Figure in parentheses are percentages
* $X^2$ significance at P<0.05

4.5.3.2 Environmental Sanitation

Almost similar proportion and high number of households in both study groups (i.e 91.4% in the malnourished and 89.2% in well nourished) had no drainage for dirty water. A significantly higher (p=0.03) proportion of households in the malnourished types of households (79%) had stagnant and dirty water in their compounds compared to households in the well nourished types of households which was 68.2%. Human faeces observed within about 10 meters of the residence of most households in both cases (i.e, 90.1% in the malnourished and 85.4% in the well nourished types of households). In the interior of the houses, human faeces was also observed in a significantly higher proportion of households in the malnourished type of households (78.4%) than households in the well nourished type of households (28.5%) (p<0.0001). There was also animal

faeces (dogs ) within about 10 meters of about three quarters (73.5%) of the malnourished households and a small number of well nourished households which was about two thirds (64.6%).

#### 4.5.3.3 Household Hygiene

As shown in Figure 7, a significantly higher proportion of well nourished households (84.3%) than malnourished households (59.9%) stored food for about 0-12 hours once they cooked for their children ($p<0.0001$). However, the proportion of households which had stored between 13-24 hours was significantly higher in the malnourished group (23.0%) than in the well nourished group (11.2%) ($p<0.01$). Further, the proportion of households with food storage time of more than 24 hours was significantly higher in the malnourished households (17.1%) than in well nourished households which was 4.5% ($p<0.001$). A significantly higher proportion of malnourished households (22.2%) did not cover their food compared to the proportion of households in the well nourished type of households (5.1%) ($p=<0.0001$). A significant proportion of households in the well nourished households (46.9%) had the practice of hand washing with soap before feeding the child as compared to those in the malnourished households which was 29.7% ($p=0.001$).

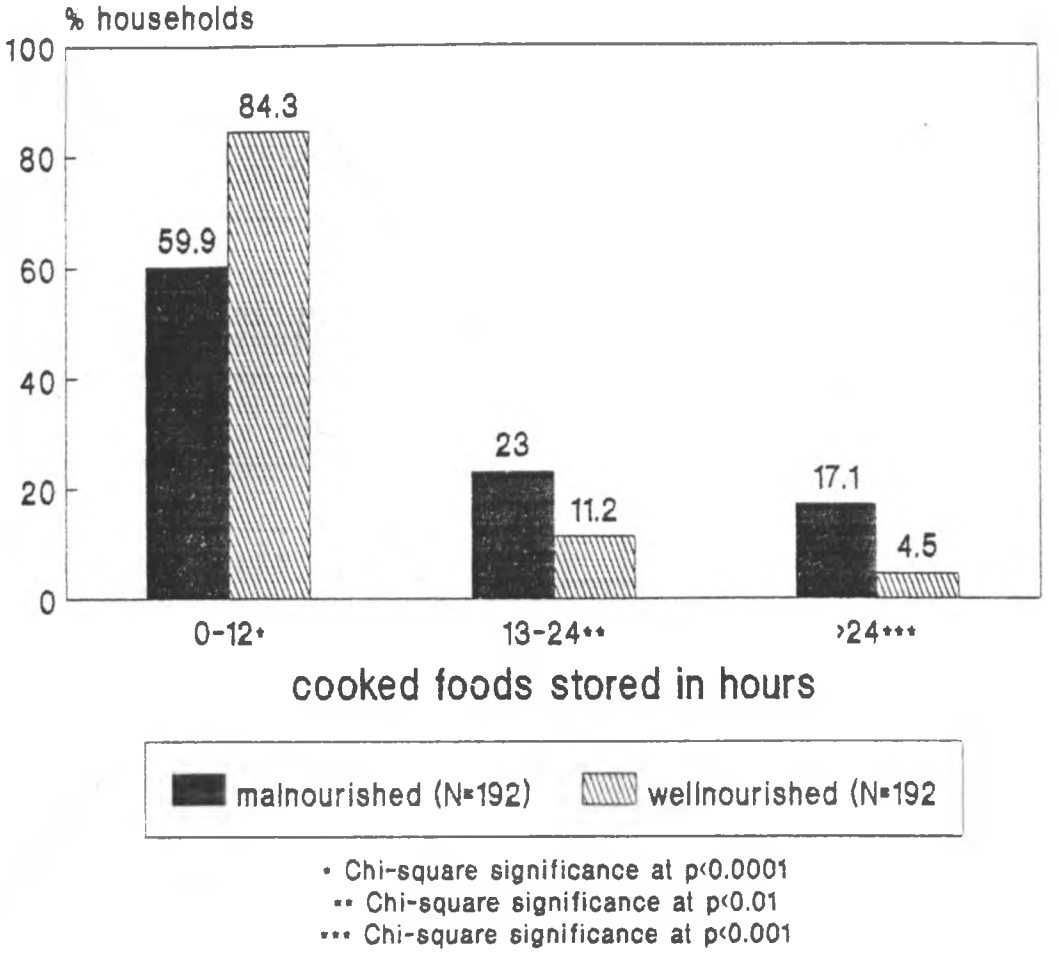



Figure 7: Distribution of Households by Food Storage Duration

In view of the results on environmental sanitation and household hygiene, the well nourished households had relatively clean compounds and better household hygiene practices.

Table 18: Distribution of Households by Environmental Sanitation and Household Hygiene Variables.

| Variable | Malnourished households N=192 | Well nourished households N=192 | $X^2$ | P value |
|---|---|---|---|---|
| Presence of drainage | | | | |
| yes | 17 (8.8)+ | 21 (10.8) | 0.26 | 0.61 |
| no | 175 (91.2) | 171 (89.2) | | |
| Stagnant water in compound | | | | |
| yes | 152 (79.1) | 131 (68.2)* | 4.3 | 0.03 |
| no | 40 (20.9) | 61 (31.8) | | |
| Human faeces in compound | | | | |
| yes | 173 (90.1) | 164 (85.4) | 1.5 | 0.21 |
| no | 19 (9.9) | 28 (14.6) | | |
| Human faeces inside house | | | | |
| yes | 151 (78.6) | 55 (28.6)* | 94.5 | 0.0001 |
| no | 41 (21.4) | 137 (71.4) | | |
| Animal faeces in compound | | | | |
| yes | 141 (73.4) | 124 (64.6) | 3.1 | 0.07 |
| no | 51 (26.6) | 68 (35.4) | | |
| Food storage time | | | | |
| 0-24 hours | 148 (77.1) | 176 (91.7)* | 14.4 | 0.0001 |
| > 24 hours | 44 (22.9) | 16 (8.3) | | |
| Food seen uncovered | | | | |
| yes | 43 (22.3) | 10 (5.2)* | 22.4 | 0.0001 |
| no | 149 (77.7) | 182 (94.8) | | |
| Water container no cover | | | | |
| yes | 175 (91.1) | 131 (68.3)* | 29.7 | 0.0001 |
| no | 17 (8.9) | 61 (31.7) | | |
| Hand washed with soap | | | | |
| yes | 57 (29.7) | 90 (46.9)* | 11.3 | 0.001 |
| no | 135 (70.3) | 102 (53.1) | | |

+ Figures in parentheses are percentages. * $X^2$ significance at $P<0.05$

### 4.5.4 Type of Caregivers

The primary persons who prepared foods and fed the child as well as the type of caregivers who substituted for mothers while at work are listed in Table 19. In general, the two groups of households were not significantly different in the type of persons involved in child food preparation and feeding.

A high proportion (i.e. 86.4% in the malnourished and 87% in the well nourished households) of households in both types of households reported that the mother was the primary person who prepared food for the child. Similarly, the proportion of households which reported that the mother was the primary person who fed the child was high in both types of households (i.e 83.3% and 85.4% in the malnourished and well nourished households respectively).

On the other hand, however, the two types of households were found significantly different in the type of persons who attended the child when mother was away ($p<0.05$). Grandmothers constituted a higher proportion of caregivers in the well nourished type of households (27.1%) than those in the malnourished type of households (10.3%).

Siblings/maid/neighbours constituted practically the same and high proportion of caregivers in both types of households (57.4%) in malnourished and 52.1% in well nourished households).

Table 19: Distribution of Households by Type of Persons Who Provide Care to the Child.

| Type of caregiver | Malnourished households | Well nourished households | $X^2$ | P value |
|---|---|---|---|---|
| Person usually prepares child's food (N=192) | | | | |
| mother | 166 (86.4) | 167 (87.0) | 3.7 | 0.2 |
| grandmother | 13 (6.8) | 19 (9.9) | | |
| siblings/ maid/neighbours | 13 (6.8) | 6 (3.1) | | |
| Person usually feeds the child (N=192) | | | | |
| mother | 160 (83.3) | 164 (85.4) | 4.8 | 0.09 |
| grandmother | 13 (6.8) | 19 (9.9) | | |
| siblings/ maid/neighbours | 19 (9.9) | 9 (4.7) | | |
| Person looked after the child when mother is away | (n=68) | (n=48) | | |
| goes with mother | 22 (32.3) | 10 (20.8)* | 5.44 | 0.04 |
| Siblings/ maid/neighbours | 39 (57.4) | 25 (52.1) | | |
| grand mothers | 7 (10.3) | 13 (27.1 | | |

+ Figures in parentheses are percentages. * $X^2$ significance at $P<0.05$

## 4.6 Ranking of Risk Factors of Malnutrition

Ranking of child care practices according to their contribution to malnutrition was made using odds ratio at 95% confidence interval (Table 20). The odds ratio showed that children who exclusively breastfeed for more than four months are about four times more

likely to be exposed to malnutrition than those who do not. The risk of malnutrition is also 1.6 times more likely to occur among children of women who are working away from home than among those who are not working outside their home. The likelihood of occurrence of malnutrition among children of households which store child food for more than 24 hours is about three times more than among those of which did not. Similarly, occurrence of malnutrition was 2.3 times more likely among children of women who are sick than among those of healthy women. Children who do not get 4 meals per day are approximately 2.5 times more likely to develop malnutrition than those who did. The practice of feeding children with unwashed hand is about two times more likely to expose children to malnutrition than is with washed hand.

Table 20: Estimated Relative Risk of Malnutrition by Child Care Practices

| Risk factor | Malnourished households N=192 | Well nourished households N=192 | Odds ratio (95% CI) |
|---|---|---|---|
| exclusive BF >4 months | | | |
| yes | 46 (23.9)+ | 14 (7.3) | 4.01 |
| no | 146 (76.1) | 178 (92.7) | 2.04<OR<7.98 |
| Mother had illness | | | |
| yes | 104 (54.2) | 65 (33.9) | 2.3 |
| no | 88 (45.8) | 127 (66.1) | 1.5<OR<3.5 |
| Feeding with unwashed hand | | | |
| yes | 135 (70.3) | 102 (53.1) | 2.1 |
| no | 57 (29.7) | 90 (46.9) | 1.34<OR<3.25 |
| Feeding frequency | | | |
| <4 times | 99 (51.6) | 57 (29.6) | 2.5 |
| ≥4 times | 93 (48.4) | 135 (70.4) | 1.62<OR<3.92 |
| Food storage time | | | |
| >24 hours | 44 (22.9) | 16 (8.3) | 3.27 |
| ≤24 hours | 148 (77.1) | 176 (91.7) | 1.7<OR<6.3 |
| Mother's occupation | | | |
| working outside home | 69 (35.9) | 49 (25.5) | 1.6 |
| not working outside | 123 (64.1) | 143 (74.5) | 1.03<OR<2.6 |

+ Figures in parentheses are percentages

# CHAPTER FIVE

# DISCUSSION

## 5.1 GENERAL RESULTS

### 5.1.1 Prevalence of Malnutrition

The prevalence of stunting and underweight in the study area was found to be relatively high as compared with the findings made by Wolde-Michael and Demeke in 1985. This indicates that the level of malnutrition in Addis Ababa is increasing.

However, even the *kebele* with highest rates of underweight and stunting (*Kebele* 31 with prevalence of 46.9% and 56.5% respectively) had much lower prevalence than those found in a slum area of Nairobi in 1990 where these were 58.4% and 86.2% respectively. Prevalence of wasting (3.4%) was, however, higher than the one (1.9%) found in the Nairobi slum (Waihenya *et al.*, 1996). The observation that the highest prevalence of both stunting and underweight was found in *kebele* 31 suggests that the living conditions in *Kebele* 31 are worse than in the other three *kebeles* which are, most likely, associated with high unemployment problem.

### 5.1.2 Demographic and Socioeconomic Characteristics

Both types of households were found to have an equal and a relatively large household size which is a manifestation of typical slum communities.The dependence ratio which was also found to be similar in the two types of households indicates a high number of dependents which characterises many communities in developing countries.

The education level of mothers in both households is generally low. The findings on maternal level of education in this study is similar to that of other studies in the slums which showed that the over all educational status of mothers was very low (Herpham. 1988: Manciaux. 1984). The mean age of mothers which was about thirty years in both malnourished and well nourished households suggests the prevalence of young motherhood in both sets of households.

The socio economic conditions of the well nourished households seemed to be comparatively better than those of the malnourished households as shown by a relatively higher household income. more number of residential rooms. mean per capita calorie and protein intake and higher literacy rate of household heads. The employment status of mothers also sereves in differentiating the two sets of households. A significantly higher proportion of mothers in the malnourished households were found to work away from home. This indicates that maternal employment is a source of household income in the malnourished households compared to that of the well nourished households. Finally, the results of this study also indicates that the presence of a relatively high number of siblings was another demographic aspect that the two types of households were sharing in common.

## 5.2 DISCUSSION ON CHILD CARE PRACTICES

### 5.2.1 Child Feeding Practices of the Study Households

As in other developing countries initiation rate of breastfeeding was very high regardless of the type of household. An earlier study conducted in North Ethiopia by Tessema and Hailu (1996) also observed a comparatively high initiation rate of breastfeeding (99.8%). In the present study, this indicates that the value attached by both types of mothers to breastfeeding is the same. For this study, therefore, initiation of breastfeeding was not picked as a risk factor of malnutrition.

Different authors have different views on the issue of appropriate duration of exclusive breastfeeding and timing of introduction of complementary foods. In this connection, Waterlow et al. (1979 and 1980) suggested that breast milk alone is insufficient to meet the nutritional needs of infants after the age of three months. In contrast, others, for example, Juez *et al.* (1983) and Brown *et al.* (1995) reported that introducing complementary foods before six months has no nutritional benefit to children. .The observation of prolonged exclusive breastfeeding (beyond four months of age) in a significantly high proportion of mothers in the malnourished type of households supports Waterlow's contention and indicates that exclusive breastfeeding beyond four months of life is a risk factor for developing malnutrition. Hence, this finding suggests that there is a need for a further investigation on the appropriate duration of exclusive breastfeeding and review the current recommendation

which supports supplementation to be at the point of six months of age.

This study has also shown that the practice of prolonged exclusive breastfeeding (between four to six months and even beyond this age) is a common occurrence among the low income households as shown by the high proportion of those earning less than 251 *Birr* in malnourished households compared to those in the well nourished households (section 4.5.1.1). This would suggest that delayed introduction of complementary foods which was observed in the malnourished type of households is a function of household food insecurity. Thus, an intervention programme that would be initiated in the urban slums should focus on those families whose monthly income falls below 251 *Birr*.

The relatively higher median duration of breastfeeding observed in malnourished households whose income is low is also another confirmation that mothers in these households have little choice other than depend mainly on breast milk.

The observation that there was little difference in the type of complementary foods used by the two sets of households, except a higher proportion of malnourished households giving non-enriched porridge (only cereal preparations), can be explained by the fact that the general level of socio-economic and demographic characteristics were not different. The practice of giving only

cereal preparations may be due to lack of mothers' knowledge about the importance of enriching weaning foods as better child care practices or their economic constraints may limit their ability to improve the quality of the diet.

Although cow milk was given by most mothers in the two groups of households, the amount of milk fed to both types of children may have been very low to account for differences in nutrient intake. The significantly higher protein intake by children in the well nourished households may have been increased by consumption of enriched porridge and probably by the intake of other foods as shown by the greater frequency of feeding in these households.

Most of the traditional weaning foods given to children are known to be bulky and to have low nutrient density.A young child has a limited capacity to manage large amounts of food at a time and hence requires frequent feeding to get enough nutrients. Recommendation to date is that feeding frequency be at least four times per day (Brown, 1995). The finding that a significantly higher proportion of well nourished children received four meals/day as compared to malnourished children underscores the importance of frequent feeding and confirms that four times is the critical minimum frequency to avoid the risk of malnutrition.

The practice of infrequent feeding of foods which are in fact too bulky as reported widely in many developing countries (Mitzner *et*

*al.*, 1984) does not only result in low energy and protein intake but also low intake of micronutrients. This could be aggravated by failure to give vegetables and fruits as reported by both types of households and the poor bioavailability of nutrients as most of the weaning foods used by both types of households are composed exclusively of plant sources.

The significantly high use of bottle for feeding porridge in the malnourished households could have resulted in more contamination of the porridge due to poor cleaning of bottles or prolonged holding of porridge in the bottles. This may have resulted in higher diarrhoea occurrence in these households (section 4.5.2.2) than in well nourished households. Contamination of weaning preparations that are fed through feeding bottles result in marasmus and other types of malnutrition namely kwashiorkor and marasmic kwashiorkor (Pellet,1977) as a consequence of infections.

### 5.2.2 Health Seeking Practices of the Study Households

High coverage of immunizations against diseases of childhood is reported as a safeguard for better nutrition and health (Viteri, 1987). However, the results of this study showed that immunization status which was found to be similar in the two groups of children (section 4.5.2.1) did not appear to be a predictor of child nutritional status. This confirms the importance of other factors in the causation of malnutrition and suggests that immunisation may be a necessary condition but not sufficient by itself for maintaining

adequate nutritional status. This is not surprising considering the fact that the aetiology of malnutrition is known to be multi-faceted (UNICEF,1990).

The observation that there was a high proportion of the well nourished households which took their children to hospitals or clinics for treatment of diarrhoea suggests that management of diarrhoea at health services is more effective for maintaining adequate nutritional status than home-based management of diarrhoea. This may be due to the fact that the type of diarrhoea management offered at health services may have a protective implication (may be use of antibiotics protecting child against other infections) as opposed to home managed diarrhoea. On the other hand, the lower utilization rates of health services by the malnourished households may suggest that these households were financially constrained and could not afford to pay for treatment, travel to hospitals/clinics or purchase drugs.

Withholding of food during illness is considered as one of the factors that brings about malnutrition as it reduces food intake of children at a time when nutrients needs are elevated. The results of this study, however,did not confirm that food withholding is a risk factor as it did not make a difference in the nutritional status of children in the two sets of households (section 4.5.2.3).

### 5.2.3 Hygiene Practices of the Study Households

Poor hygienic practices and unsanitary environmental conditions are associated with high prevalence of infections and are hence associated with malnutrition. These conditions apart from causing direct infections can cause infection which result from consumption of contaminated food or water or fluids. Brown *et al.* (1995) suggested that the issue of optimal child care practices must include prevention of children's food from contamination to reduce the risk of infection.

This study has found an association between some selected variables of household hygiene behaviours and malnutrition. This is an indication that the prevalence of malnutrition in the slum area is also a consequence of poor hygienic behaviours of households. The attributes of hygiene behaviours that have been found to explain nutritional status in this study are feeding with unwashed hands, long holding of food after cooking, keeping food and drinking water uncovered, presence of stagnant water in compound and child waste inside house.

The high prevalence of the practice of feeding children with unwashed hands in malnourished households compared to the prevalence in well nourished households would strongly suggest that personal hygiene is one of the risk factors that exposes children to malnutrition. This could be explained by the fact that the caregiver's hands might be a source of potential pathogens capable of causing infections.

such as, diarrhoea, and thus.contributed to the synergism between malnutrition and disease as described by Brown. et al. (1995).

The finding that long holding of food after cooking was related to malnutrition is not surprising since such practice is known to have a negative impact on child survival (Mitzner *et al.*, 1984 and Brown *et al.*, 1995). This is due to microbial development that occurs during long holding of food at temperatures that are favourable to that process. This implies that precaution is not taken to prevent recontamination for a second and/or subsequent serving.

The observations that a significant number of malnourished households stored food and drinking water in uncovered receptacles when compared to those of the well nourished type is not unexpected since storing of food and water without covering is likely to result in contamination which exacerbates the chances of negative nutritional consequences.

The findings of this study suggest that the presence of stagnant water in the compounds exposes children to a higher risk of contamination. hence, the cycle of infectious disease and malnutrition.

The presence of faeces inside the house as observed in a significantly higher proportion of households of the malnourished type would be expected to cause food contamination and parasitic

infestations. Thus, this observation is not unexpected since both of these, as aforementioned are involved in the malnutrition infection/infestation vicious cycle (Brown *et al.* ,1995).

This study established an association between recent illness experience with nutritional status. This confirms the relatively important contribution of illness to nutritional status of young children which has been documented by others (Kaiser and Dewey, 1991; and Mazur and Sanders, 1988). It is probable that the poor household hygiene practices observed in the malnourished type of households are partly responsible for the significantly high prevalence of morbidity among the malnourished children.

The observation that there was a significantly high number of malnourished children with diarrhoea is plausible as this reflects the well known fact that diarrhoea is more common among children with poor nutritional status (Necla et al., 1988; and Cameron and Hofvander, 1983).

## 5.6 Maternal Morbidity

The higher prevalence of morbidity among mothers of malnourished children compared to that of mothers of well nourished children is not surprising since maternal morbidity has been known to have a negative impact on child care (Engle and Menon,1996; and Winkvist, 1995) which inevitably affects the nutritional status of children. A mother who is frequently ill may not be able to prepare food and

feed her child properly and would also spend less time in providing other critical aspects of care.

The higher prevalence of headaches and coughs among the mothers with malnourished children may be due to stress associated with economic deprivation or it happened as a result of poor environmental and residential sanitary practices.

# CHAPTER SIX

# CONCLUSION AND RECOMMENDATIONS

## 6.1 CONCLUSION

The findings of this study suggest that the two types of households were different in child feeding (including calorie and protein intake), health seeking and hygiene practices as inappropriate feeding, low utilization of health services and poor hygienic practices were common among those families who had malnourished children when compared to those with well nourished children.

This study leads to the conclusion the following are risk factors in malnutrition:

. prolongation of exclusive breastfeeding beyond four months of age
. feeding supplementary diet with a frequency of less than four times within a day
. partaking porridge using bottle feeding, and
. the practice of feeding weaning diets which are exclusively made from cereal sources.

The study also leads to the conclusion that poor sanitation in residential areas and unhygienic practices of households namely. stagnant water in the compound and faecal matter inside the house, prolonged holding of cooked foods, poor handling of drinking water and foods are other principal factors which contribute to prevalence of nutrition insecurity in the slums of Addis Ababa.

Based on the findings of the present study, conclusion is also made that the risk of malnutrition is expected to be high when morbidity status of the child's mother is poor and if children do not get health facility based management during a diarrhoea episode.

The study has also led to the conclusion that families with an average of six members and earn a monthly income of less than 251 *Birr* are high-risk groups to nutritional insecurity. Hence, an intervention programme that would be initiated in the urban slums should be planned in favour of these groups.

The educational level of heads of household, maternal occupation, the per capita calorie and protein consumption as well as residential crowding and poor housing condition are risk factors in poor nutritional status in the households.

The similarity between the two types of households in terms of household size, maternal education and age, dependency ratio as well as number of under five year old children leads to the conclusion that the general level of socio-economic and demographic characteristics of the slum community is almost the same.

## 6.2 RECOMMENDATIONS

1. The place of empowerment of child caregivers to improve and protect nutrition security is well understood. Therefore, skills training and income generating projects should be planned for women

groups recruited from those families whose monthly income is below 251 *Birr*. This will enable them to form production units and produce goods by themselves for their own use and/or sell to the immediate community to improve their income. The skills training and income generating project can include the following activities:

A) Community based food processing and packaging including
   -processing of legume based low-cost weaning foods. and other composite flours

B) Garment making, including
   - weaving
   - sewing including school uniforms
   -printing and dyeing children's clothes

C) Instalment of grain mill for provision of a reasonably priced milling services for these low income groups.

2. This study has disclosed that child malnutrition would result if exclusive breastfeeding goes beyond four months. Therefore. it is recommended that mothers should be advised not to continue exclusive breastfeeding after four months and instead supplementation should begin at this point of age.

3. The preparation of weaning diets from a single food group (cereal sources in the case of this study) is still a problem in the slum section of Addis Ababa. Since this kind of practice leads to the formulation of low quality diet. demonstrative and sustained nutrition education on preparation of nutritious diets from homely

available foods is strongly recommended. The processing of legume based low-cost weaning foods by the women groups can play an important role in making available such an appropriate child food.

4. The recommendation made by other workers on the provision of at least four meals for good nutrition is once again confirmed through this study. Therefore, nutritionists, health workers and other cadres of nutrition should continue the advocacy of four times as a critical minimum feeding frequency.

5. There is also need to advice the slum communities to use spoon and cup in feeding children and avoid the practice of giving porridge with feeding bottle.

6. A participatory study should be undertaken to establish how the households are knowledgeable about household hygiene and sanitation practices. Then based on such findings, strong health education campaign should be made focusing on:

- -washing hands before feeding children, preferably with soap
- -keeping drinking water/foods covered
- -keeping houses/compounds free from faecal materials
- -avoidance of stagnant water from residential compounds
- -not to store child foods for more than 24 hours
- -the importance of seeking proper treatment for children during the event of diarrhoea.

7. Residential crowding and poor housing conditions were related to poor nutritional status and thus housing shortages may limit the overall success of public health programmes that would be planned for the urban slums. Therefore, self-help housing improvements that can be linked to income generating schemes of the women groups to produce cheap construction materials (eg. carpentry, mason skills) is recommended to resolve the aforementioned problem.

8. Improvement of maternal health through safe mother hood programme is recommended to make them able to provide optimal care for their children.

9. Further research on the nutritional effect of exclusive breastfeeding beyond four months and determination of appropriate timing of complementation is recommended, especially in the slum communities where under nutrition and social deprivation is common.

10. Research should also be made in the slum settings to investigate the level of contamination of complementary foods with increased duration of storage after cooking.

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Appedix 1: Distribution of Household Heads by Sex and Household Type

| Sex | Malnourished household (N=192) | Well nourished household (N=192) |
|---|---|---|
| Male | 139 (72.4)* | 149 (77.6) |
| Female | 53 (27.6) | 43 (22.4) |
| Total | 192 (100.0) | 192 (100.0) |

* Figures in parenthesis are percentages

Chi-square=0.8 DF=1 P=0.36

Appendix 2: Distribution of Households by size and by Household Type

| Household size | Malnourished household (N=192) | Well nourished household (N=192) |
|---|---|---|
| 2-3 | 31 (16.1)* | 20 (10.4) |
| 4-6 | 79 (41.1) | 88 (45.8) |
| 7-9 | 63 (32.8) | 57 (29.7) |
| ≥10 | 19 (10.0) | 27 (14.1) |
| Total | 192 (100.0) | 192 (100.0) |

* Figures in parenthesis are percentages

Chi-square=3.5 DF=3 P=0.3

Appendix 3: Distribution of Households by Maternal Education and Household Type

| Education level | Malnourished household (N=192) | Well nourished household (N=192) |
|---|---|---|
| NO educ. | 64 (33.3)* | 58 (30.2) |
| Primary | 60 (31.3) | 48 (25.0) |
| Above primary | 57 (35.4) | 86 (44.8) |
| Total | 192 (100.0) | 192 (100.0) |

* Figures in parenthesis are percentages

Chi-square=3.4 DF=2 P=0.17

Appendix 4: Questionnaire

PART ONE

CHILD INFORMATION / CHARACTERISTICS AND ANTHROPOMETRY

1.Zone -- 2. Woreda (district) --- 3. Kebele ---

4. Household no. ---- 5. Name of household head ----------

6. Name of the youngest child ----------

7. Date of interview ----------

8. Date of birth --------- 9. Age in months -------

10. Sex: Male=1 Female=2

11 (a). Weight to the nearest 0.1 kg.

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ |

11 (b). Height/Length to the nearest 0.5 cms

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ |

12. Name of the second youngest child ----------

13. Date of birth -------- 14. Age in months -----

15. Sex: Male=1 Female=2

16 (a). Weight to the nearest 0.1kg.

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ |

16 (b). Height/Length to the nearest 0.5 cms.

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ |

17. Name of the third youngest child ----------

18. Date of birth ---------- 19. Age in months-------

20. Sex : male = 1 Female = 2

21 (a). Weight to the nearest 0.1 kg.

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ | ¦__¦__¦.¦__¦ |

21 (b). Height/Length to the nearest 0.5 cms.

| 1st reading | 2nd reading | average |
|---|---|---|
| ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ | ¦__¦__¦__¦.¦__¦ |

PART TWO:

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Zone------ 2. Woreda (district) ---------- 3. Kebele------ 4. H.H NO.------ 5.Date of interview ----------

6. Name of head of H.H.---------- 7. Name of respondent---------- 8. Name of interviewer----------

| Ser NO | Name | Sex | Age | Religion | Ethnic | Marital status | Relatn to H.H head | Education |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
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codes

| Ethnic | Marital status | Relation to h.h head | Religion | Education | Sex |
|---|---|---|---|---|---|
| Amhara=1 | single=1 | husband=1 | orthodox=1 | illitrate=0 | male=1 |
| Oromo=2 | married=2 | wife=2 | muslim=2 | preschooler=99 | female=2 |
| Tigre=3 | divorced=3 | daughter=3 | catholic=3 | write school years | |
| Gurage=4 | widowed=4 | son=4 | protestant=4 | for literate | |
| Sidama=5 | separated=5 | grand child=5 | Other-------- | | |
| Welaita=6 | not applicable=6 | parent=6 | | | |
| Kembata=7 | | maid=7 | | | |
| Hararie=8 | | sister=8 | | | |
| Other(specify) | | brother=9 | | | |
| ---------- | | not related=10 | | | |

SECTION B: BREASTFEEDING AND WEANING PRACTICES

1. Type of child

   Malnourished = 1  Well nourished = 2

2. Name of child ----------

3. Date of birth ----------

4. Age in months ----------

5. Age obtained from

   1= clinic attendance card 2= mother 3= clinical estimate

6. Sex :male = 1  female = 2

7. Are you breast feeding your child now?

   1 = yes  2 = no

8. (If the child is not breastfeeding) How old was your child when you stopped breastfeeding ? ----------months

9. At what age did you start giving your child any other food/drink in addition to breast milk?

   At -------months

10. What foods / drinks were the child first introduced and what method of feeding have you used?

| Type of food | Name of food | Method of feeding |
|---|---|---|
| Liquid | | |
| | | |
| | | |
| | | |
| Semi-solid | | |
| | | |
| | | |
| | | |

codes

spoon = 1

hand feeding = 2

feeding bottles = 3

other (specify)----------

11. Excluding breast milk, how many times was the child fed yesterday?

0= none 1= 1 times 2= 2 times 3= 3 times
4= 4 times 5= 5 times 6= 6 times
7= more than 6 times

SECTION C: IMMUNISATION, MORBIDITY AND FOOD WITHHOLDING

12. Is the child fully immunized for age?

1 = yes 2 = no

13. During the last seven days, did your child suffer from any disease?

1 = yes 2 = no

14. (If yes) Which illness?

1 = Diarrhoea 2 = Fever 3 = Running nose
4 = cough 5 = Vomiting
6 = Other, specify ----------

15. How do you treat diarrhoea?

1= Traditional health care 2= Gave ORS
3= Gave water 4= Gave tea
5= Hospital/clinic 6= Other(specify)
---

16. Do you withhold any food during diarrhoea?

1 = yes 2 = no

17. (If yes) What foods do you withhold?

| Food | Code |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |

18. During the last two weeks. did the mother of this child suffer from any sickness?

1 = yes 2 = no

19. (If yes) Which illness?

1= Fever 2= Gastrointestinal problem
3= Diarrhoea 4= Headache 5= Eye problem
6= Cough/Colds 7= Disabled 8= Vomiting
9= Other. specify----------

SECTION D: ECONOMIC AND MATERNAL OCCUPATIONAL DESCRIPTION

20. what is the occupation of the mother of this child?

1= House wife 3= Self-employed (outside house)
2= employed 4= Other(specify)----------

21. Who takes care of the child when the mother is away from home?

1= Father 5= Maid
2= Sibling less 6= Neighbours
3= Grand mother 7= Normally goes with mother
4= Friends 8= Other(specify)----------

22. Who. usually prepares the meal for the child ?

1= Mother 5= Neighbours
2= Grandmother 6= Father
3= Siblings 7= Maid
4= Relatives 8= Other (specify) ----------

23. Who usually feed the child?

1= Mother 5= Neighbours
2= Grandmother 6= Father
3= Siblings 7= Maid
4=Relatives 8= Other (specify) ----------

24. What is the total household income per month? birr ------

SECTION E : HOUSE CHARACTERISTICS, HOUSEHOLD HYGEINE, SANITATION AND ENVIRONMENTAL INFORMATION

25. Observe the main house and record the building materials

floor -------

wall -------

roof -------

codes

1= mud
2= corrugated tin
3= grass
4= block
5= bricks
6= cement
7= other.( specify)----------

26. How many rooms are there in this house? ----------

27. What type of latrine does this household own?

1= private 2= communal 3=none

28. What is your source of water?

1= tap in the house
2 = communal tap
3= tap but purchased from neighbours
4= well
5= others. specify ----------

29. Once you cooked foods for your child. for how long do you store it? for --------hours.

30. Do you always wash your hand with soap before feeding your child?

1=yes 2= no

31. Examine and answer the following questions

1= yes 2= no

(a). Are water containers covered? ------

(b). Are there human faeces in the interior? ----

(c). Are there human faeces within 10 meters of the house? ---

(d). Are there animal faeces (dogs.chicken etc. within 10 meters of the house?--------

(e). Presence of drainage for dirty water?--

(f). Presence of stagnant water in the compound?-------

(g). Is uncovered food plainly visible in the house? -----

PART THREE

HOUSEHOLD FOOD INTAKE: 24-HOUR RECALL

1. Name of h.h. head _____ 2. H.H. No _____3. Date _____4. Name of interviewer_____

5. What did your family eat the whole of yesterday?_

| Meal time | Dish | Ingredient | Amount of ingredient | Waste portion in ingredients | Amount of cooked dish | Amount eaten | Energy k/cal. | Protein (g) |
|---|---|---|---|---|---|---|---|---|
| Breakfast | | | | | | | | |
| Snack 1 | | | | | | | | |
| Lunch | | | | | | | | |
| Snack 2 | | | | | | | | |
| Supper | | | | | | | | |
| Total | | | | | | | | |

6. How many people consumed each of the above meal?

| Meal time | Consumed by number |
|---|---|
| Breakfast | |
| Snack 1 | |
| Lunch | |
| Snack 2 | |
| Supper | |