ASSOCIATION BETWEEN MALNUTRITION AND FEEDING PRACTICE AMONG CHILDREN AGED SIX–TWENTY FOUR MONTHS AT MBAGATHI DISTRICT HOSPITAL-KENYA

A Dissertation submitted in partial fulfillment of the requirements for the Degree of

M.med –Pediatrics at the UNIVERSITY OF NAIROBI

By: DR.RESPICIUS BAKALEMWA

H58/62061/2011

NOVEMBER 2014

DECLARATION

I certify that this Dissertation is my original work and has not been presented for the award of a degree in any University.

Signed……Date……

Dr. Respicius Bakalemwa

This dissertation is submitted with full approval of my supervisors:

Dr. Dalton Wamalwa

Senior Lecturer, Department of Pediatrics and Child Health, University of Nairobi

Signed ……..Date ……..

Dr. Florence Murila

Senior Lecturer, Department of Pediatrics and Child Health, University of Nairobi.

Signed…….Date…….....

ACKNOWLEDGEMENT

- First and foremost, I have to thank my research supervisors Dr.Dalton Wamalwa and Dr. F.Murila .I am thankful for their aspiring guidance, invaluably constructive criticism and friendly advice during the project work. I am sincerely grateful to them for sharing their truthful and illuminating views on a number of issues related to the thesis. Without their assistance and dedicated involvement in every step throughout the process, this thesis would have never been accomplished. I would like to thank you very much for your support and understanding over these past three years.
- My appreciation goes to Mbagathi District Hospital team for allowing this study to be conducted within the hospital and use their patients in the study.
- I would like to extend my gratitude to Prof: Obimbo head of the department of pediatrics and child health and the entire department staffs for their comments and technical supports.
- I would like to acknowledge PRIME-Kenya for their financial, academic and technical support.
- Finally I would like to thank my family especially my wife Revina Simon who encouraged me and prayed for me throughout the time of my research.
- This thesis is heartily dedicated to my father Mzee CHRISTOPHER BAKALEMWA who took the lead to heaven before the completion of this work.

TABLE OF CONTENTS

DEFINITION OF TERMS

Complementary feeding: Complementary feeding is defined as the feeding process Which starts when breast milk alone is no longer sufficient to meet the nutritional? Requirements of infants, and therefore other foods and liquids are needed, along with Breast milk for healthy growth and development.

Exclusive breastfeeding: Exclusive breastfeeding refers to the practice whereby the Child receives only breast milk, not even water - for the first six months of life for healthy Growth and development.

Guardian: A person legally instructed with the care of, and managing the property and rights of the baby and must have stayed with the baby not less than six.

Malnutrition: The term is used to refer to a number of conditions, each with a specific Cause related to one or more nutrients (for example, protein, iodine or calcium) and each Characterized by cellular imbalance between the supply of nutrients and energy on the One hand and the body's demand for them to ensure growth, maintenance, and specific Functions on the other.

Stunting: Height-for-age Z-scores (HAZ) reflect linear growth retardation and are used To describe long-term nutritional status; stunting is defined as HAZ < -2 Z-scores.

Underweight: Weight-for-age Z-scores (WAZ) represent a global measure of Malnutrition; and underweight is defined as WAZ < -2 Z-scores

Wasting: Weight-for-height Z-scores (WHZ) reflect more current nutritional status and Measure the degree of thinness in a child; wasting is defined as WHZ < -2 Z-scores.

Z-scores: A Z-score (or standard deviation score) is defined as the deviation of the value Of an individual child from the median value of the reference population, expressed in Standard values.

LIST OF ABBREVIATIONS

BMI	Body Mass Index
CFs	Complementary Foods
CHO	Community Health Officer
CI	Confidence Interval
Cm	Centimeters
ENA	Emergency Nutrition Assessment
GDHS	Ghana Demographic and Health Survey
GDP	Gross Domestic Product
HAZ	Height-for-Age Z-score
Kg/ m2	Kilogram per meter square
KDHS	Kenya Demographic and Health Survey
LBW	Low Birth Weight
MDHS	Malawi Demographic and Health Survey
P-Value	Probability Value
SAM	Severe Acute Malnutrition
SD	Standard Deviation
UN	United Nations
UNICEF	United Nations Children's FUND.
USA	United States of America
USAID	United States Agency for International Development
WAZ	Weight-for-Age Z-score
WHO	World Health Organization
WHZ	Weight-for-Height Z-score

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background**:** Exclusive breast feeding for the first six months of life and appropriate introduction of complementary feeds is a key determinant of the nutrition status of children.

Objective: To assess the feeding practices among children 6- 24 months of age and its relationship with their nutritional status at Mbagathi District hospital.

Methodology: We conducted a case control study at the MDH pediatric emergency outpatient clinic between February and April 2013. Nutritional assessment was done using anthropometry weight for-height and height-for age; and examined the children for visible severe wasting as well as the presence of edema. Malnourished children who fulfilled the selection criteria and those who their parent accepted to participate in the study were consecutively enrolled into the study. And each case was matched with well-nourished controls of similar age.

Results: A total of 220 children with their mothers were enrolled in the study in which 110 were cases and 110 were control. A significantly larger proportion of malnourished children (9.4%) than well nourished children (1.8%) were given pre-lacteal feeds (p=0.036; χ^2-test. There was a trend toward statistical significance in time breastfeeding was initiated between cases and controls (p=0.07; χ^2-test).Slightly higher proportional (80%) of control than cases (75%) were initiated on breastfeeding in the first one hour. A significantly higher proportion (90%) of mothers of children with normal nutritional status than (78%) mothers of malnourished children exclusively breastfed their children for longer periods (p=0.001; χ^2-test).Malnourished children were introduced to complimentary feeds at a significantly lower mean age (3.6±0.8 months) compared with children with normal nutrition status (3.9±.4 months) (p=0.003; t-test).

Conclusions/recommendations: An inappropriate feeding practice of infant and young children was associated with worse nutritional status. To reduce childhood malnutrition due emphasis should be given in improving the practice of parents on appropriate infant and young child feeding.

CHAPTER ONE: INTRODUCTION

Globally malnutrition has been responsible, directly or indirectly, for 60.0% of the 10.9 million deaths annually among children under five. Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life. No more than 35.0% of infants worldwide are exclusively breastfed during the first four months of life; complementary feeding frequently begins too early or too late, and foods are often nutritionally inadequate and unsafe. **(2)** . Feeding practices that are reviewed in this study are breastfeeding practices and complimentary practices.

1.0.1 Breastfeeding Breast milk alone is ideal start to an infant's life. Inappropriate breastfeeding, especially lack of exclusive breastfeeding during the first half-year of life are important risk factors for infant and childhood morbidity and mortality (2). Breastfeeding is nearly universal throughout the first year of life for both urban and rural children in Kenya. In the second and third years of life, breastfeeding rates decline, and they decline more rapidly in urban areas. However, breastfeeding rates remain quite high overall through the second year in most communities. The use of baby feeding bottles is considered an unhealthy and inappropriate practice as far as child feeding is concerned. However, it is documented that the use of baby feeding bottle is still practiced in many countries; in Ghana, about 12.0% of young children are fed using baby feeding bottles (6). This practice has health and nutrition implications for young children and the community at large.

.Breast milk is the best way to satisfy the nutritional and psychological need of the baby. The human milk has inherent anti-infective properties which no any other milk has .this proactive of function of human milk is extremely important in developing countries where the exposure to infection is very high. Some of the advantages of breast milk according to WHO (1) are:

- Breast milk is the best natural food for the baby
- Breast milk is always clean
- Breast milk protect the baby from diseases
- Breast milk makes the baby more intelligent
- Breast milk available for twenty four hour a day and needs no special preparation
- Breast milk is nature" gift to the infant and does not need to be purchased
- Breast milk make a special relationship between the infant and the mother
- Breast milk help he parents to space their children
- Breast milk help the mother to shed the extra weight gained during pregnancy.
- Breast milk is easy to digest

1. 0.2 Early initiation of breastfeeding

Early initiation of breastfeeding is extremely important for successful establishment of lactation as well as proving colostrums (mother's first milk) to the baby. Ideally the baby should receive the first breast feed as soon as possible preferable within the first one hour after birth. The newborn is very active during the first half an hour, and if the baby is kept with the mother while efforts are made to breastfeed, infants learn suck very fast. This early suckling by the infant initiates the process of milk formation in the mother and help in the secretion of breast milk. In case of caesarean section, with the support for the mother, breastfeeding can be initiated within four to six hours after birth (2).

It is essential that the baby gets the first milk (colostrums) which is thicker and yellowish than the later milk. Colostrums is limited in amount and it lasts only for first few days (1) .

Early initiation of breastfeeding is encouraged for a number of reasons. Mothers benefit from early suckling because it stimulates breast milk production. The first breast milk Contains colostrums, which is highly nutritious and has antibodies that protect the newborn from diseases like diarrhea that predispose the child to early malnutrition. Early initiation of breastfeeding also fosters bonding between mother and child.

Globally, over one million newborn infants could be saved each year by initiating breastfeeding within the first hour of life. In developing countries alone, early initiation of breastfeeding could save as many as 1.45 million lives each year by reducing deaths mainly due to diarrheal disorders and lower respiratory tract infections in children (4). WHO recommends early initiation of breastfeeding (i.e. within one hour of giving birth). A recent trial has shown that early initiation of breastfeeding could reduce neonatal mortality by 22%. This would go a long way in the achievement of the Millennium Development Goals (5).

Overall in Kenya, 58 percent of children are breastfed within one hour of birth and 86 percent within one day after delivery. Forty-two percent of children are given something before breastfeeding (prelacteal feed). The proportion of children who receive a prelacteal feed is negatively correlated with the level of education of the mother; children whose mothers have no education are the most likely to receive a prelacteal feed (54%), while those whose mothers have attended primary school are the most likely to receive a prelacteal feed (54%), while those whose mothers have attended secondary school are the least likely to be fed before starting breastfeeding (36 percent). Children born at home are more likely to receive a prelacteal feed (51%) than those born in a health facility (31%). The proportion of children who receive a prelacteal feed is negatively correlated with the household wealth (9) .

1.0. 3 Exclusive Breast Feeding

The world health organization (WHO) recommends that infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods with breastfeeding continuing for up to two years of age and beyond (2) .Exclusive breast feeding is associated with multiple advantages including child's acquisition of passive immunity against infection, nutrients for physical and mental development, emotional security and closeness to the mother. Breastfeeding drastically reduces deaths from acute respiratory infections and diarrhea which are the two major causes of infant mortality worldwide and in addition to protection from other infectious diseases. Despite these advantages, only 39% of all infants aged 0 to 5 months in the developing world are exclusively breastfed while < 60% of those aged 6 to 9 months continues to be breastfed while receiving complementary foods (6) .

In Kenya Exclusive breastfeeding rates at 6 months have witnessed a decline from 3.5 per cent in 1998 (7) . This means that less than 3 in every 100 Kenyan infants are exclusively breastfed within the first half hour of birth and for the first 6 months. However, with such a low proportion of children exclusively breastfed, this potential is not realized.

The implication is that 97 per cent of Kenyan infants are being exposed daily to an increased risk of disease, and have lowered immunity because they are given foods other than breast milk before they are 6 months old.

According to UNICEF (6), between 2000- 2007, the percentage of infants aged 0 to 5 months exclusively breastfed in Sub-Saharan Africa was only 31%. Such a scenario is typical in Tanzania where exclusive breastfeeding during the first 6 months is rarely practiced. The 2004/2005 TDHS shows that only 41% of infants below 6 months of age are exclusively

breastfed. Among children under 6 months, younger children are more likely to be exclusively breastfed. For example 70% of infants < 2 months of age received breast milk only compared to 14% of infants aged 4 to 5 months (8).

In addition to low adherence to exclusive breast feeding, many infants begin to receive cereal-based complementary foods well before the 6- month. Low adherence to exclusive breast feeding for the first 6 month and risk of diarrhea disease from contaminated complementary foods given to infants well before 6 months of age is believed to contribute to malnutrition observed in infants at this age (< 6months).

Exclusive breastfeeding during the first 6 months of life also helps to avoid or reduce exposure to contaminants and displacement of breastfeeding by water or other foods (3). Exclusive breastfeeding is recommended because breast milk is uncontaminated and contains all the nutrients necessary for children in the first few months of life. In addition, the mother's antibodies in breast milk provide immunity to disease (9). The increased use of infant formula and other breast milk substitutes too early in a baby's life contributes to the high degree of under development and malnutrition in our children (9) . And babies given cow's milk and formula early in their lives has over 60% more risk of being malnourished .

There has been noted an exception to the benefits of breastfeeding in a study done in Turkey that showed no association between stunting and mean time of breast-feeding/exclusive breast-feeding. (10)

1. 0.4 Complementary feeding: WHO recommendation on complimentary feeds (1)

i. Start giving other foods at 6 months. Breastfeed exclusively from birth to 6 months, then begin to give tastes of other foods while continuing to breastfeed frequently and on-demand

ii. Continue breastfeeding for 2 years or longer. Continue breastfeeding as often and for as long As you and your baby want to.

iii. Practice 'Responsive Feeding'. Respond to your child's signs of hunger and feeding abilities. Give help and encouragement (without force feeding), feeding slowly and patiently, experimenting with different foods, tastes, combinations and textures, Minimizing distractions, using plenty of smiles, eye contact and encouraging words, so that feeding becomes a time for learning and love.

iv. Prepare and store foods safely. Wash and clean your hands, your child's hands and utensils before preparing food and feeding. Ideally, foods should be given immediately after preparation. If you have to store prepared foods unrefrigerated, use within 2 hours or save only until the next meal and reheat thoroughly. Store ingredients in cool closed containers so that they cannot get contaminated. Avoid using feeding bottles because they are difficult to keep clean.

v. Gradually increase the amount of food offered. Start with small amounts at 6 months and increase the amount offered as your child shows more interest, while maintaining frequent breastfeeding. The energy needs from complementary foods are approximately 200 kcal/day at 6-8 months,300 kcal/day at 9-11 months, and 550 kcal/day at 12-23 months.

vi. Vary the consistency and variety of foods offered. Respond to your child's interest and ability to handle different textures and consistency. To begin with, babies need soft foods, but they soon learn to chew. By 8 months, babies can eat 'finger foods' - foods that they hold themselves. By 12 months, they can eat most family foods, cut into small pieces or softened as needed, but they still need to be given the nutrient-rich 'best bits' of the family's food.

vii. Increase the number of times food is offered. Offer two to three times a day at six-eight months and three to four times a day at nine –twenty four months, plus nutritious snacks once or twice a day, as desired, in addition to breastfeeding.

viii. Give nutrient-rich foods. Give meat, poultry, fish, beans, peas, lentils, nut-pastes, and/or milk Products particularly if meals do not contain animal-source foods. Give colored fruits and Vegetables daily. Try not to give the 'staple' food on its own, for example, don't give plain rice or maize porridge, but add a nutrient-rich food such as, ground fish, egg, pulses or nut paste. Don't give sodas, sugary drinks, coffee or tea. These drinks fill tummies and displace more nutritious foods. If your child is thirsty, offer breast milk or plain boiled water.

ix. Protect Health with Vitamins and Minerals. Give a wide variety of foods as this will increase the chance of meeting vitamin and mineral requirements. Young children fed vegan or Vegetarian diets usually need suitable vitamin and mineral supplements or fortified foods to Meet their nutrient needs. Other mothers and children may also need to use appropriately Fortified foods or take supplements according to local conditions.

x. Breastfeed more frequently during illness. Offer more fluids and favorite foods during illness. For at least two weeks after illness, encourage your child to eat more food.

Early supplementation is discouraged for several reasons. First, it exposes infants to pathogens and increases their risk of infection, especially disease. Second, it decreases infants' intake of breast milk and therefore suckling, which reduces breast milk production. Third, in low-resource settings, supplementary food is often nutritionally inferior.

Infants and young children are at increased risk of malnutrition from six months of age onwards, when breast milk alone is no longer sufficient to meet all nutritional requirements and complementary feeding needs to be introduced to them. Timely introduction of appropriate complementary foods promote good health and positive nutritional status of infants and young children during a period of rapid growth, physiological maturation and development (11).

Complementary foods are often of lesser nutritional quality than breast milk and some of the nutrients may have low bioavailability and utilization. In addition, they are often given in insufficient amounts, quality and if given too early or too frequently, they displace breast milk. Poor breastfeeding and complementary feeding practices, coupled with high rates of infectious diseases, are the principal causes of malnutrition during the first two years of life (11). According to TDHS 2004/2005, complementary feeding generally starts at an early age and is recorded in 7% of children under the age of 2 months, 32% of children aged 2 to 3 months and 58% of children aged 4 to 5 months(9).

1. 0.6 Diagnosis of malnutrition

Acute malnutrition is determined by a child's weight and height, by calculating weight-for-height as "Z-Score" (WHO Child Growth Standard 2006) and the presence of edema. The weight-for-height index measures body mass in relation to body height or length and describes the current nutritional status. Children whose Z-scores are below minus two standard deviations

(-2 SD) are considered thin (wasted) and are acutely malnourished. Those whose weight-for-height is below minus three standard deviations (-3 SD) are considered severely wasted.

The height-for-age index is an indicator of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) are considered short for their age (stunted) and are chronically malnourished. Children who are below minus three standard deviations (-3 SD) are considered severely stunted. Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake.

Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic malnutrition. Children whose weight-for-age is below minus two Standard deviations are classified as underweight. Children whose weight-for-age is below minus three standard deviations (-3 SD) are considered severely underweight.

Below is a table summarizing the anthropometric criteria of identifying acute malnutrition.

Table 1: Anthropometric criteria to identify severe, moderate and at risk categories of acute malnutrition in children aged 6-59 months

INDICATOR	SEVERE ACUTE MALNUTRITION	MODERATE ACUTE MALNUTRITION	AT RISK OF ACUTE MALNUTRITION.
W/H Z scores	< - 3 Z-Score	Between -3 to < -2 Z-Score	Between -2 to <-1 Z-Score
MUAC	< 11.5 cm	11.5 to 12.4 cm	12.5 to 13.4 cm
Edema	Symmetrical Edema present	Edema absent	Edema absent

CHAPTER II: LITRATURE REVIEW

Malnutrition causes about 5.6 million of 10 million child deaths per year, with severe malnutrition contributing to about 1.5 million of these deaths (12) . The nutritional status of children is the best indicator of the well being of children. Issues that cause a decline in the nutritional status of children are multidimensional and difficult to understand (13) . In South Africans, to ensure that all children can achieve optimal nutrition, lower the incidence of infectious disease and malnutrition related deaths in infants and children, it is thought that it is necessary to understand the factors contributing to malnutrition (14)

The United Nations Children's Emergency Fund (UNICEF) conceptual framework of child Malnutrition shows multiple levels for interventions that can reduce morbidity and mortality related to malnutrition. To prevent or treat malnutrition the factors causing the condition need to be evaluated. The different causes of malnutrition are interlinked and include immediate causes, underlying causes and basic causes (3).All these factors operate together and not independently (15) .

The World Health Organization (WHO) defines malnutrition as "the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions." Malnutrition generally implies under- nutrition and refers to all deviations from adequate and optimal nutritional status in infants, children and in adults. In children, under nutrition manifests as underweight and stunting (short stature), while severely undernourished children present with the symptoms and signs that characterize conditions known as kwashiorkor, marasmus or marasmic-kwashiorkor. Malnutrition can be acute or chronic or a combination of both. Acute malnutrition can be classified as moderate acute malnutrition (MAM) and severe acute malnutrition (SAM); these are determined by the patient's degree of

wasting. All cases of bilateral edema are categorized as SAM. Chronic malnutrition is determined by a patient's degree of stunting.

SAM is further classified as marasmus, kwashiorkor, and intermediate states of marasmus-kwashiorkor. Marasmus is derived from the Greek word *marasmos,* which means withering or wasting. Marasmus involves inadequate intake of protein and calories and is characterized by emaciation. Kwashiorkor is taken from the Greek language of Ghana and means the "sickness of the weaning" or "the disease of the displaced (from the mother's breast)" child. Dr. Cicely .D. Williams first used the term in 1933 and it refers to an inadequate protein intake with reasonable caloric (energy) intake. Edema is characteristic of kwashiorkor but is absent in marasmus.

2.0. 1 Immediate causes of malnutrition

UNICEF (2004) (3) classifies the immediate causes of childhood malnutrition as insufficient diet as well as stress, trauma, disease (severe or frequent infections) and poor psychosocial care. Insufficient dietary intake may refer to poor breastfeeding practices, early weaning, delayed introduction of complementary foods and insufficient protein in the diet. The inadequate intake can also be linked to neglect and abuse (3) (15) . Other factors that influence food intake include health status, food taboos, growth and personal choice related to diet (16).

2.0.1.1 Inadequate diet

Inadequate dietary intake and poor nutritional status go hand in hand. It is uncommon for well-nourished children to die from diarrhea, therefore maintaining a good nutritional status can help with the improvement of child survival (17) .

Factors contributing to the development of protein-energy-malnutrition (PEM) include cultural and social practices that lead to the exclusion of certain foods due to food taboos, food

and dietary fads and migration from rural areas to urban slums (18). Dietary choices are influenced by parents' nutritional knowledge, preference for alternative foods and true or perceived food allergies (19) .

Malnutrition can also develop due to neglect, abnormal mealtimes with a carer/parent or insufficient quantities of food. Food quantity and quality in turn may be influenced by insufficient parental knowledge, poor appetite in the child or neglect, physical or emotional abuse (20) .Sometimes the mother restricts the child's food intake. This is either because the mother did not want the child or because a second child is born and there is not sufficient money to buy food for the expanding family (18).

When income decreases, the quality and quantity of food also decreases. Evidence shows that when unemployment and low wages are presenting factors, families eat cheaper food, which may be less nutritious, leading to weight loss and malnutrition (21) . As food products derived from animals are usually more expensive, children's intake of proteins and nutrients from these groups decreases with poverty (22) . Malnutrition therefore also develops when the food ingested does not meet the high protein and energy needs of the child (18).

Globally, the practice of breastfeeding is declining; (14) (23) . When exclusive breastfeeding is not practiced it can contribute to a high prevalence of malnutrition (14) . In South Africa the practice of exclusive breastfeeding is very low. The South African Demographic and Health Survey (SADHS) found that of all three month old babies, only ten percent were exclusively breastfed and 48.3 percent (%) were bottle fed (14). In addition, inadequate weaning practices and poor infant feeding practices lead to low protein and energy intake (23).

2.0.1.2 Timing of complementary feedings

In Kenya, complementary foods are introduced as early as the first month and by 6 months, 84 percent of infants are already receiving complementary feeds. Unfortunately, these supplementary foods which replace breast milk are low in energy and micronutrients. This coupled with unhygienic preparation and storage conditions predisposes many infants to diarrhea and inadequate diets causing a negative impact on growth and development which is very characteristic of this age group in KENYA (7) .

The target age range for complementary feeding is generally 6 to 24 months of age although breastfeeding may continue well beyond the second year. Timely introduction of appropriate

a complementary food promotes good nutritional status and growth in infants and young children. Too early or too late introduction of complementary foods is not appropriate feeding practice as it carries many risks which contributes to persistent child malnutrition. Unfortunately, both too early introduction of complementary foods (< 6month) and delayed introduction have been reported in Sub-Saharan Africa (24) and Tanzania in particular (Hussein, 2005; NBS and ORC Macro, 2005). Although, the introduction of complementary foods in Tanzania has improved as shown by available statistics from 1992 through 2005, however, there are still numerous cases of too early complementary feeding practices in Tanzania. The variations in trends of feeding practices by age (months) in Tanzania are shown Tables 1 and 2. According to TDHS 2004/2005, complementary feeding generally starts at an early age and is recorded in 7% of children under the age of 2 months, 32% of children aged 2 to 3 months and 58% of children aged 4 to 5 months. Previous studies have also shown that complementary foods are usually introduced at an early age in Tanzania (25) .

The age at which complementary foods are introduced depends on many factors including social and economic issues, geographical locality and ethnicity. For instance, among nomadic tribes such as the Wadatoga of Mbulu district, animal milk and milk products are commonly introduced before the age of two months while grain based solids are introduced at the age of nine months (9). In the neighboring Dodoma, the introduction of complementary foods was reported to start at three to four months of age (26) (25). Furthermore in Morogoro, mothers from medium and high-income groups introduced complementary foods to children at an early age compared to those in lower income groups that is, 1 to 2 months in the medium and 5 to 6 months in the high-income group (27). Similar complementary feeding practices and timings have been reported (28) with some evidence that introducing cereal gruel before the age 4 months poses potential risks to the infant that may trigger early malnutrition (29). This is because too early introduction of complementary foods is reported to stress the immature gut, kidneys and immune system, increased allergies and morbidity due to diarrhea (30). Further, the early introduction of complementary foods pre-disposes the infants to reduced protective benefits of the breast milk. Moreover, risks of microbial contamination as a result of poor hygiene that results to gastrointestinal infections are higher with complementary foods. In addition, the micronutrients in complementary foods are not absorbed as well as those in breast milk thus increasing the chances of slow growth pattern among infants. Similarly, a cohort study of infants in Vietnam found that the early introduction of complementary foods resulted in the slowdown of growth (31). A downward trend in mean weight of age (WA) was also observed from approximately the age of 3 months, following the initiation of complementary feeding since the fluids and solids introduced to infants early tend to be of lower nutritional quality than the breast milk.

Factors leading to nutrient deficiencies and low energy and protein intakes seen in children are the increased use of diluted cow's milk and vegetable foods and a delay in giving children family foods (32). Even though breast milk is rich in high quality protein (33) prolonged exclusive breastfeeding may cause a delay in the introduction of complementary foods and can result in micronutrient deficiencies. This is because human milk is low in some of the micronutrients such as iron and zinc (34).

On the other hand, babies are sometimes weaned too early because of another birth, Causing the mother to cease breastfeeding of the older baby. Babies are then often weaned on a thin cereal with low quality protein, causing the older child to become ill when the new baby arrives. Children cannot obtain food for themselves (33) (20) and they have small gastric capacities, meaning they are incapable of ingesting large amounts of, or sufficient, food. This in turn can lead to malnutrition.

In developing countries malnutrition may develop after breastfeeding is ceased because of low milk production, death of the mother or because the mother decided to bottle-feed her infant. Mothers may decide to bottle-feed because of their Human Immunodeficiency Virus (HIV) status, work commitments or because the baby is not living with them (35). Breast milk substitutes may be unsuitable because of a high renal solute load (cow milk) or low energy density (diluted cow's milk or incorrect formula) (20) .

The early introduction of complementary food is associated with an increased risk of respiratory infections, eye infection and a high incidence of malaria morbidity. When complimentary foods are started, there is a reduction in breast milk consumption, which can lead to a loss of protective immunity. This causes a higher morbidity when unhygienic foods are used, due to the

development of diarrhoea. In a study done in India (36), growth curves falter by the fourth month of life due to the early introduction of weaning foods.

In Prevention of Mother to Child Transmission (PMTCT), mothers that opted for exclusive breastfeeding had a mean duration of exclusive breastfeeding of less than one month

2.0.2 Consequences of malnutrition

Malnutrition results in poor physical and cognitive development as well as lower resistance to illness. In addition to the human suffering, the loss in human potential translates into social and economic costs that no country or most countries can afford (37). Less than optimum feeding practices during this critical period (less than 2 years of age) can increase the risk of growth faltering (wasting and stunting) and nutritional deficiencies and may have longer-term adverse effects on health, mental development and level of productivity in later years of life. Adequate nutrition during infancy and early childhood is fundamental to the development of each child's full human potential. It is well recognized that the period from birth to two years of age is a "critical window" opportunity for the promotion of optimal growth, health and behavioral development. After a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier. Adults who were undernourished in childhood earn significantly less and contribute less to economic growth. Under nutrition also reduces Gross Domestic Product in every country across the globe. It is believed that under nutrition arises from a complex, multiple and interactive events or causes. The immediate causes include poor childhood feeding practice, inadequate dietary intake and disease. Underlying these are causes operating at household and community levels: household food insecurity, inadequate care for women and children, and unhealthy household environments and lack of health services, with income poverty

underpinning all three. Ultimately, these factors are determined by the larger political, economic, social and cultural environment.

2.0.3 Problem Statement

Under nutrition is a human disaster on a vast scale especially among children under two years of life living in developing countries communities. Chronic under nutrition affects one in three children in developing countries. Malnutrition accounts for the death of more than 3 million children and more than 100,000 mothers every year. Under nutrition cripples the immune system, making children much more susceptible to disease. It increases the risk of anemia and women dying during pregnancy and childbirth. It prevents proper brain development, which means children are less able to start school when they should, and less able to learn and perform. Adults who were undernourished in childhood earn significantly less and contribute less to economic growth. Under nutrition also reduces Gross Domestic Product in every country across the globe. The immediate causes include inadequate dietary intake and disease. Underlying these are causes operating at household and community levels: household food insecurity, inadequate care for women and children, and unhealthy household environments and lack of health services, with income poverty underpinning all three.

2.0.4 Study justification

Good nutrition in early ages is translated into high productivity and economic development at the national level. There is increasing recognition that optimal complementary feeding depends not only on what is fed, but also on how, when, where, and by whom the child is fed (38) Poor feeding practices lead to malnutrition. This study looked at the association of feeding practices and malnutrition in our set up.

The results will also serve as baseline data for the Mbagathi District. It shall also provide information on the feeding practices associated with children with malnutrition in the area. Understanding the practices and the possible reason for the feeding practices is important as it will guide us in coming up with better interventions informed by local findings. The results of this study will guide interventions specific to the target population.

2.0.5 General Objective

1. To compare infant feeding practices among children aged six -twenty four months with PEM, with that of healthy controls at Mbagathi district hospital.

2.0.6 Specific Objectives

1 To compare breastfeeding practices (timing of initiation and duration of exclusive breastfeeding among children aged six -twenty four month with PEM, with that of healthy controls at Mbagathi district hospital.

2 To compare complementary feeding practices among children aged six -twenty four month with PEM, with that of healthy controls at Mbagathi district hospital.

3 To compare the social economics characteristics among children aged six -twenty four month with PEM, with that of healthy controls at Mbagathi district hospital.

2.0.7 Research questions

1. Is there an association between exclusive breast-feeding practice of children when they are less than six months and their nutritional status at Mbagathi district hospital?
2. Is there an association between feeding practice of children aged six-twenty four months and their nutritional status at Mbagathi district hospital

CHAPTER III: MATERIALS AND METHODS

3.0 Study design

This was hospital based case control study in which malnourished children (cases) were matched for age with well-nourished children (controls). The controls were children aged 6-24 months without malnutrition (weight for age greater than 80 % of the standard, with neither edema nor other signs of malnutrition), and their caretakers/mothers.

3.0.1 Setting

The study was carried out at the pediatric filter clinic (outpatient), pediatrics wards and MCH clinic at Mbagathi District Hospital –Kenya over a period of three months. Mbagathi District Hospital it has a monthly average admission and outpatient attendance of approximately 340 and 2600 monthly for children less than 5 years respectively. The catchment area for the hospital is Golf Course within Dagoretti division with population of less than 5 years of 4960 and a total population of 39061.

3.0.2 Study population

This consisted of children attending Mbagathi district Hospital with a diagnosis of moderate to severe protein energy malnutrition (kwashiorkor, marasmus, or both, according to the Z-score classification. Include children without malnutrition according to Z-score classification.

3.0.3 Inclusion criteria

Case: Children aged six–twenty four months with moderate to severe protein energy malnutrition, according to Z-score classifications it is defined by the WHO, and those with bilateral edema whose their parent/caretaker consented to participate in the study.

Control: Include children without malnutrition according to Z-score classification and without bilateral edema, aged six-twenty four months attending Mbagathi district.

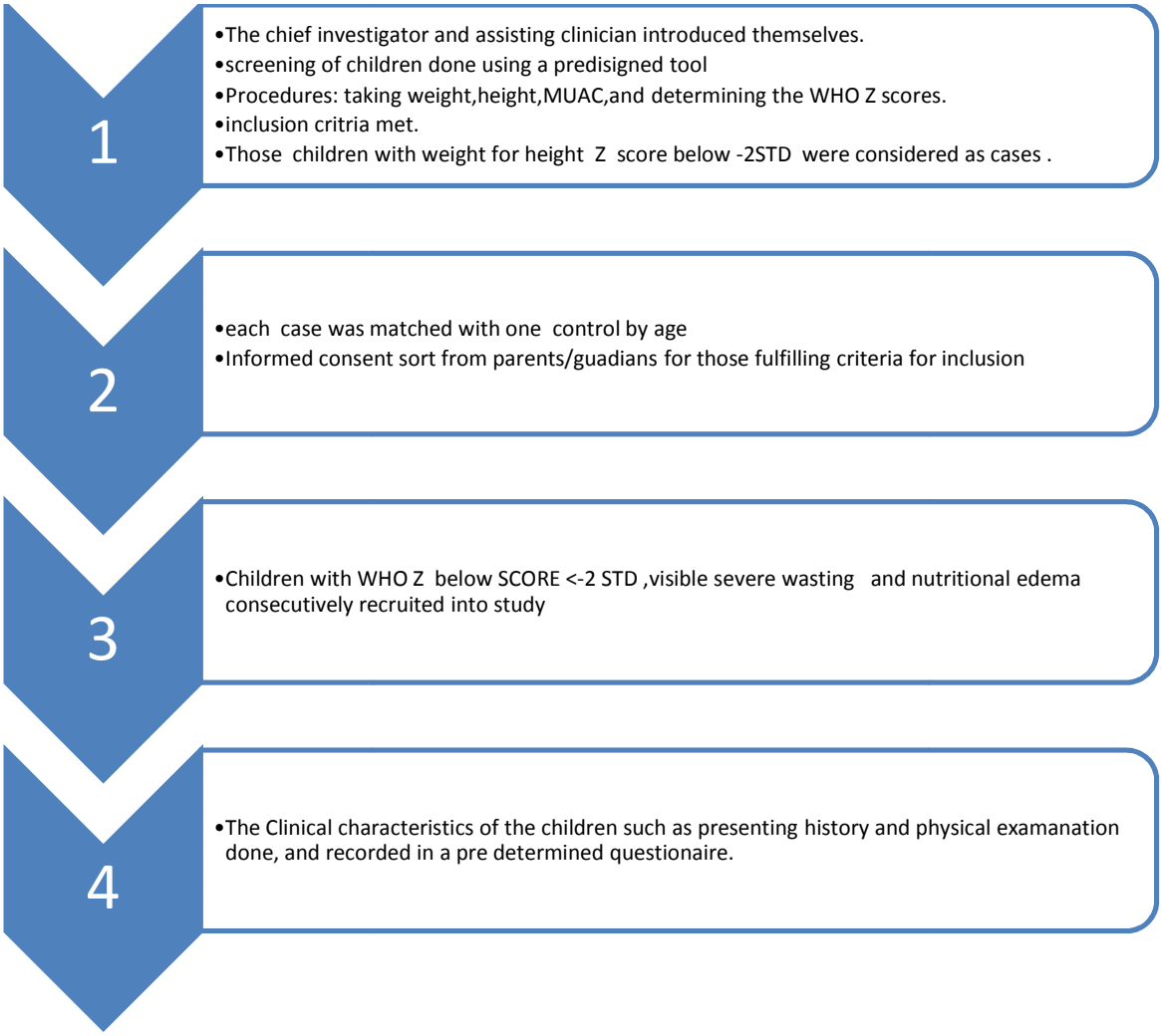
Each case was matched for age with one control.

3.0.4 Exclusion criteria

i. Children whose mothers/caretakers had not been staying with them within six months prior to the study,
ii. Children whose parents/caretaker were not willing to participate in the study.
iii. Sick children who were not accompanied by a caretaker.
iv. Children who had unilateral edema
v. Children with confirmed chronic illnesses such as mental illness, cerebral palsy and cancer were excluded from the study.
vi. Children with bilateral edema of other confirmed cause apart from nutritional like chronic liver or renal or heart failure.

3.0.5 Sampling and sample Size

Malnourished children who fulfilled the selection criteria and those whose their parent accepted to participate in the study were consecutively enrolled into the study. They were matched with well-nourished controls of similar age. The controls were recruited by drawing on the attendance register of the unit at the emergency unit, MCH clinic or admission book from the admitting ward. In case there were more than two well-nourished children suitable as controls, one of them was chosen using simple random sampling. All the cases and controls were assigned identification numbers and their files/hospital records tagged to avoid double recruitment.



3.0.6 Sample size calculation

Stata Version 9 (Stata Corp College Station, Texas) was used to calculate the sample size. This was done using the Formula for two-sample proportions with the following assumptions:

- P1 = Proportion of exclusive breastfeeding among the general population in Bangladesh
- P2= proportion of exclusive breastfeeding among the malnourished children in Bangladesh

Alpha = 0.05 (two-sided), power = 0.9000

p1 = 0.32 (KDHS), p2 = 0.13 (Bangladesh)

N2/n1 = 1.00

Estimated required sample sizes:

- n1 = 110(cases)
- n2 = 110 (control)

3.0.7 Study procedures

Children eligible to participate in the study were identified from the ward/MCH. Informed consent was sought from the parents after explaining to them about the study ,nutritional assessment was done using the anthropometric measurements of weight for length, visible severe wasting and bilateral edema criteria then those below -2SD were defined as cases and those above -1SD were define as the control. A structured questionnaire was administered to the child's parent(s).Each individual case was matched with its control for age

The age of the child was estimated to the nearest completed month using the parents or guardians report, birth or baptismal certificate and health record cards (growth monitoring card, clinic/ hospital follow up card). For those children requiring emergency attention were not excluded from the study instead their nutrition assessment was done as soon as they were clinically stable. Sampling was done consecutively for those who agree to participate in the study until the desired sample size is obtained. An identification number was stacked onto the subject's card to avoid double recruitment.

3.0.8 The WHO measuring technique

All patients were weighed and had height measured to determine eligibility for inclusion in the study based on the main WHO anthropometric indices – WAZ, HAZ and WHZ.

Weight:

Body weight measurements were conducted using a Salter scale (maximum capacity-25 kg). Daily calibration of the scale was done by checking the scale against a known weight of 10 kg or less each morning before use. The weighing pants were attached to the lower hook of scale, and the instrument was adjusted to zero. The clothes of the child were removed and the pan was put on. The weight was read to the nearest 0.1 kg with the scale at eye level. The measurer read the value out loud; the assistant repeated it and recorded it on the recording form.

3.0.9 Measurements of length

For children less than 87 cm the measuring board is placed on the ground.

1. The child was placed lying down along the middle of the board.
2. The assistant holds the sides of the child's head and positions the head until it firmly touches the fixed headboard with the hair compressed.
3. The measurer placed her hands on the child's legs, gently stretches the child and then keeps one hand on the thighs to prevent flexion.
4. While positioning the child's legs, the sliding foot-plate is pushed firmly against the bottom of the child's feet.
5. To read the height measurement, the foot-plate was perpendicular to the axis of the board and vertical.
6. The height is read to the nearest 0.1cm

3.1 DATA MANAGEMENT

3.1.1 Data collection

A data collection form was be used to record anthropometric measurements, the socio demographic data, the history and physical examination findings of the study subject. A predesigned form was used to record laboratory data.

3.1.2 Data analysis

Data obtained was coded and entered into Microsoft access data base. Data cleaning was done prior to analysis and any inconsistencies in data were verified against the original questionnaires before amendments were made. Data were then transferred to Statistical Package for Social Sciences (SPSS) version 18 for analysis. Descriptive statistics were used to summarize data using means, standard deviation and median for continuous variables including age and Z scores. Categorical data like patients' gender, proportions with specific clinical features were summarized by calculating percentages which were presented as frequency tables, and charts.

The Chi square test and Fishers exact test were used to compare categorical data among children with and those without bacteraemia. Similar comparisons for continuous data were conducted using the student t test.

3.2 ETHICAL CONSIDERATIONS

Permission to conduct research was sought from the Department of Paediatrics and Child Health, University of Nairobi, the Kenyatta National Hospital Scientific and Ethical Review Committee and the Mbagathi District Hospital health management team.

Informed consent was sought from the parents of eligible children and the health workers attending to the children. Information obtained was treated with confidentiality and was kept within the limits of the research objectives.

Withdrawal from the study did not compromise management and quality of care given to the patient and this was stated to the parents. There were no additional costs to the parent's or health care workers.

If a child was found to be malnourished, the child was classified appropriately and the clinical team and parents were alerted. Those who had not been put on appropriate care were started on nutritional rehabilitation following the national guideline for integrated management of acute malnutrition and booked for follow up before discharge to the nearest paediatric clinic. Emergency care and resuscitation was always a priority to the study during data collection

CHAPTER FOUR: RESULTS

Study population

A total of 220 children aged between 6 and 24 months and whose mothers or legal guardians gave informed consent for their participation, were recruited into the study. Their mean age was 11.7±5.2 months and there was no significant statistical difference in age between boys (12.3±5.6 months) and girls (11.0±4.5 months) (p=0.07; t-test). The mean birth weight of the children was 3.1±0.5 kg. There was no significant difference in birth weight between malnourished children and children with normal nutritional status (n=220, p=0.43; t-test).

The children were categorized into four age groups (6-10months, 11-15months, 16-20months and 20-24months respectively) as shown in Table 1.2. There was no significant statistical difference in age groups between boys and girls (p=0.31; χ^2-test).

The overall mean age of the mother was 26±4.4 years. There was no significant difference in mean age between mothers of malnourished children and those of children with normal nutritional status (p=0.14; χ^2-test). Similarly, there was no significant difference in nutritional status between children born through spontaneous vertex delivery (SVD) and those born through caesarean section (CS) (p=0.07). The general characteristics of the study population in relation to nutritional status are shown in Table 1.1

Table 1: General characteristics of the study population in relation to nutritional status

		Malnourished (n=110)	Normal nutritional (n=110)	Overall N=220	*p*-value
Birth weight (kg) Mean ±SD		3.1±0.6	3.1±0.4	3.1±0.5	**0.43**
Age (months) Mean ±SD		11.7±5.3	11.7±5.0	11.7±5.2	**0.99**
Mother's Parity Mean ±SD		2.2±1.2	2.1±1.2	2.2±1.2	**0.62**
No. Of children in family Mean ±SD		2.2±1.2	2.0±0.9	2.1±1.1	**0.18**
Age of mother (yrs) Mean ±SD		26.2±4.4	27.0±3.8	26.6±4.2	**0.14**
Sex	Male	53(44.9%)	65(55.1%)	118	**0.11**
Mode of delivery	SVD	103(50.2%)	102(49.8%)	205	**0.07**

Table 2: **Ages of children in relation to sex**

Sex	**6–10 months**	**11–15 months**	**16–20 months**	**21–24 months**	**Total**
Boys	56	34	14	14	118
Girls	53	33	11	5	102
Total	**109**	**67**	**25**	**19**	**220**

Out of the 220 children, 110 had malnutrition whereas 110 did not have malnutrition as defined by World Health Organization (WHO 2006). The former were thus regarded as cases and the latter were regarded as the controls. There was no significant statistical difference in age between the cases and the controls (p=0.99; t-test) and neither was there a significant statistical difference between the number of boys and girls in cases or controls groups (p=0.11; χ^2-test). There was also no significant statistical difference in the number of cases and controls in the age groups (p=0.12; χ^2-test) as shown in Table 1.3.

Table 3: Children's age group in relation to their nutritional status

Age groups	6–10 months	11–15 months	16–20 months	21–24 months	Total
Cases	55	33	12	10	110
Controls	54	34	13	9	110
Total	**109**	**67**	**25**	**19**	**220**

Of the 110 children with malnutrition, 33 (30%) and 77 (70%) had moderate and severe malnutrition, respectively. A significantly higher proportion of malnourished (by weight/height), (23%) children had severe stunting than children with normal nutritional status (8%) (p=0.03; χ^2-test). The proportions of stunted children are shown in Figure 1.1.

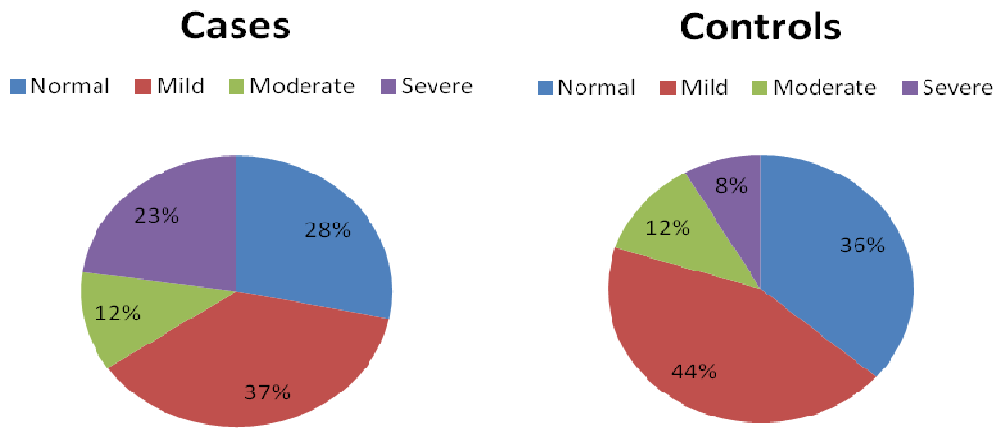


Figure 1: Pie chart showing the proportions of children in relation to their linear growth (stunting)

The mean age of the mothers interviewed was 26.6±4.2 years. There was no significant difference between malnourished children and children with normal nutritional status in relation to their mothers' ages (n=220, p=0.14; t-test).

The mean parity of the mothers was 2.2±1.2 and there was no significant difference in parity between mothers of malnourished children and those of children with normal nutritional status (p=0.62). There was no significant difference in parity of the mothers between malnourished children and children with normal nutritional status (n=220; p=0.66, χ^2-test). The proportions of malnourished children and children with normal nutrition status in relation to parity are shown in Figure 1.2

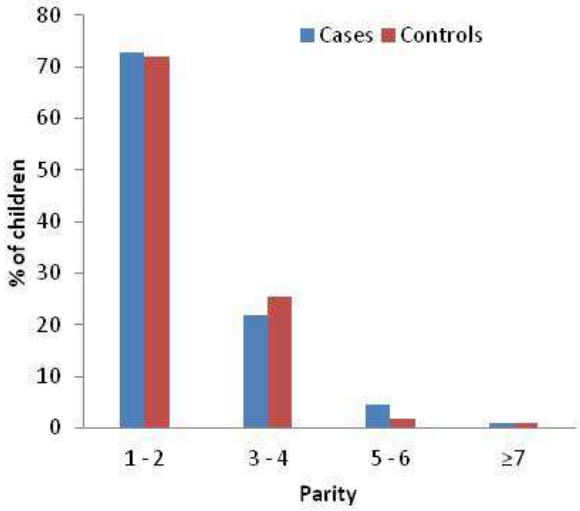


Figure 2: Proportions of children in relation the parity of their mothers Socio-economic status in relation to malnutrition

Marital status

The marital status of the mothers in relation to the nutritional status of their children was recorded. Of mothers with malnourished children, 97 and 13 were married and single, respectively whereas of mother with children with normal nutritional status, 104 and 6 were married and single, respectively. There was no significance difference between malnourished children and children with normal nutritional status in relation to the marital statuses of their mothers (p=0.09; χ^2-test).

Parent's highest education levels

The nutritional statuses of the children were compared in relation to the education levels of their parents. Low level or no education of both parents related negatively with the nutritional status of their children. Malnourished were more likely to come from the family of both parent with low and no education, as the parent's education level increased also the nutritional status of their children improved. There were highly significant differences between malnourished children and children with normal nutritional status in relation to the education levels of their mothers and their fathers (p<0.001 and p<0.001, respectively; χ^2-test). The number of children in relation to their nutritional statuses and education levels of their parents are shown in Table 1.4.

Table 4: The number of children in relation to their nutritional statuses and education levels of their parents

	Mothers		Fathers	
Level of education	**Malnourished**	**Normal**	**Malnourished**	**Normal**
No formal	3	0	2	0
Primary	58	28	28	15
Secondary	32	54	29	49
College	16	27	15	35
Total	**109**	**109**	**74**	**99**

Parent's occupation

The nutritional statuses of the children were compared in relation to the occupation of their parents. Parents occupation was strongly associated with the nutritional status of their children, unemployed parents or those without permanent job (casual) most their children had poor nutritional status compared with those children whose their parents were employed. There were highly significant differences between malnourished children and children with normal nutritional status in relation to the occupation of their mothers and their fathers ($p<0.001$ and $p=0.001$, respectively; χ^2-test). The number of children in relation to their nutritional statuses and occupation of their parents are shown in Table 1.5.

Table 5: Children's nutritional statuses in relation to their parent's their occupation

	Mothers		Fathers	
Occupation	**Malnourished**	**Normal**	**Malnourished**	**Normal**
Unemployed	58	29	4	1
Employed	33	62	49	92
Casual	16	18	20	7
Total	**107**	**109**	**73**	**100**

Household income: The nutritional statuses of the children were compared between in relation to monthly household income. There was a highly significant difference between malnourished children and children with normal nutritional status in relation their monthly household income (n=213, $p<0.001$; χ^2-test).Low monthly house hold income was associated with children's poor nutritional status, most of the children(52%) with malnutrition come from the family with an average of monthly house hold income of between 5000ksh-10000ksh compared with (40%) of children with normal nutritional status who come from the family with monthly house hold income of more than 20000ksh.The proportions of the children in relation to their nutritional statuses and monthly household income are shown in Figure 1.3.

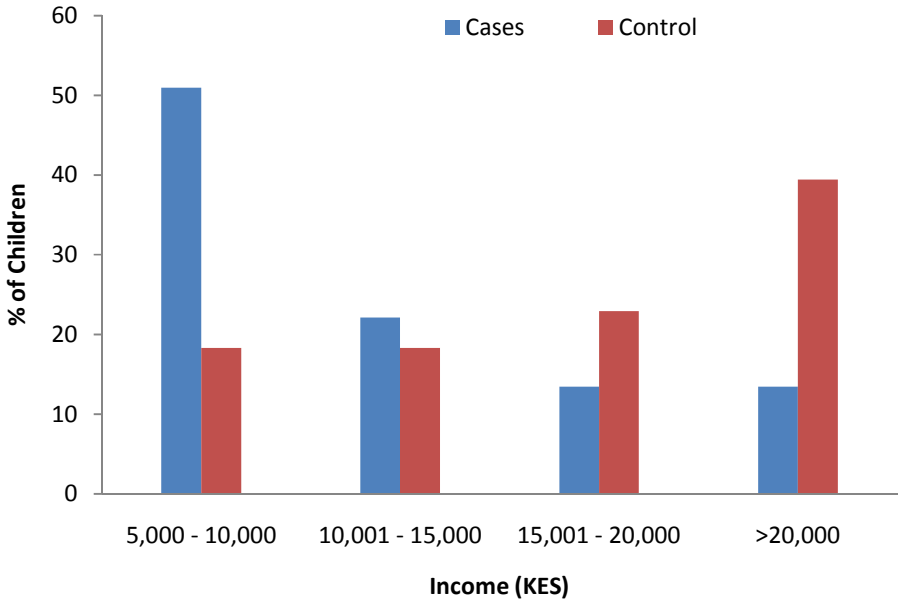


Figure 3: The proportions of the children in relation to their nutritional statuses and monthly household income

Number of rooms and type of wall

The type wall and the number of room in the residential houses were used as an indicator of socio-economic status of the families from which the children came. There were three types of wall namely; mud walls, iron sheet walls and concrete walls. Significantly more children with malnutrition lived in houses made of iron sheet wall with single room (p=0.009; χ^2-test). There was a borderline significant difference between malnourished children and children with normal nutritional status in relation to the number of rooms in houses made of concrete walls (p=0.049; χ^2-test). There was no significant difference between malnourished children and children with normal nutritional status in relation to the number of room in houses made of mud walls (p=0.377; χ^2-test). The types of walls and the number rooms in the residential houses in relation to the nutritional status of the children are shown in Table 1.6.

Table 6: The types of walls and the number rooms in the residential houses in relation to the nutritional status of the children

	Mud wall		**Iron sheet wall**		**Concrete wall**	
No. of Rooms	**1**	**>1**	**1**	**>1**	**1**	**>1**
Cases	7	2	50	10	13	21
Controls	3	2	36	25	8	36
Total	**10**	**4**	**86**	**35**	**21**	**57**

Access to electricity: Mothers were interview on whether they had access to electricity at home. Significantly more children with malnutrition lived in a family with lack to access to electricity ($p<0.001$; χ^2-test). The proportion of children and their families' access to electricity are shown in Figure 1.4.

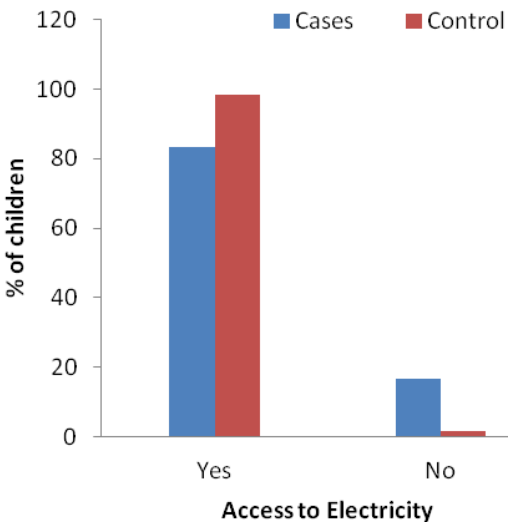


Figure 4: The proportion of children and their families' access to electricity.

Pre-lacteal feeding in relation to malnutrition

Two hundred and seventeen (217) mothers responded to the question on whether they gave their children pre-lacteal food. Out of these 107 (49.3%) were mothers of malnourished children and 110 (50.7%) were mothers of children with normal nutritional status. A significantly larger proportion of malnourished children (9.4%) than well nourished children (1.8%) were given pre-lacteal feeds (p=0.036; χ^2-test). The foods were sugar or glucose, tea, artificial milk, cow milk and other food like juice, traditional medicine. The proportions of children in relation to pre-lacteal food are show in Figure 1.6.

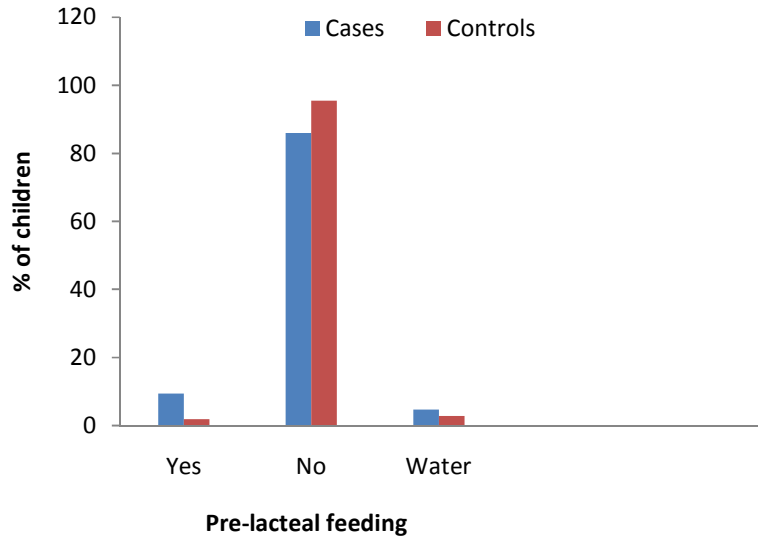


Figure 5: Showing proportion of children and their nutritional status in relation to pre-lateal food

Breastfeeding in relation to malnutrition

A total of 182 (83%) mothers were breastfeeding at the time they were interviewed whereas the remaining 38 (17%) were not. 78.2% of the malnourished children (cases) were breastfeeding while 87.3% of the well nourished (control) were breastfeeding. There was a trend toward significant in nutritional status between children belonging to breastfeeding mothers and those belonging to mothers, who were not breastfeeding. This means that breastfeeding was slightly more common practiced in mothers who had children with normal nutritional status (control) than among mothers with malnourished children (cases). (OR=0.54; p=0.08; logistic regression).

Initiation of breastfeeding

Two hundred and nineteen (219) mothers responded to the question on the time breastfeeding was initiated. One (1) mother could not recall when she initiated breastfeeding. Of the mothers

who responded, 172 (78.5%) started breastfeeding within 1 hour, 30 (13.7%) started in 2 to 6 hours and 17 (7.8%) started 12 hours and beyond after delivery. There was a trend toward statistical significance in time breastfeeding was initiated between cases and controls (p=0.07; χ^2-test).Slightly higher proportional (80%) of control than cases were initiated on breastfeeding in the first one hour compared with (75%) of cases.The proportions of mothers and time breastfeeding was initiated in relation to nutrition status of their children are shown in Figure 1.7.

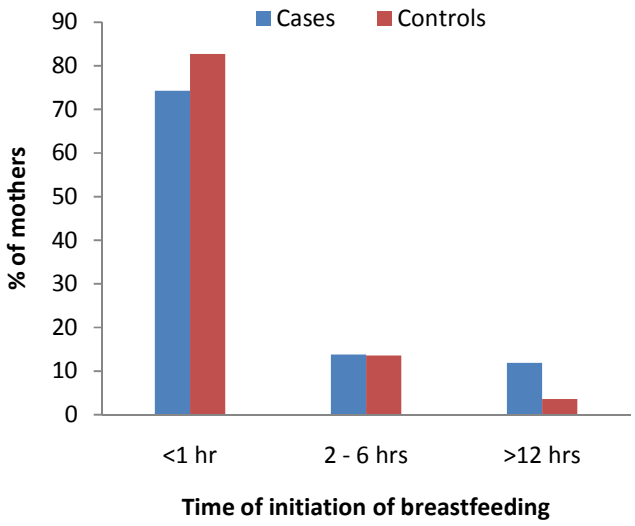


Figure 6: Showing proportions of children and time of initiation of breastfeeding

Period of entire breastfeeding

A significantly higher proportion of mothers of control planned to breastfeed their children for longer periods than mothers of cases (p=0.011; χ^2-test). The proportions of mothers and the period they planned to breastfeed in relation to nutrition status of their children are shown in Figure 1.8.

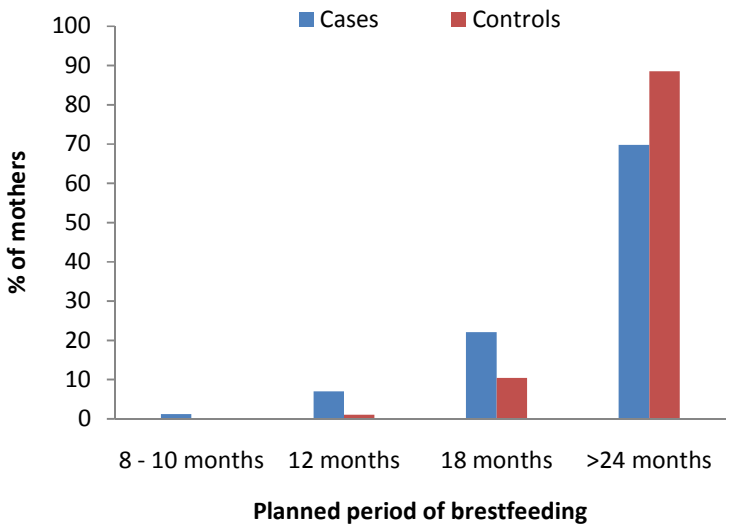


Figure 7: Showing the proportions of mothers and period they planned to breastfeed in relation to nutrition status of their children.

There was a trend toward significance between cases and control in relation to duration of entire breastfeeding (n=38; p=0.06; χ^2-test).Malnourished children(cases) were breastfed a little shorter(55% below one year) than well nourished children(control) who were breast fed little longer(70% 1year and above). The proportions of mothers who were no longer breastfeeding at the time of interview and entire period of breastfeeding in relation to nutrition status of their children are shown in Figure 1.9.

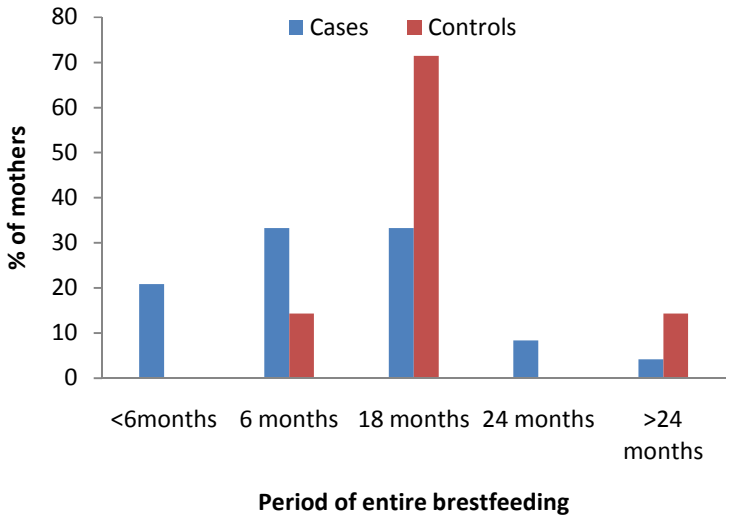


Figure 8: Showing the proportions of mothers and entire period of breastfeeding in relation to nutrition status of their children.

Exclusive breastfeeding

One eighty two (182) mothers were still breastfeeding their children at the time of interview. Of the breastfeeding mothers only 148 (81%) responded to the question on whether they exclusively breastfeed their children. But (5) (0.03%) mothers were still exclusively breastfeeding their children at the time of interview, of which 4chilren were cases and one child was control. Sixty (60) (93.8%) were mothers of children with malnutrition (cases) whereas 83 (98.8%) were mothers of children with normal nutritional status (control). There was no significant difference between the two groups (p=0.09; χ^2-test).

Duration exclusive breastfeeding

Two hundred and fourteen (214) mothers responded to the question on duration of exclusive breastfeeding. One hundred and six (106) (49.5%) of these were mother of malnourished children where as 108 (50.5%) were mothers of children with normal nutritional status. A significantly higher proportion of mothers of children with normal nutritional status than mothers of malnourished children exclusively breastfed their children for longer periods (p=0.001; χ^2-test). The proportions of children in relation to duration of exclusive breast feeding are shown in Figure 1.10.

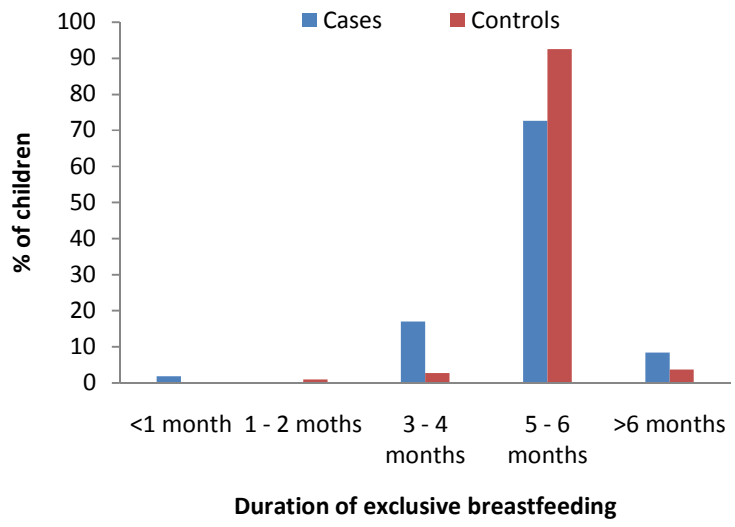


Figure 9: The proportions of children in relation to duration of exclusive breast feeding

Breastfeeding at night

One hundred and eighty-five (185) mothers responded to the question on frequency of breastfeeding at night. A significantly higher proportion of mothers with malnourished children breastfed their children less frequently at night than mothers of children with normal nutritional status ($p<0.001$; χ^2-test). The proportions of children in relation to frequency of breastfeeding by their mothers at night are show in Figure 1.11.

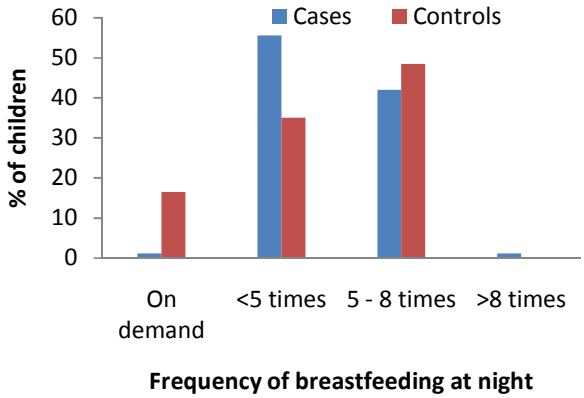


Figure 10: The proportions of children in relation to frequency of breastfeeding by their mothers at night.

One hundred and eighty-four (184) mothers responded to the question on frequency of breastfeeding during the day. There was no significant difference between malnourished children and children with normal nutritional status in relation to the frequency of breast feeding by their mothers during the day ($p=0.73$; χ^2-test). The proportions of children in relation to frequency of breastfeeding by their mothers during the day are show in Figure 1.12.

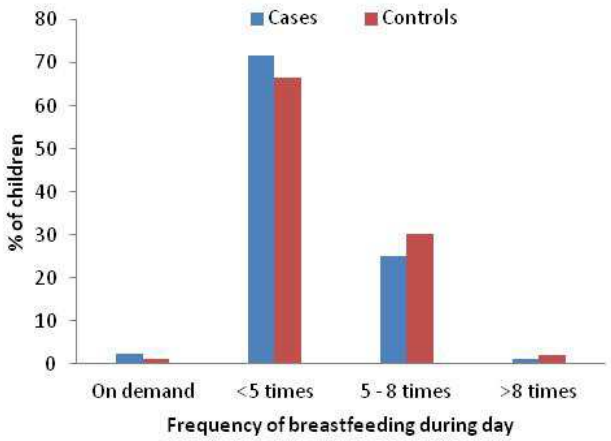


Figure 11: The proportions of children in relation to frequency of breastfeeding by their mothers during the day

There was no significant difference between the number of stunted children and that of children with normal linear growth in relation to duration of entire breastfeeding (n=38; p=0.72; χ^2-test).

There was no significant difference between the number of stunted children and that of children with normal linear growth in relation to duration of exclusive breastfeeding (p=0.37; χ^2-test).

Complementary feeding in relation to malnutrition

Two hundred and fourteen (214) mothers responded to the question on the child's age at which they introduced complementary foods. Mothers of malnourished children introduced complimentary feeds at a significantly lower mean age (3.6±0.8 months) compared to mothers of children with normal nutrition status (3.9±.4 months) (p=0.003; t-test). The proportions and ages of the children at which complementary foods were introduced in relation to nutrition status are shown in Figure 1.13

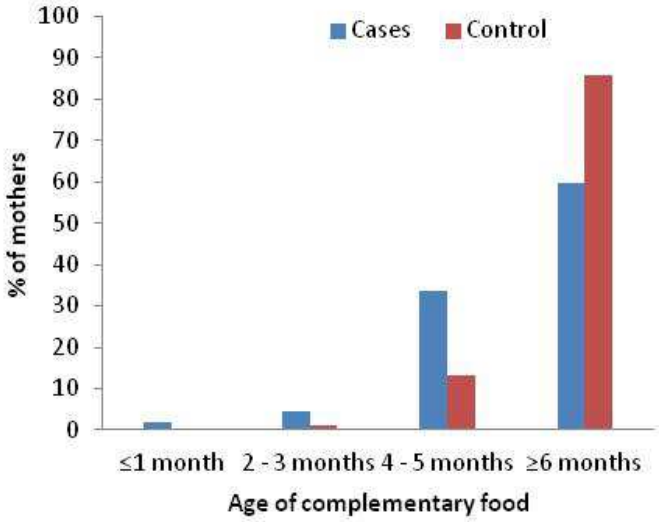


Figure 12: The proportions and ages of the children at which complementary foods were introduced in relation to nutrition status

Two hundred and fourteen (220) mothers responded to the question on the frequency of their children's liquid intake in the previous 24 hours. There was a highly significant difference between children with malnutrition and those with normal nutrition status in relation their liquid intake (p=0.012; χ^2-test). The cases were given less source of liquid in the last twenty four hour s compared to the control. The numbers and frequencies of the children liquid intake in relation to their nutrition status are shown in Table 1.8.

Table 7: **Showing the numbers and frequencies of the children liquid intake in relation to their nutrition status.**

	Milk	**Milk+Water**	**Milk+Porridge**	**Milk+Porridge+Water**	**Other**	**Total**
Cases	8	26	18	49	9	110
Controls	1	16	12	70	11	110
Total	**9**	**42**	**30**	**119**	**20**	**220**

Two hundred and fourteen (220) mothers responded to the question on the source of protein for their children in the previous 24 hours. There was a highly significant difference between children with malnutrition and those with normal nutrition status in relation their source of protein in the previous 24 hours ($p<0.001$; χ^2-test).The children in cases group received less varieties sources of protein compared with the children in control group. The numbers of children and their source of protein in the previous 24 hours in relation to nutritional status are shown in Table 1.9.

Table 8: Showing the numbers of children and their source of protein in the previous 24 hours in relation to nutritional status

	Milk	Milk+Meat	Milk+Plant	Milk+Meat+Plant	Other	Total
Cases	98	1	8	2	1	110
Controls	56	19	18	4	13	110
Total	**154**	**20**	**26**	**6**	**14**	**220**

Hand washing

Mothers were interviewed on whether they washed their hands with soap after changing their children's diapers and whether they used bottles to feed their children. There was no significant difference between children with malnutrition and those with normal nutritional status in relation to hand washing with soap by their mothers (n=214; p=0.42; χ^2-test). There was, however, a highly significant difference between children with malnutrition and those with normal nutritional status in relation to their mothers' use of bottle to feed them. Bottle feeding was more practiced among malnourished children than those children with normal nutritional status. (n=218; p=0.001; χ^2-test). The proportions of children's mothers who washed their hands after changing their children and those whose mothers used bottles to feed them in relation to their nutritional status are shown in Figure 1.14

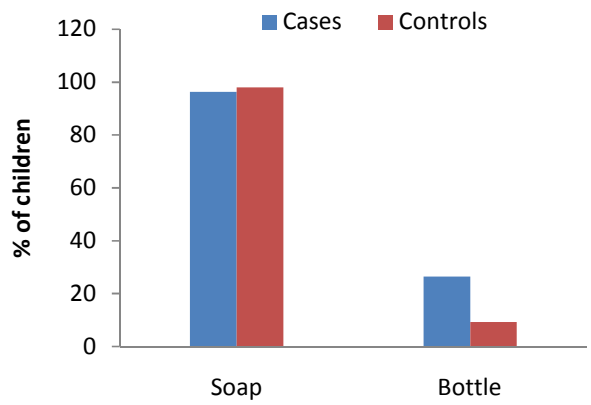


Figure 13: Showing the proportions of children's mothers who washed their after changing their children and those whose mothers used bottles to feed them in relation to their nutritional status.

Feeding during illness

Mothers were interviewed on whether they increased or reduced food when their children fell sick. For mothers with malnourished children as well as those with children with normal nutritional status, 6 reportedly increased food and 104 reportedly reduced food, in each group, when their children fell sick.

Of the 220 mothers interviewed, 107 with malnourished children and 106 with children with normal nutritional status responded to the question on the action they took when their children refused to eat a certain type of food. There was no significant difference between malnourished children and those with normal nutritional status in relation to the action their mothers took (p=0.10; χ^2-test). The numbers of children and the action their mothers took when the former refused to feed are shown in Table 1.10.

Table 9: The numbers of children and the action their mothers took when their children refused to feed.

	Forced	Played to entice	Left them a lone	Changed to favourite food	Total
Cases	21	0	5	81	107
Controls	15	5	7	79	106
Total	**36**	**5**	**12**	**160**	**213**

CHAPTER FIVE: DISCUSSION

In our study A total of 182 (83%) mothers were breastfeeding at the time they were interviewed whereas the remaining 38 (17%) were not. 78.2% of the malnourished children were breastfeeding while 87.3% of the well nourished were breastfeeding but there was no significant difference in nutritional status between children belonging to breastfeeding mothers and those belonging to mothers who were not breastfeeding (OR=0.54; *p*=0.08; logistic regression). Breastfeeding was initiated within the first hour in 78% of the cases and controls. This is similar with the finding in Ethiopia by Solomon et al (40) The proportions of mother who initiated breastfeeding within the first one hour in our study were even higher than Kenya national value of fifty percent(58%). Overall in Kenya, 58 percent of children are breastfed within one hour of birth and 86 percent within one day after delivery. The malnourished children are more likely to receive pre-lacteal feeds than the controls. The use of pre-lacteal feeds is not recommended as it can make the infant ill and interferes with breastfeeding (18).

Introduction of other diet before six months of age is common with cases than in the controls; and initiation of complementary diet before six months was more common in the malnourished group, indicating that children with severe acute malnutrition are started with complementary diet either too early or sometime too late. A study done in China showed that the introduction of other diet before the age of six months increased the prevalence of pneumonia and diarrheal disease (19). Similarly a study in Kenya showed an increased risk of being underweight when complementary food was started early (20). As a global public health recommendation, infants should be exclusively breastfeed for the first 6 months of life to achieve optimal growth, development and health.

Thereafter to meet their evolving nutritional requirements, infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond (21). Bottle-feeding is more commonly observed in the severely malnourished group (%) than the controls (%).This was similar to the findings in a case control study done in ETHIOPIA. Bottle-feeding is discouraged at any age. It is usually associated with increased risk of illness, and especially diarrhoeal disease, because of the difficulty in sterilizing. the nipples properly. Bottle-feeding also shortens the period of postpartum amenorrhea and increases the risk of pregnancy (5).

In this study a significantly larger proportion of malnourished children (9.4%) than well nourished children (1.8%) were given pre-lacteal feeds (p=0.036; χ^2-test). The foods given were sugar or glucose, tea, artificial milk, cow milk and other food like juice and traditional medicine .This proportion was even smaller compared to national estimate of children who are given pre lacteal. Forty-two percent (42%) of children in Kenya are given something before breastfeeding (pre-lacteal feed). WHO recommend that give newborn infants no food or drink other than breast milk, unless medically indicated (2). Pre-lacteal feeds interfere with mother's confidence and also with the sucking stimulation and prolactin production. It may also introduce infections and hence it should be discouraged (40) (5). A case-control done in Ethiopia 2007 observed that prelacteal feeds were also considered to be of importance in 28% of the mothers of the cases when compared to 9% of the controls((40). This indicates that it is not only lack or shortage of food that predisposes young children to malnutrition but also lack of knowledge on appropriate infant and young child feeding practices. Male children are more likely to receive a prelacteal feed (45 percent) than female children (39 percent). The proportion of children who receive a prelacteal feed is negatively correlated with the level of education of the mother; children whose mothers have no education are the most likely to receive a prelacteal feed (54 percent), while those whose mothers have attended secondary school are the least likely to be fed before starting breastfeeding (36 percent) (39). Parental illiteracy is found to be associated with a higher risk of children's poor nutritional status. This is observed in a case-control study in Bangladesh, where the maternal illiteracy was associated with a fourfold increase in the risk of severe acute malnutrition in their children (40); which is higher than our observation.

Unemployment, access to electricity and poor house hold income were found to be associated with malnutrition. The risk of malnutrition is increased when the monthly income was between 5000-10000ksh and below. Similarly poor family income has been found as a risk factor for severe acute malnutrition in studies done in Nigeria (41) . A community based study done in Jimma, Ethiopia showed that children with malnutrition lived in a household with low monthly income (42). In a case-control study in Bangladesh, the maternal illiteracy was associated with a fourfold increase in the risk of severe acute malnutrition in their children.

However the age of the mother, number of children in the family, Mother's Parity and birth weight of the child were not associated with malnutrition.

Limitation the study

The limitation of this study was the recall bias; the study relied on the memory of the mother concerning the information used here. Whether the information was correct or not researcher had no means to verify the information given.

Strength of the study

This was a case control study in which at least every case was equally matched with the control in their age.

Conclusions/recommendations

The findings of this study confirmed that, inappropriate feeding practices of infant and young children impact negatively on their nutritional status. Moreover social economic factors like poor education of the parents, unemployment, poor housing and low house hold income all contribute indirectly to the poor nutrition of the children. To reduce childhood malnutrition due emphasis should be given in improving the practice of parents on appropriate infant and young child feeding. However, as this was a hospital-based study with few sample size, further large and community based studies are recommended to identify and give a conclusive finding on the association between malnutrition and feeding practices.

7.0 REFERENCES

1. **World Health Organisation.***Global Strategy for infant and young child feeding.* Geneva : s.n., 2002.

2. **World Health Organization.***Global Strategy for Infant and Young Children Feeding.* Geneva : s.n., 2003.

3. **United Nations children"s Fund (UNICEF).***starategy for improved nutritional of children and womens in developing countries.* New York, U.S.A : s.n. UNICEF Policy Review .

4. **Lauer, J.A., Betran A.P, Barros AJ, de Onis M**:*Deaths and years of life Lost due to suboptimal breast feeding among children in the developping world"a global ecological risk assessment.*Public Health Nutrition, 2006, 9(2), pp. 673 - 685.

5. **Edmond KM, Zandoh C, Quigley MA, Amenga-Etego S, Owusu-Agjei S and Kirwood BR.** s.l. : *Delayed breastfeeding initiation increases risk of neonatal mmortality.*Pediatrics, 2006, Vol. 117, p. 3.

6. **UNICEF.***Overview of breast feeding pattern.* [internet] 2009b.

7. **Ministry of Planning and National Development.***Kenya Demographic and Health Survey.* Nairobi : s.n., 2003.

8.**Poggensee G, Schulze K, Moneta I, Mbezi P, Baryomunsi C, Harms G:***Infant feeding practices in Western Tanzania And Uganda:Implications for infant feeding recommendations for HIV-infected mothers.*Dar es salaam : Trop. Med. Int. Health, 2004, Vol. 9, pp. 477-485.

9.**W, Sellen**:*Infant and young child feeding practices among African pastoralists: The Datoga of Tanzania* . J.Biosci, Vol. 30, pp. 481 - 99.

10. **Feliz E, Pinar O, Gonka A, Erdal B** : *Nutritional status and risk factors of chronic malnutrition in children under five years of age in Aydin, a western city of Turkey.* The Turkish Journal of Pediatrics, 2007, Vol. 49, pp. 283 - 289.

11. **WHO/UNICEF.***Global Strategy for Infant and Young Child Feeding.* Geneva : WHO/UNICEF, 2003.

12. **Hainkens G.T et al** : *case management HIV infected severe malnourished children:challenges in the area with highest prevalences.*The Lancet, 2008, Vol. 371, pp. 1305-1307.

13. **De Onis, M, Frongillo, E.A. and Blossner, M.***Is Malnutrition Declinining? An analysisis in Levels of Child Malnutrition Since 1980.* Geneva : Wordld Health Organization, 2000.

14. **National Depertment of Health:Directorate Nutrition.***the intergrated nutritional progaramme;nutritional satus.* Johannesburg, south africa : s.n., 2005.

15. **Williams, A.F.***Pediatric Nutrition in, The nutrition Siciety Textbook Series, Clinical Nutrition.* United Kingdom : Blackwell Publishing, 2005. pp. 378 - 411.

16. **Vorster, H.H and Hautvast, J.***A Global Perspective on Food and Nutrition in the Nutrition Society Textbooks series, Introduction to Human Nutrition.* United Kingdom : Blackwell Publishing, 2002. pp. 5 - 6.

17. **Jackson, A.A., Asworth, A. and Khanum, S.** 8, : *Improving Child Survival: Malnutrition Task Force and Paeditrician's responsibility.*Archives of Diseases in Childhood, 2006, Vol. 91, pp. 706 -710.

18. **Piercecchi-Marti, M.D., et al.** 3, s.l. : Journal of Forensic Science, 2006, Vol. 51, pp. 670 - 673.

19.. **Katz, K.A, Mahlberg, M.H, Honig, P.J. and Yan, A.C.** : *Malnutrition, a Rare Form of Child Abuse:Diagnostic Criteria.Rice nightmare: Kwashiorkor in Philadephia-area infants fed rice Dream Beverage.* .Journal of the American Academy of Dermatology, 2005, Vol. 52, pp. 69 - 72.

20. **Duggan, M and Golden, B.***Deficiency Diseases, in Human Nutrition.* United Kingdom : Elsevier Churchill Livingstone, 2005. p. 11th ed.

21. **United Nations Children's Emergency Fund.** A Matter of Magnitude: the impact of economic crisis on women and children in Southern Asia. *http//www.unicef.org.za.* [Online] 2009. [Cited: January 7th, 2010.]

22. **Christiaensen, L. and Alderman, H.** Child Malnutrition: Can Maternal Knowledge Augument the Role of Income? *http//www.worldbank.org.za.* [Online] 2001. [Cited: January 7th, 2007.]

23. **Torun, B. and Chew, F.***Protein-Energy Malnutrition in, Modern Nutrition in Health and Diseases.* 8th. United States of America : Lea & Febiger, 1994. pp. 950 - 975.

24.**Onyango A, Koski KG, Turker KL.** s.l. : Int. J. Epidemiol, Vol. 27, pp. 484 - 489 .

25. **M, Mabilia**: *Food diversity versus breastfeeding choice in determining anthropometric status in rural Kenyan toddlers.* Ecol. Food Nutr, 2003, Vol. 35, pp. 209 - 217.

26.**M., Mabilia**: *Beliefs and practices in infant feeding among the Wagogo of Chigongwe (Dodoma Rural District), Tanzania.* I. Breastfeeding. Ecol Nutr, Vol. 35, pp. 195 - 207.

27. **Shirima R, Greiner T, Kylberg e, Gebre- Medhin M** : *Exclusive breastfeeding is rarely practiced in rural and urban Morogoro Tanzania.*Public Health Nutr, 2001, Vol. 4, pp. 157 - 154.

28. **Hotz C, Gibson RS** : *Complementary feeding practices and dietary intakes from complementary foods amongst weanlings in rural Malawi.* Eur. J. Clin Nutr, 2001, Vol. 55, pp. 841 - 849.

29. **Getaneh T, Assefa A Tadesse Z**: *Protein-energy malnutrition in urban children:prevalence and determinants.* Ethiop. Med. J., 1998, Vol. 39, pp. 153 - 166.

30.**Ferguson D, Horwood L, Shannon** F : *Early solid feeding and recurrent childhood eczema: a 10-year longitudinal.* Pediatr, 1990, Vol. 85, pp. 541 - 546.

31. **Hop LT Gross R, Giay T, SastroamidjojoS, Schultink W, Lang NT** : *Premature complementary feeding is associated with poorer growth of Vietnamese children.*J. Nutr, 2000, Vol. 130, pp. 2683 - 2690.

32. **Torun, B.***Protein-Energy Malnutrition in, Modern nutrition in health and Diseases.* 10th. United States of America : Lippincott Williams & Wilkins, 2006. pp. 881 - 906.

33. **Golden, M.H.N. and Golden, B.E.***Severe Maalnutrition in, Human Nutrition and Dietetics.* 10th. United Kingdom : Churchill Livingstone, 2000. pp. 515 - 525.

34. **Kalanda, B.F., Verhoeff, F.H. and Brabin, B.J.** *Breast and Complementary feeding practices in relation to morbidity and growth in Malawian infants.* European Journal of Clinical Nutrition, 2006, Vol. 60, pp. 401 - 407.

35. **Berdanier, C.D.** *Advanced Nutrition: Macronutrients.* United States of America : CRP Press Inc, 1995.

36. **Kapur, D., Sharma, S. and Agarwai, K.N.:***Dietary Intake and Growth Pattern of Children 9 -36 months of Age in ana Urban Slum in Delhi.* Indian Paediatrics, April, 2005, Vol. 42, pp. 351 - 356.

37. **World Health Organization.***Fact Sheets No 119: Child Malnutrition.* s.l. : WHO, 1999.

38. **Pelto, G., Levitt, E. Thairu L.** : *Improving feeding practices: current patterns, common constraints and the design of interventions.* Food Nutr Bull, in press, 2002.

39. **R., Arimond M. and Marie.***Summary Indicators for Infant and Child Feeding Practices: An Example from the Ethiopia Demographic and Health Survey. .* Washington D.C. : Food and Nutrition Technical Assistance Project Academy for Educational Development 2002, 2002.

40. **Michaelsen KF, Weaver L Branca F, Robertson A.***Feeding and Nitrition of Infants and Young Children: Guidelines for the WHO European Region.* Copenhagen : WHO Regional Publications, European Series, No87, 2000.

41. **Edmond K.M, Zandoh C., Quigley M.A, Amenga-Etego S, Owusu-Agyei S, Kirkwood B.R.***Delayed breast feeding initiation increases risk of neonatal mortality.*Pediatrics, 2006, Vol. 117, pp. 380 - 386.

42.**Onyango, Onyango AW.** : *Dietary diversity, child nutrition and health in contemporary African communities.* Rev. Comp. Biochem. Physiol, 2003, Vol. 136, pp. 61 - 69.

43. **Victors CG, Smith PG, Vaughan JP, Nombre LC, Lobardi C et al.**: *Infant feeding and deaths due to diarrhea: a case-control study.* American Journal of Epidemiology, 1989, Vol. 129, pp. 1032 - 41.

44. **WHO, Ip S, Chung M, RAman G, Chew P, Manguna P et al.***Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries.* Washington DC : Agency for Healthcare Research and Quality, 2007.

45.**AK, Hussein.** 1,. *Breastfeeding and complementary feeding pracices in Tanzania.* : East Afr. J. Public Health, 2005, Vol. 2, pp. 195 - 207.

46. **P, Milla.** s.l. : *The weanling's gut.* Acta Paediatr. Scand. Supp, 1986, Vol. 323, pp. 5 -13.

47. **Kelly DA, Phillips AD, Elliott EJ, Dias JA and Walker Smith JA.** 8, : *Rise and fall of coeliac diseases 1960 -85.*Arch. Dis. Child, 1989, Vol. 64, pp. 1157 - 1160.

48. **Wilson AC, Forsyth JS, Greene SA, Irvine L, Howie PW.** : *Relation of infant diet to childhood health: seven year follow up of cohort of children in Dundee infant feeding study.* BMJ, 1998, Vol. 316, pp. 21 - 25.

49.**F, Trowbridge.** : *Prevention and control of iron deficiency : priorities and action steps.* J. Nutri, 2002, Vol. 132, pp. 880 - 882.

APPENDIX 1: INFORMATION AND CONSENT FORM:

ASSOCIATION BETWEEN MALNUTRITION AND FEEDING PRACTICE AMONG CHILDREN AGED SIX–TWENTY FOUR MONTHS AT MBAGATHI DISTRICT HOSPITAL-KENYA.

PART A: PARENT/GUARDIAN INFORMATION SHEET

The following information is to help you understand what this study is about so that you give informed consent for your child to participate in this study. Please read the information carefully before signing the consent form. (Part B)

Who is doing this study?

My name is DR. RESPICIUS BAKALEMWA and I am the principal investigator in this study. I am currently undertaking postgraduate training at the University of Nairobi, based at the College of Health Sciences, Kenyatta National Hospital. I am doing the study with other doctors from the University of Nairobi and Mbagathi District Hospital.

What is this study about?

This study is looking at the association between the infant feeding practices and their nutritional status, where by the malnourished children will compared with those children of normal nutritional status.

Why am I doing this study? I am doing this study because we do not have the latest information about inappropriate infant feeding as the reason for poor nutritional status of the children especially those under 2years.this study will give us the information based on local findings.

Why am I requesting to include your child?

I am requesting to include your child because your child has been diagnosed with malnutrition (cases).Your child's age matches with the child that has malnutrition. He /she are eligible for the study and I want to give all children a chance to participate in the study.

What will be done to my child if I agree?

If you are happy for your child to participate we will ask you a few questions about your child, examine him/her, take his weight and height and record the information in a form.

Are there any risks to my child?

There is no risk at all.

Are there any benefits if my child participates?

If you agree to take part in this study the nutritional status of your baby will be assessed, you shall receive nutritional advice and any necessary treatments available will be provided accordingly. The results from this study will help the hospital and the government in general, in planning and provision of good care for other children in similar circumstances.

What happens if I refuse to participate?

Participation is voluntary. You are free to decide if you want your child to participate. If you agree you can still change your mind at any time and withdraw from the study. This will not affect your child's care now and in the future.

Who will have information about my child in this study?

Information will be shared with your doctors. Your child's medical records will be kept confidentially and securely without your child's name on it.

Who has allowed this study to take place?

The ethics and research committees of University of Nairobi/Kenyatta National Hospital and Mbagathi District Hospital have studied the proposed study carefully and given permission for it to be done.

What if I have questions to ask about this study?

Feel free to ask me any questions now and at any other time. You can contact me for any further clarifications.

DR. RESPICIUS BAKALEMWA
DETARTMENT OF PEDIATRICS & CHILD HEALTH
UNIVERSITY OF NAIROBI
P.O.BOX 19676-00200, NAIROBI
MOBILE: 0710571936
Email: respiciousbak@gmail.com
OR
Dr. D. Wamalwa = 0721239493
Dr.Murila = 0729430022

OR
THE SECRETARY
KNH/UON ETHICS & RESEARCH COMMITTEE
P.O.BOX 20723-00202, NAIROBI
TEL. 020 2726300-9 EMAIL: KNHplan@ken.Healthnet.org

PART B: CONSENT FORM

I , being the guardian of ……..have understood the information in **partA** above on what the study entails. I have had a chance to ask questions and they have been answered satisfactorily. I understand that I can withdraw from the study at any stage and that this will not affect me/ my child in any way.

I hereby consent to my child's participation in this study.

Parent/guardian's signature: ……. Date: ……..

Parent/ guardian's name: ……..... Time: ……

Doctor's Signature: …….. Date……

Doctor's Name: ……Time:……

APPENDIX 2: SWAHILI VASION OF CONSENT

SEHEMU A: MAELEZO KUHUSU UTAFITI

TAFADHALI SOMA KWA MAKINI MAELEZO YAFUATAYO KABLA YA KUJAZA NA KUTIA SAHIHI SEHEMU B

Utafiti huu unafanywa na nani?

Jina langu ni Dkt.RESPICIUS BAKALEMWA . Mimi ni mwanafunzi anaye somea shahada ya udaktari wa watoto katika chuo kikuu cha Nairobi iliyopo hospitali kuu ya taifa Kenyatta. Ninafanya utafiti huu pamoja na madaktari wengine kutoka chuo kikuu cha Nairobi na hapa hospitali ya Mbagathi.

Utafiti huu unahusu nini?

Utafiti huu unahusu namna lishe inavyohusiana na utapia mlo ama lishe duni kwa watoto wachanga kati ya miezi sita na ishirini na nne katika hospitali ya wilaya mbagathi.

Kwanini unafanya utafiti huu?

Ninafanya utafiti huu kwa sababu tayari tunayo matokeo kutoka katika tafiti mabali mbali zilizofanyika sehemu nyingine hapa nchini ,Africa na hata dunia nzima yanaoonesha kwamba kuna uhusianao wa moja kwa moja kati ya lishe duni na utapia mlo.hivyo sisi tunataka kudhibitisha hayo katika sehemu yetu hii ya mbagathi.

Kwanini unataka kumhusisha mtoto wangu?

Nataka kumhusisha mwanao kwa sababu ano utapia mlo, ama ana umri sawa na yule motto mwenye utapia mlo.Hivyo kushiriki kwake kutasaidia kujua sababu zinazosababisha utapia mlo kwa watoto wenye umri sawa nay eye na hivyo kusaidia kupata suruhisho la sababu hizo.

Nikikubali mtoto wangu atafanywa nini?

Ukikubali mtoto wako ahusike katika utafiti huu wewe mzazi utaulizwa maswali machache kuhusu wewe mwenyewe, familia yako, na mtoto mwenyewe. Mtoto atapimwa vipimo kama vile uzito, urefu na pia ataangaliwa kama ana tatizo lolote la kiafya.na akipatikana na tatizo lolote atapewa matibabu kulingana na tatizo hilo.

Je kuna madhara katika utafiti huu?

Utafiti huu hauna madhara yoyote kwako wewe na hata kwa mtoto.

Je kuna manufaa maalum kwa mtoto wangu akihusika katika utafiti huu?

Watoto watakao shiriki katika utafiti huu watapewa matibabu wanayohitaji na hakutakuwa na nyongeza yoyote.

Je nisipokubali mtoto wangu ahusishwe nitapata shida yoyote?

Unayo haki ya kukubali/kukataa kushiriki katika utafiti huu.na hata kama ukikataa bado mtoto wako atapata huduma zote anazostahili kupata bila tatizo lolote.

Ni watu wapi watakuwa na ruhusa ya kusoma mambo yanayohusu mtoto wangu?

Jina la mtoto wako halitaandikwa katika makaratasi ya utafiti na pia mambo yote yanayo husu wahusika yatawekwa vyema. Ni madaktari wanaomtibu mtoto wako pekee ambao wanaweza kuelezewa yale mambo yenye manufaa katika matibabu ya mtoto wako.

Ni nani aliyeruhusu utafiti huu ufanyike?

Utafiti huu umeruhusiwa na kamati ya haki na usalama katika utafiti ya chuo kikuu cha Nairobi, hospitali kuu ya Kenyatta na hospitali ya Mbagathi baada ya kusoma na kuona ni utafiti unaofaa.

Je nitaruhusiwa niulize maswali juu ya utafiti huu?

Ndio. Ukiwa na maswali yoyote unaweza kuniuliza saa hii au wakati wowote ukitumia anwani na nambari yangu ya simu ya rununu iliyopo hapa chini. Pia unaweza kuwasiliana na ofisi ya Chuo Kikuu cha Nairobi ukitumia nambari iliyopo hapa chini.

DR. RESPICIUS BAKALEMWA
TAALUMA YA MAGONJWA YA WATOTO
CHUO KIKUU CHA NAIROBI
S. L.P 19676-00200, NAIROBI
MOBILE: 0710571936
Email: respiciousbak@gmail.com
AU
KATIBU
KAMATI YA HAKI/USALAMA KATIKA UTAFITI
CHUO KIKUU CHA NAIROBI/HOSPITALI KUU YA KENYATTA
SANDUKU LA POSTA 20723-00202, NAIROBI
NABARI YA SIMU 020 2726300-9

EMAIL: KNHplan@ken.Healthnet.org

AU

Dr. D. Wamalwa Tel: 0721239493 (SUPERVISOR)

DR.MURILA Tel : 0729430022 (SUPERVISOR)

CHETI CHA RIDHAA:

Mimi mzazi/mlezi....., nimeelezwa na nimesoma maelezo haya kwa makini sana. Na pia nimeuliza Maswali yangu na yamejibiwa vizurikwa ufasaha.

Hivyo nimekubali mimi na mwanangu kwa ihari kushiriki kwenye utafiti huu.

Sahihi ya mzazi/mlezi .....Tarehe……

sahihi ya daktari.....Tarehe.....

APPENDIX 3: DATA COLLECTION TOOL

TO DETERMINE THE ASSOCIATION BETWEEN MALNUTRITION AND FEEDING PRACTICES AMONG CHILDREN AGED SIX-TWENTY FOUR MONTHS AT MBAGATHI DISTRICT HOSPITAL – KENYA .

DATE OF DATA COLLECTION____/___/2012 CASE NO _____/CONTROL NO____

A. particulars of the baby:

1. Age (months)……..
2. Sex 1.male 2.female
3. Birth weight (kilogram)…….....
4. Mode of delivery 1. SVD 2. C/S
5. Gestation age at birth (weeks)……
6. Number of children in the family……...
7. Age (months)of the child before him/her……...
8. Age (months) of the child after him/her……..

B: **Particular of the mother or care guardian**:

9. Age…… (Years)
10. Parity…….
11. Marital status:
    1. Married
    2. Single
12. Level of education:
    1. No formal education
    2. Primary education
    3. Secondary
    4. College education

13. Occupation:

    1. Unemployed
    2. Employed
    3. Casual worker

14. Relation to the baby:

    1. Biological mother/father
    2. Guardian

C: social economical status:

15. Own a house:

    1. Yes
    2. No (rental)

16. Number of rooms……

17. Type of roof:

    1. Iron sheet
    2. Grass thatched
    3. Polythene paper roofed/walled

18. Type of wall:

    1. Mud
    2. Iron sheets
    3. Concrete
    4. Paper

19. Approximate family income per month;

1. Ksh……

2. I don’t know

20. Access to electricity:

1. Yes

2. No

(D**) Food security;**

21. Who decides on what to eat?

1. Father

2. Mother

3. Together9mother+father)

22. Presence of food store at home

1. Yes

2. Food is bought on daily bases

E) Access to media

23. Printed:

1. Yes

2. No

24. Television:

1. Yes

2. NO

25. Radio:

1. Yes

2. NO

F) **Sanitation /clean water:**

26. Presence of Toilet:

1. Pit

2. Flushing toilet

3. Use disposable paper bags

27 Toilets Shared

1. Yes

2. No

28. How is the Source of water?

1: Protected. (Piped) 2. Unprotected (open)

G): **feeding practice (continued BF and introduction of CF)**

29. Are you breastfeeding?

1. Yes

2. No.

30. Are you on EBF?

1. Yes

2. No

31. When was breastfeeding initiated?

1. within first one hour
2. Two-six hrs
3. >12hrs

32. For how long did/will you exclusively breastfeed your baby:

1. <1month
2. One-two month
3. three-four months
4. Five-six months
5. >six months

33. What was the Duration of entire breast feeding?

1. <six months
2. six months-1yr
3. one year and six month
4. Two years
5. >two years.

34. For how long are you planning to breastfeed your baby:

1. six months
2. eight to ten months
3. one year
4. one year and half
5. two years and above

35. Frequency of breastfeeding at night (24hrs recall)

1. on demand
2. <five times
3. five –eight times

36. Frequency of breastfeeding during the day (24hrs recall)

1. on demand
2. <five times
3. five-eight times
4.>eight times

H) **Complementary feeds:**

37. Did you give any pre-lacteal food?

1. Yes
2. No

38. What did you give?

1. Water
2. Sugar (glucose)
3. Tea
4. Traditional medication
5. Other medications
6. Artificial milk
7. Cow's milk
8. Other

39. At what age did you introduce the Complementary food?

1. <1month
2. two-three months
3. four-five months
4. Six month
5.>six months

40. Frequency of liquid intake in last24hrs:

1. Breast milk
2. Plain water
3. Commercial infant formula
4. Other fortified child food
5. porridge/flour
6. Tinned powdered or flesh animal milk
7. Fruit juice
8. Coffee or tea
9. Traditional medicine

41. Consumption of protein source food (last 24hrs)

1.-animal meat
2. Chicken or other birds
3. Fresh or dried fish
4. Eggs
5. Food made from beans
6. Groundnuts/peanuts

7. Cheese or yogurt

8. Organs meat

9. Insects

10. Food made with fat, oil or batter.

e) **Hygienic practice associated with CF:**

42.-Mother washed hands with a soap after cleaning the defecated baby

1. Yes

2. No

43.Water treatment:

1. No treatment

2. Settle /sedimentation

3. Strain it through clothes

4. Boil

5. Add bleach chloride

6. Water filter

44. Feeding bottle used/ is being used:

1. Yes

2. No

45. Storage of food for the child

1. Baby bowl
2. Food flask
3. Pot
4. Fridge
6. Not stored

46. How do you feed your baby when he/she is sick?

1. Increase the feeds
2. Reduce the feeds

47. What do you do when your baby refuses to take a certain kind of food?

1. Force
2. Pray with the baby and introduce it slowly
3. I leave him/her alone 4.i give another type of food she/he likes

I) Anthropometry:

Weight (kg) …… Height/Length (cm) ……

Weight for Height Z (WHZ) score on admission……

Weight for Age Z score on admission……

Height for Age Z score on admission……

J) Nutritional diagnosis

48. Acute Malnutrition

1. Severe
2. Moderate
3. Mild

49. Chronic malnutrition

1. Severe
2. Moderate
3. Mild

50. Underweight

1. Severe
2. Moderate
3. Mild

K) Other diagnosis

51. Diarrhea

1. Acute
2. Persistent
3. Bloody

52. Pneumonia

1. Pneumonia
2. Severe pneumonia
3. Very severe pneumonia

53. Tuberculosis

1. Pulmonary
2. Extra-pulmonary
3. Unknown

54. HIV

1. Positive

2. Negative

3. Unknown

60. Any other diagnosis. (Specify)…….

End

APPENDIX 4: PROJECT BUDGET JUSTIFICATION

ITEM	QUANTITY	UNIT PRICE	TOTAL
CLINICAL			
Infant weighing scales	1 Secca 7	24,000	24,000
Child weighing scale	1	5,000	5,000
Infant and child measuring board	1	12,000	12,000
MUAC tapes	2	250	500
STATIONERY/PRINTING			
Questionnaires	350	12.20	4,270
Pens	6	10	60
Box file (office point)	1	240	240
Note book(50 leaves)	1	35	35
Final manuscripts	4	362.50	1450
Poster presentations	1	2000	2000
TOTAL			**49,555**

APPENDIX 5: TIMELINE (GANTT CHART)

Months	1	2	3	4	5	6	7	8	9
Research question									
Presentation of proposal									
Correction/oral presentation									
Data instrument/testing									
Oral proposal presentation									
1st supervisors review									
Handed to ethics									
Ethical comments									
2nd supervisors review									
Data collection									
Data analysis									
Data presentation/report									
Final marking									
Poster presentation									
Stakeholders meeting.									