NUTRITIONAL STATUS, COMPLEMENTARY FEEDING PRACTICES AND ASSOCIATED FACTORS AMONG CHILDREN AGED 6-23 MONTHS IN MKURANGA DISTRICT, TANZANIA

By

Tunsubilege Moses Kibibi

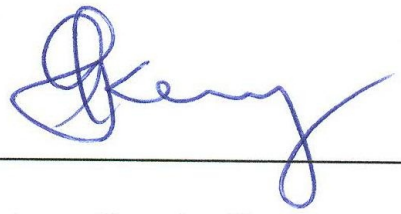
A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Health of the Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences

October, 2008

CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***Nutritional status, complementary feeding practices and associated factors among children aged 6-23 months in Mkuranga District, Tanzania***, in partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences



Dr. Anna Tengia- Kessy

(Supervisor)

Date: 31 – 10 – 2008

DECLARATION

AND

COPYRIGHT

I, **Tunsubilege Moses Kibibi,** declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature: _____

This Dissertation is copyright material protected under the Berne Convention, the Copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extracts in fair dealing; for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of the Directorate of Postgraduate Studies, on behalf of both the author and the Muhimbili University of Health and Allied Sciences.

ACKNOWLEDGEMENT

I would like to thank the Almighty God who gave me life and strength throughout the whole period of my studies, His grace and blessings are sufficient to me.

Special thanks to my supervisor Dr. A. Tengia-Kessy, for her untiring support, constructive critics and encouragement during the preparation of this dissertation. I would also like to express my gratitude to Dr. S. R. Kamazima, my academic advisor, Dr.D. C. Kakoko (the research coordinator), Dr. M. Kazaura (the course coordinator) and Mr. F. Mayunga for their guidance from the early stages of proposal development to report writing. Without their dedicated involvement and assistance, this dissertation would not have been possible.

Thanks to the Regional Administrative Secretary (RAS) of the Coast Region, the District Executive Director (DED) and the District Medical Officer (DMO) of Mkuranga District for allowing me to conduct the research in the district. Many thanks to my research assistants, Mr. J. Ndande and H. Majjid, the village executive officers and village health workers for their support during field work.

My sincere gratitude to the Ministry of Health and Social Welfare for providing sponsorship that enabled me cover the costs for this course. Many thanks also to my fellow Master of Public Health (MPH-2007/08) colleagues for their contributions and encouragement during the course of this work.

Special thanks to my lovely husband, Job, for his moral and material support, encouragement and perseverance during the whole period of my study. He is truly a strong man!

My dear children, Atuganile, Tulibako, Rebecca, Joshua and Caleb, thank you for your love and perseverance, I love you all!

Special thanks to Professors (Mr. & Mrs.) D. Ngassapa, for the encouragement and support; my sisters Syana, Rebecca, Bupe, Ikupa, my brothers Samuel, Ephraim and Dr. Gwamaka together with all my in-laws, for the prayers and support. May God bless you all!

Last but not least, the women fellowship of Faith Word Church of Tanzania, for your prayers, encouragement and support. Be blessed abundantly.

DEDICATION

To my beloved father, the late Moses Mbilla Mwakyendelwa and my mother Daina Moses Kalobo, for the good faith and education foundation they laid for me.

ABSTRACT

Adequate nutrition during infancy and early childhood is fundamental to the development of each child's full human potential. The period from birth to two years of age is a critical window for the promotion of optimal growth, health and behavioral development. Despite the fact that WHO recommends all infants to be exclusively breastfed in their first six months of life, in Tanzania, only 68% of children less than 2 months of age are exclusively breastfed. A cross sectional study was therefore conducted in Mkuranga district, Coast region in July 2008 to determine nutritional status, complementary feeding practices and associated factors among children aged 6-23 months. A total of 219 mother-child pairs were randomly selected from one ward and invited for the interviews and weighing of their children. Findings show that 62.6% of the children were complemented below the age of six months. Regarding their nutritional status, 81% had a normal weight for their age while 13% were underweight. Furthermore, the data shows that neither socio-demographic characteristics nor complementary feeding practices of the mothers have a significant influence on the nutritional status of the children. Despite majority of the infants and young children in the area having good nutritional status, early complementation is common and generally, the mothers' complementary feeding practices are contrary to those recommended by the World Health Organization (WHO). It is proposed that nutritional education on child feeding especially proper complementary feeding practices be emphasized among mothers in the study area.

TABLE OF CONTENTS

ITEM	PAGE
CERTIFICATION.....	ii
DECLARATION AND COPYRIGHT.....	iii
ACKNOWLEDGEMENT.....	iv
DEDICATION.....	vi
ABSTRACT.....	vii
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
LIST OF ACRONYMS.....	xiii
CHAPTER ONE.....	1
1.0 INTRODUCTION.....	1
1.1 Statement of the problem.....	5
1.2 Rationale of the study.....	7
1.3 Study questions and variables.....	8
1.4 Study objectives.....	8
1.4.1 Broad objectives.....	8
1.4.2 Specific objectives.....	9
CHAPTER TWO.....	10
2.0 LITERATURE REVIEW.....	10
2.1 Breastfeeding practices.....	10
2.2 Complementary feeding practices.....	12
2.3 Nutritional status.....	14
2.4 Factors associated with infant and young child feeding.....	16
CHAPTER THREE.....	18
3.0 METHODOLOGY.....	18
3.1 Study area.....	18

3.2 Study design..... 19
3.3 Study population..... 19
3.4 Sample size estimation..... 19
3.5 Sampling methods..... 20
3.6 Inclusion and exclusion criteria..... 20
3.7 Data collection..... 20
3.8 Recruitment and training of research assistants..... 21
3.9 Pre-testing of research instrument..... 21
3.10 Data management and analysis..... 22
3.11 Ethical clearance and permission to conduct research..... 22
3.12 Operational definitions..... 23
CHAPTER FOUR..... 25
4.0 RESULTS..... 25
4.1 Socio-demographic characteristics of the study sample..... 25
4.2 The profile and nutritional status of the children..... 27
4.3 Child feeding practices..... 29
4.4 The association between nutritional status and complementary feeding practices... 35
4.5 The association between nutritional status of the children and the socio-demographic characteristics of their mothers..... 38
4.6 Sources of information on complementary feeding..... 39
4.7 Opinions regarding infant and young child feeding in the study area..... 41
CHAPTER FIVE..... 43
5.0 DISCUSSION..... 43
5.1 Nutritional status of the children..... 43
5.2 Complementary feeding practices and associated factors..... 44
5.3 Association between nutritional status and complementary feeding practices..... 47
5.4 Association between nutritional status and the socio-demographic characteristic of mothers..... 48
5.5 Sources of information regarding infant and young child feeding practices..... 49

CHAPTER SIX..... 50
6.0 Conclusion and recommendation..... 50
6.1 Conclusion..... 50
6.2 Recommendations..... 50
REFERENCES..... 51
APPENDICES..... 59
Appendix I Informed Consent (English version)
Appendix II Informed Consent (Kiswahili version)
Appendix III Questionnaire (English version)
Appendix IV Questionnaire (Kiswahili version)

LIST OF TABLES

Table 1: Socio-demographic characteristics of the study sample..... 26
Table 2: Age and sex distribution of children whose mothers participated in the study..... 27
Table 3: Distribution of nutritional status of the children according to age..... 28
Table 4: Distribution of nutritional status of the children according to sex..... 28
Table 5: Age at introduction of complementary foods to the children, persons making decision and reasons for the decisions 30
Table6: Distribution of feeding frequencies among children by age groups..... 31
Table 7: Consistency of complementary foods offered to the children in relation to their age..... 32
Table 8: The association between nutritional status and complementary feeding practices..... 37
Table 9: Nutritional status in relation to the socio-demographic characteristics of mothers..... 39
Table 10: Sources of information on complementary feeding practices among the study respondents..... 40

LIST OF FIGURES

Figure 1: Distribution of responsible people for providing financial support for the child's complementary foods..... 33

Figure 2: Respondent's perceived age to introduce complementary foods..... 34

Figure 3: Distribution of respondent's reasons for preferred sources information on complementary feeding..... 41

LIST OF ACRONYMS

ACC	(United Nations) Administrative Committee on Coordination
AIDS	Acquired Immuno Deficiency Syndrome
CDC	Centre for Disease Control
HIV	Human Immunodeficiency Virus
IDA	Iron Deficiency Anaemia
IDD	Iodine Deficiency Disorders
MDG	Millennium Development Goal
MoH	Ministry of Health
MUHAS	Muhimbili University of Health and Allied Sciences
NCHS	National Centre for Health Statistics
PAHO	Pan American Health Organization
PEM	Protein Energy Malnutrition
SCN	Sub Committee on Nutrition
SD	Standard Deviation
TBAs	Traditional Birth Attendants
TFNC	Tanzania Food and Nutrition Centre
TDHS	Tanzania Demographic and Health Survey
UNICEF	United Nations Children's Fund
USA	United States of America
VAD	Vitamin A Deficiency

WHA	World Health Assembly
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

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 for the promotion of optimal growth, health and behavioral development (PAHO/WHO, 2003).

Nutritional status can be defined as the interpretation of information obtained from the methods of nutritional assessment. The information obtained is used to determine the nutritional status of individuals or population groups as influenced by their intake and utilization of nutrients by the body (Gibson, 1990).

Malnutrition is increasingly recognized as a prevalent and important health problem in many countries. This problem has serious long-term consequences for the child and adversely influences the development of the nation. The common nutritional problems worldwide include protein energy malnutrition (PEM), iron deficiency anaemia (IDA), iodine deficiency disorders (IDDs) and vitamin A deficiency (VAD) (ACC/SCN, 2000). Globally, malnutrition constitutes about 60 percent of the 11 million deaths that occur each year among underfives. Malnutrition has also been associated with over a half of all child deaths in developing countries (Stephenson *et al.*, 2000). More than a quarter of all under fives i.e. 143 million in developing world are underweight; 35 million come from Sub- Saharan Africa. PEM is more common in developing countries among the under

fives, the severe form being between 1-10% and under weight between 20-40% (UNICEF, 2006).

Malnutrition in Tanzania is an underlying factor in about 70% of the illnesses that cause death among children underfive years. The Tanzania Demographic and Health Survey (TDHS) 2004-05 found that 38% of underfives were stunted, 22% under weight, and 13% were severely stunted. The prevalence of stunting was observed to be higher among rural than urban children (41% and 26% respectively).

Breastfeeding is a process of feeding newborns milk directly from the breast. It is a way of providing ideal food for the healthy growth and development of infants. It has a unique biological and emotional influence on the health of both mother and child. Milk from the human female provides all the nutrients that a baby needs for the first six months of life, as well as substances which promote growth and help fight infections (Lawrence and Lawrence, 1999). Early initiation of breastfeeding brings in the mother's milk more quickly and the colostrum that comes out offers the infant immediate protection from infections. Colostrum is a thick, yellowish fluid rich in protein, antibodies, and other infection-fighting agents and it is more concentrated than mature breast milk.

Breastfeeding saves lives and the World Health Organization (WHO) has estimated that 1.5 million infants die each year because they are not breastfed (WHO, 2001). In nearly all low-income countries, breastfeeding is still the traditional way of feeding infants.

Worldwide, health advice is for mothers to breastfeed their babies exclusively for the first six months of life and to continue breastfeeding for two years or beyond (WHO, 2003). This means giving babies nothing else but breast milk for the six months, and continuing to breastfeed when babies and young children are having other foods and drinks, for as long as the mother and the baby want to.

Complementary feeding is defined as the process of giving the infants other foods to complement breast milk or milk formula. Other foods and liquids are needed along with breast milk or milk formula when they are no longer sufficient to meet nutritional requirement of infants. The target age range for complementary feeding is generally taken to be 6 - 23 months of age (PAHO/WHO, 2003).

Poor nutrition leads to ill-health and ill-health contributes to further deterioration in nutritional status. These effects are most dramatically observed in infants and young children, who bear the brunt of the onset of malnutrition and suffer the highest risk of disability and death associated with it. Poor breastfeeding and complementary practices, coupled with high rates of infections and diseases are the principal proximate causes of malnutrition during the first two years of life. For this reason it is essential to ensure that caregivers are provided with appropriate guidance regarding optimal feeding of infants and young children. In 2001, 50–70% of the burden of diarrhoeal diseases, measles, and malaria and lower respiratory tract infections was attributable to malnutrition (WHO, 2003).

Feeding infants and young children is more than a means of delivering nutrients. Complementary feeding affects children's psycho-social and emotional welfare as people other than the mother become involved in feeding. It provides opportunities for development of motor skills and the hand-to-eye coordination, for social communication skills and it lays the foundations of behavioral patterns around food choice and eating that persist well beyond infancy. Complementary feeding needs love, care and concern, so that it is seen as a time for extending and strengthening the mother-baby bond of breastfeeding, not ending it (Williams, 2007).

Complementary feeding should be timely, with all infants starting to receive foods in addition to breast milk from 6 months onwards. It should be adequate, meaning that the nutritional value of complementary foods should parallel at least that of breast milk. Foods should be prepared and given in a safe manner, taking measures to minimize the risk of contamination with pathogens. They should be given in a way that is appropriate, in terms of texture and sufficient quantity. For the average healthy breastfed child, it is recommended that meals of complementary foods be fed 2-3 times per day at 6-8 months of age and 3-4 times per day at 9-23 months of age. Furthermore, older infants and young children should be provided additional nutritious snacks 1-2 times per day (WHO, 2005).

Inappropriate choice of complementary foods is known to lead to PEM and a range of micronutrient deficiencies like vitamins and minerals. Other implications in the long

term may include interference with the infants' behavior, the development of obesity, hypertension, atherosclerosis and other disease of lifestyle later in life.

In Tanzania, complementary feeding starts early (TDHS, 2004/05), with 7% of children below two months, 32% 2-3 months and 58% of children 4-5 months being given complementary foods. Although many children receive these foods too early, others receive such foods too late. Ideally, complementary foods should be introduced at the age of six months, but only 91 percent of children aged 6-9 months were found to be actually given complementary foods.

1.1 STATEMENT OF THE PROBLEM

Infant and young child feeding practices are important determinants of the health and nutritional status of children under two years of age. Poor breastfeeding practices especially lack of exclusive breastfeeding in the first six months of life, coupled with inappropriate complementary feeding practices are important risk factors for poor nutritional status of children in this age category. Poor nutritional status (malnutrition) in turn is a risk factor for infant and childhood morbidity and mortality.

In developing countries, the age at which children are introduced to complementary foods is of public health importance because of the risk of diseases, particularly diarrhoea from contaminated foods. Such diseases may lead to morbidity and mortality especially if the foods are introduced too early in life. On the other hand, if

complementary foods are introduced too late (after the WHO recommended age of 6 months) may result into the risk of growth faltering and malnutrition (Cohen *et al*, 1994). In Tanzania, like in other developing countries, the practice of breastfeeding is universal with 96% of children being breastfed for some period of time (TDHS, 2004/05).

The age at introduction of complementary foods varies and is influenced by many factors including different cultural practices, urbanization and the socio economic status of households. In urban areas, the tendency is early complementation, whereas in some rural areas complementation is delayed up to one year or more (Shirima *et al*, 2001). Proper complementary feeding practices are vital to supplement breastfeeding (or breast milk substitutes where necessary) after six months of life. On the other hand, improper complementary feeding practices can lead to poor nutritional status in infants.

Despite the fact that WHO recommends all infants to be exclusively breastfed in their first six months of life, only 68% of children less than 2 months of age in Tanzania are exclusively breastfed (TDHS, 2004-05). Furthermore, available information on young child feeding in the country indicates presence of inappropriate initiation of complementation as well as malpractices among mothers. Some of such practices include delayed initiation of breastfeeding, early or late introduction of complementary foods, improper choices of foods, inappropriate feeding frequencies and lack of proper care during feeding.

Mothers, apart from receiving infant feeding information from various sources, they also obtain such information from the antenatal clinics where over 90% of pregnant mothers attend. There is however, disparity between what should be the ideal feeding practices and what is observed on the ground. This study therefore aimed at assessing the nutritional status, complementary feeding practices and associated factors among children 6-23 months of age in Mkuranga District in order to identify the gaps and suggest strategies to improve young child feeding.

1.2 RATIONALE OF THE STUDY

Since good nutrition is the cornerstone for child's growth, survival and development, appropriate complementary feeding practices will lead to attainment of good nutritional status to children by mothers and caregivers, and hence reducing child morbidity and mortality. This is an important step in attaining the Millennium Development Goal (MDG) number 4.

The results obtained from the study will help to add information about current nutritional status of children 6-23 months and factors associated with the complementary feeding practices in a rural district in Tanzania. The information can be used for planning, designing and implementing effective nutritional intervention programs by policy makers and other stakeholders aiming at reducing malnutrition and the related morbidity and mortality among infants and young children aged 6-23 months in Tanzania, and to ultimately achieve MDG-4.

1.3 STUDY QUESTIONS AND VARIABLES

The main study questions were mainly four and they included:

1. What are the child feeding practices and associated factors among mothers of children aged 6-23 months?
2. What are the reasons associated with age at introduction of complementary feeding?
3. What is the current nutritional status among the infants and young children in the study area?
4. Is nutritional status influenced by the complementary feeding practices?

The study variables included background information such as socio-demographic characteristics of mothers including their age, marital status, education level, religion and occupation; and age and sex of the children aged 6-23 months. Other information included potential factors which may influence the nutritional status of the children such as source of information on complementary feeding; feeding styles; frequency of feeding; support by spouses and decision making on complementary feeding.

1.4 STUDY OBJECTIVES

1 .4.1 Broad Objective

To determine the nutritional status, complementary feeding practices and associated factors among children aged 6-23 months in Mkuranga District.

1.4.2 Specific Objectives

1. To determine the nutritional status of children aged 6-23 months in Mkuranga District according to weight for age.
2. To determine the complementary feeding practices and the associated factors among mothers with children aged 6-23 months.
3. To determine the association between nutritional status of children aged 6-23 months and the complementary feeding practices.
4. To determine the association between nutritional status of children aged 6-23 months and the socio-demographic characteristics of the mothers.
5. To identify sources of information on complementary feeding among mothers of children aged 6-23 months.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Breastfeeding practices

Initiation of breastfeeding is the time when the newborn is put on the breast for the first time. The practice should take place within the first hour after delivery as recommended by UNICEF and WHO. This is universal in almost all low income countries (Haggerty and Rutsten, 1999). In some areas, the initiation of breastfeeding is commonly delayed and this is linked to the practice of giving various foods and fluids (pre-lacteal feeds) in the first days of life (WHO, 2001). These feeds reduce the desire to suckle, which in turn decreases the amount of milk produced. They may also promote infections as the baby does not receive protection from the anti-infective factors found only in the first milk produced, the yellowish colostrum. Giving pre-lacteal feeds varies from culture to culture and may be due to reasons such as quenching thirst and cleansing or purging the stomach as has been reported in several places (Cosminsky, 1993; Wellstart International, 1996)

In Tanzania, initiation of breastfeeding has been observed to be universal, with the interval between delivery and breastfeeding ranging from one hour to a few hours (Mabilia, 1996; Sellen, 1999; de Paoli, 2001; Balati, 2003; TDHS, 2004-05). Shirima *et al* (2001) further established that urban mothers initiate breastfeeding earlier compared to their rural counterparts.

The practice of giving pre-lacteal feeds has been reported in Igunga (Agnarsson *et al*, 2001), where a quarter of infants were given pre-lacteal feeds. In related studies in Kilimanjaro and Dar-es Salaam, 18% and 17% respectively of the new born babies were given pre-lacteal feeds (de Paoli, 2001; Balati, 2003). Some of these feeds included formula milk, glucose water or plain water, depending on where the baby was born.

Current research evidence shows that exclusive breastfeeding is rarely practiced in Tanzania, despite WHO's recommendations to exclusively breastfeed infants in their first six months of life. According to the most recent national demographic survey, only 70% of children less than two months of age were exclusively breastfed (TDHS, 2004-05). This was also evident in a study done in Dar-es-Salaam (Kulwa *et al*, 2006) where the proportion of exclusive breastfeeding among under-twos was only 9%. Poggensee *et al* (2003) also reported that exclusive breastfeeding is rarely practiced in South Western Tanzania. Likewise, in other parts of the developing world, low proportion of exclusive breastfeeding was reported. For example, only 37% of infants below four months were exclusively breastfed in Brazil (de Lima Parada, 2004), while Mamabolo *et al*, (2004) reported a proportion of 56% among infants in their first month of life, in Limpopo Province of South Africa.

In order to achieve optimal infant and young child feeding, breastfeeding patterns i.e. initiation of breastfeeding, frequent on demand feeding, exclusive breastfeeding and timely introduction of complementary feeding should be practiced as recommended (WHO, 1996). Child feeding practices and patterns vary across populations and between

The practice of giving pre-lacteal feeds has been reported in Igunga (Agnarsson *et al*, 2001), where a quarter of infants were given pre-lacteal feeds. In related studies in Kilimanjaro and Dar-es Salaam, 18% and 17% respectively of the new born babies were given pre-lacteal feeds (de Paoli, 2001; Balati, 2003). Some of these feeds included formula milk, glucose water or plain water, depending on where the baby was born.

Current research evidence shows that exclusive breastfeeding is rarely practiced in Tanzania, despite WHO's recommendations to exclusively breastfeed infants in their first six months of life. According to the most recent national demographic survey, only 70% of children less than two months of age were exclusively breastfed (TDHS, 2004-05). This was also evident in a study done in Dar-es-Salaam (Kulwa *et al*, 2006) where the proportion of exclusive breastfeeding among under-twos was only 9%. Poggensee *et al* (2003) also reported that exclusive breastfeeding is rarely practiced in South Western Tanzania. Likewise, in other parts of the developing world, low proportion of exclusive breastfeeding was reported. For example, only 37% of infants below four months were exclusively breastfed in Brazil (de Lima Parada, 2004), while Mamabolo *et al*, (2004) reported a proportion of 56% among infants in their first month of life, in Limpopo Province of South Africa.

In order to achieve optimal infant and young child feeding, breastfeeding patterns i.e. initiation of breastfeeding, frequent on demand feeding, exclusive breastfeeding and timely introduction of complementary feeding should be practiced as recommended (WHO, 1996). Child feeding practices and patterns vary across populations and between

individual mothers. Many factors are behind the scenario, they may include socio-economic status, educational level, information on infant and young child feeding, occupation and community norms and beliefs. These factors may differ from one culture to another or from one place to another (Balati, 2003). Others may be health services provided during antenatal and postnatal care which can also bring effects on infant and young child feeding practices (Obmeyer, 1997; Owino *et al,* 2008).

2.2 Complementary feeding practices

Growth of all infants from the age of six months onwards depends largely upon the provision of additional building materials supplied through complementary foods in order to help them grow into healthy and active adults. They need to be fed on a diet that provides all the nutrients and energy required for normal growth; vitamins and minerals to alleviate their hidden hunger and keep them stronger.

In Tanzania, available literature shows that other foods apart from breast milk are usually introduced at an early age. The exact time when these are introduced depends on many factors including geographical locality and ethnic group (MoH, 2004). Among the nomadic tribes, such as the Wadatoga of Mbulu district, animal milk is usually introduced before two months of age (Sellen, 1999); whereas in Dodoma, complementary foods are introduced when the infant is 3-4 months of age (Mabilia, 1996). Related studies elsewhere reveal the mean age at complementation as being 2-4 months (Gebriel, 2000; de Lima Parada, 2004; Wamani *et al.*, 2005). According to Shirima and Greiner (2001) there seems to be a relationship between income and age at

introduction of complementary foods. Mothers of medium and high income groups tend to introduce other foods earlier than those of lower income groups (1-2 months and 5-6 months respectively). Urban mothers were also found to introduce complementary foods at a later age compared to rural mothers (Shirima *et al* 2001).

The adequacy of complementary feeding not only depends on the availability of a variety of foods in the household, but also on the feeding practices of mothers and other caregivers. Feeding young infants requires active care and stimulation, where the caregiver is responsive to the child's clues for hunger and also encourages the child to eat.

Increasingly it is recognized that, in addition to the dietary aspects of feeding, caregiver-child interactions during feeding may critically influence nutrient intake. Although such interactions are repeated, complex, and variable, feeding behaviors often occur together in ways that can be conceptualized as a caregiver feeding style. There are three feeding styles namely: controlling, laissez-faire, and responsive feeding (Birch and Fisher 1995; Bentley *et al*, 1999).

In a controlling style of feeding, the caregiver seeks to control when and how much the child eats; this may result in either forced feeding or dietary restriction. In this case, the child does not learn to recognize his/her appetite cues and self-regulate energy intake, and that ultimately increase the risk of becoming overweight (Birch and Fisher 2000; Black *et al,* 2001). On the other hand, in laissez-faire style the caregiver provides little

physical help or verbal encouragement to eat, even to children less than one year of age. In general, this style of feeding does not reflect neglect, but rather stems from parental and cultural beliefs that support minimal caretaker-child interaction during feeding (Dettwyler, 1989; and Zeitlin 1996; Bentley *et al*, 1999). The third style of feeding, commonly known as responsive style, includes such behaviors as physically helping the young child to eat, verbal encouragement and prompting, role playing, persistence and patience (Engle and Zeitlin, 1996; Birch and Fisher, 2000).

2.3 Nutritional status

Good nutrition is the cornerstone for survival, health and development. Well nourished children perform better in school, grow into healthy adults and in turn give their children a better start in life. Infant and young child feeding practices, including breastfeeding and the introduction of complementary foods are important determinants of the nutritional status of children which in turn influence their health status. Infants and young children from 6-23 months are particularly vulnerable to malnutrition. To ensure that their nutritional needs are met, complementary feeds need to be timely, nutritionally adequate, safely prepared and properly fed (WHO, 2002).

Under nutrition, conversely, has been estimated to be an underlying cause for around half of all child deaths worldwide. Undernourished children have lowered resistance to infection and are more likely to die from common childhood ailments like diarrhoeal diseases and respiratory infections. Frequent illness saps the nutritional status of those

who survive, locking them into a vicious cycle of recurring sickness and faltering growth.

Rapid growth of infants during the first year of life and specifically the first six months postpartum requires an adequate supply of nutrients to cope with the rapid build-up of body muscles and other tissues (Domellof *et al.*, 2002). This critical transition period is associated with a dramatic increase in malnutrition among infants. Inappropriate initiation of complementation together with malpractices can have undesirable consequences to the infant (Nyagawa *et al.,* 2004). When initiated too early, complementation could lead to increased risk of morbidity due to diarrhoea and food allergies. These are caused by the external challenges introduced into the immature digestive tract of the infants as well as infant malnutrition due to the normal decrease in maternal milk production (Kramer *et al.,* 2002, Wilson, *et al,* 1998). Similarly, late introduction of complementary foods can lead to growth faltering, decreased immune protection and under-nutrition, when exclusive breastfeeding or formula feeding becomes inadequate.

There are underlying factors which influence the nutritional status among children under five years of age. These include dietary factors and infectious and parasitic diseases. Factors which lead to under nutrition in children have been identified as inadequate food intake due to low feeding frequencies during complementation, low energy density of diets and insufficient dietary therapy during and immediately after mild or severe illnesses that frequently occur. Another important cause of childhood malnutrition in

various parts of the world includes poverty, although it is not a direct cause. Poverty limits access to adequate diet, availability of education, health services and healthy environment, which are determinants of good health and nutritional status (Nyaruhucha *et al*, 2006).

The health and nutritional status of infants and children aged 6-23 months is largely influenced by the feeding practices. According to the TDHS (2004-05), the prevalence of underweight, stunting and wasting are high in Tanzania. A study by Nyaruhucha *et al* (2006), among children in a pastoral society in Simanjiro, Arusha similarly revealed high proportions of malnutrition with 31.2% of the children being under weight, 17.2% stunted and 35%.

2.4 Factors associated with infant and young child feeding

Infant and young child feeding practices are influenced by many factors which may bring either a positive or a negative effect on the child's nutritional status. For example, lack of appropriate information concerning child feeding may contribute to malpractices (Balati, 2003). This kind of information can be obtained at the health care facilities where the mothers attend with their babies for postnatal care (Obmeyer, 1997). Other factors include lack of formal education among mothers; as mothers with education are more likely to prepare appropriate complementary foods (Wamani *et al*, 2005). In addition, the occupation of the mother, income level, area of residence (urban versus

rural), decision making on child feeding and parity have also been shown to influence child feeding (Shirima *et al* 2001).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study area:

This study was conducted in Mkuranga district; one of the six districts of Coast region. The area was purposely chosen for logistical reasons; in addition to having a rural-urban influence. The district is bordered by Dar-es-Salaam region to the north, the Indian Ocean to the east, Rufiji district to the south and Kisarawe district to the west. Administratively, Mkuranga district is divided into four divisions which in turn are divided into 15 wards and 101 villages. It covers an area of 2,432 square kilometers and the district headquarter is located at Mkuranga township along the Dar-es-Salaam–Kibiti-Lindi highway, about 50 kilometers from Dar-es-Salaam city.

According to the Tanzania national population census of 2002, the population of the district is 187,428 people of which 91,719 are males and 95,714 are females. It has a total of 42,937 households with an average size of 4.4. The major tribes in the area are Zaramo, Ndengereko, Matumbi and Makonde. Most of the residents are peasants engaged in subsistence agriculture with cashew nuts, coconuts, pineapple and oranges as their cash crops. Important food crops grown in the district include cassava, rice, maize and beans.

Mkuranga district has one public hospital which is also the district hospital, two health centres, fifteen public and ten private dispensaries. All these facilities provide free maternal and child health services as per Ministry of Health and Social Welfare policy. Alternative health care delivery systems that operate in the district include traditional healers and tradition birth attendants (TBAs).

3.2 Study design

The study design was cross sectional.

3.3 Study population

The study population consisted of mother-child pairs, focusing on mothers with children aged 6-23 months.

3.4 Sample size estimation

The sample size for the study was established using the single proportion formula (Bland, 1995):

$$N = \frac{z^2 p (100-p)}{\Sigma^2}$$

Where,

N = sample size

z = normal standard deviate, normally set at 1.96 which corresponds to a 95% confidence interval.

p = 22 percent, the proportion of underweight children in Tanzania (TDHS 2004-05)

Σ = the margin of error on p which was set at 6%.

3.10 Data management and analysis

The data were checked for completeness and then coded. The open ended questions were summarized and coded before entry for analysis. Data entry, cleaning, validation and analysis were done with the assistance of an experienced computer technician using Epi Info 6.04d (CDC, Atlanta Georgia, USA). Anthropometric data (z-score) was entered using Epi Info 6.04d and analyzed using the Statistical Package for Social Sciences (SPSS). Weight for age indicator was compared to the reference values recommended by the National Centre for Health Statistics (NCHS). Nutritional status was categorized basing on standard deviations (SDs) according to WHO cut-off points, where below (-3SD) = severe under-nutrition; between (-3SD) and below (-2SD) = moderate under-nutrition; between (-2SD) and (+2SD) = normal nutritional status and above (+2SD) = over-nutrition (WHO, 1995).

3.11 Ethical clearance and permission to conduct the study

Ethical clearance for conducting the study was obtained from the Research and Publications Committee of the Muhimbili University of Health and Allied Sciences (MUHAS). Permission for data collection was obtained from the District Executive Director and the District Medical Officer of Mkuranga district as well as the respective local authorities in the study area i.e. ward and village executive officers and hamlet chairpersons. Finally, verbal consent was obtained from the heads of households and individual mothers who participated in the survey. In order to maintain confidentiality,

only numbers were used in the questionnaire and not names. Only mothers who agreed to participate were recruited in the study.

3.12 Operational definitions

Nutritional status: Is the interpretation of information obtained from the anthropometric methods of nutritional assessment. The information obtained is used to determine the nutritional status of individuals (in this study, children 6-23 months old).

Pre-lacteal feeds: Are foods or fluids that are given to infants in their first day of life, before initiating breast milk.

Exclusive breastfeeding: Feeding an infant with breast milk (including expressed breast milk) only, without any other food or drink, not even water. However, drops or syrups consisting of vitamins, mineral supplements or medicines can be given when medically prescribed.

Infant formula: A breast milk substitute formulated industrially in accordance with applicable Codex Alimentarius Standards of infants to satisfy the nutritional requirements of infant up to six months of age.

Complementary food: Any food, whether manufactured or locally prepared suitable as a complement to breast milk or breast milk substitutes.

Complementary feeding: Feeding a child with breast milk or breast milk substitutes and other additional foods.

Early complementation: Giving the child complementary foods before the age of six months.

Timely complementation: Introducing the child to complementary foods at the recommended age of six months.

Delayed complementation: Introducing the child to complementary foods after the age of six months.

Snacks: Foods eaten between meals, usually self-fed, convenient, and easy to prepare.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-Demographic characteristics of the study sample

The study population on which these results are based comprised of 219 mother-child pairs (mothers with infants and young children aged 6-23 months) from six villages in Mkuranga district. All mothers recruited consented to participate giving a coverage rate of >100 %. These mothers were interviewed and the body weights of their children taken. Their socio –demographic characteristics are summarized on Table 1. Most of the mothers were in the age range of 19-29 years and 210 (95%) of them were Moslems. Close to half 108 (49.3 percent) of the respondents had completed primary school education while 83 (37.9%) had no formal education. More than three quarters 167 (76.3 %) of the mothers were married and a few 29 (13.2 %) were single while 139 (63.5 %) were peasants and about a quarter were housewives.

Table 1: Socio-Demographic characteristics of the study sample

Characteristic	Number =219	Percent
Age group (years)		
<18	10	4.5
19-24	68	31.0
25-29	63	28.8
30-34	39	17.8
35-39	23	10.5
40+	16	7.3
Religion:		
Christian	11	5.0
Muslim	208	95.0
Level of Education		
No formal education	83	37.9
Primary school incomplete	19	8.7
Primary school complete	108	49.3
Secondary school and above	9	4.1
Marital status		
Single	29	13.2
Married	167	76.3
Cohabiting	6	2.7
Divorced/Separated/Widowed	17	7.8
Occupation		
Peasant	139	63.5
Housewife	58	26.5
Petty business	17	7.7
Employed	5	2.3

4.2 The profile and nutritional status of the children

This section presents information regarding the 219 children whose mothers participated in the study. Their ages and sex are shown on Table 2. Age groups 6-11 and 18-23 months comprised of 37% and 39.7% of the children respectively, while males constituted the highest proportion (56.1%).

Table 2: Age and sex distribution of children whose mothers participated in the study

Variable	Sex		
Age group(months)	**Male**	**Female**	**Total (100%)**
6-11	51 (62.9)	30 (37.1)	81
12-17	26 (51.0)	25 (49.0)	51
18-23	46 (52.9)	41 (47.1)	87
Total	123 (56.1)	96 (43.9)	219

Table 3 shows the distribution of the children in relation to their age groups into the various categories of nutritional status. Overall, 80.8% of them have good nutritional status while 4.6% are severely malnourished and 1.8% are overweight. The highest proportion of normally nourished children is in the age group 6-11 months and this proportion decreases with increasing age. However the association between age of the children and nutritional status was not statistically significant ($p = 0.136$, Fisher's Exact Test = 8.908).

Table 3: Distribution of nutritional status of the children according to age

Age (months)	Nutritional status				Total (100%)
	Normal	Moderate	Severe	Overweight	
6-11	71 (87.7)	5 (2.5)	2 (2.5)	3 (3.7)	81
12-17	39 (76.5)	9 (17.6)	3 (5.9)	0 (0.0)	51
18-23	67 (77.0)	14 (16.1)	5 (5.9)	1 (1.1)	87
Total	177 (80.8)	28 (12.8)	10 (4.6)	4 (1.8)	219

The distribution of the nutritional status of the children according to their sex is shown on Table 4. The proportion of females and males who are normally nourished are respectively 82.3% and 79.7%. On the other hand, 5.2% and 4.1% of females and males respectively have severe form of malnutrition. However, the relationship between the sex of the child and nutritional status is not statistically significant ($p = 0.8$).

Table 4: Distribution of the nutritional status of the children according to sex

Sex	Nutritional status				Total (100%)
	Normal	Moderate	Severe	Overweight	
Male	98 (79.7)	17 (13.8)	5 (4.1)	3 (2.4)	123
Female	79 (82.3)	11 (11.5)	5 (5.2)	1 (1.0)	96
Total	177(80.8)	28 (12.8)	10 (4.6)	4 (1.8)	219

4.3 Child feeding practices

All mothers interviewed reported to have breastfed their children at some point and 158 (81%) of them were still breastfeeding at the time of the survey. Furthermore, all the mothers were giving complementary foods to their children.

Table 5 shows the age at complementation, decision making and reasons for introducing complementary foods to children in Mkuranga district. According to the survey findings, 137 (62.6%) of the children were complemented before the age of six months (some as early as one month) while 77 (35.2%) were introduced to such foods at the age of six months.

The decision to start giving the children complementary foods was made by various people although 167 (76.3%) of mothers themselves made the decision. Other important decision makers included fathers of the children 29 (13.2%) and grandmothers 16 (7.3%).

Each mother was asked to single out the most pressing reason which made her start giving complementary foods to her child at that particular age. The reasons advanced are as summarized on Table 5. The main reasons were baby crying excessively 97 (44.3%) followed by baby being grown-up 78 (35.6%). A tenth of the mothers complemented their babies because they felt that the breast milk was not enough.

Table 5: Age at introduction of complementary foods to the children, persons making decisions and reasons for the decision to start complementary foods at those ages

Variable	Number (N=219)	Percentage (100%)
Age at complementation		
<6 months	137	62.6
At 6 months	77	35.2
> 6 months	5	2.2
Person making the Decision to complement the child		
Child's father	29	13.2
Mother	167	76.3
Grandmother	16	7.3
Others(health workers/relatives)	7	3.2
Main reasons for complementing the child		
Baby grown-up enough	78	35.6
Baby not satisfied with breastmilk	23	10.5
Baby not gaining weight	11	5.0
Excessive crying	97	44.3
Baby thirsty	5	2.3
Others (baby hungry, sick mother)	5	2.3

Complementary foods which were given to the children included mainly plain porridge made from maize flour (84.9%), followed by stiff porridge from the same flour (74.0%), beans/legumes (49.8%), rice (33.8%) and mashed bananas/potatoes (30.1%). Foods of animal origin included mostly fish (36.8%), eggs (27.9%), beef and chicken (17.4%). Vegetables were less reported (10.5%). The children were also given a variety of drinks with tea being very common, consumed by 169 (77.2%), followed by fresh fruit juices 124 (56.6%), artificial juices 35 (16%) and cow's and formula milk 14 (6.4%). Compared to other fruits, oranges were the most common fruits given to the children (93.6%). Others were passion fruits (58.4%), ripe bananas (39.3%), pineapples (35.2%) and, mangoes (30.6%).

On the overall, 201 (91.8%) of the mothers were feeding their children 2-3 times per day and the least proportion of those fed four or more times per day was amongst the youngest age group as shown on Table 6. However, the relationship between the feeding frequency and the age of the children was not statistically significant (chi- square = 5.63, p = 0.063).

Table 6: Distribution of feeding frequency among the children by age groups

Age group (months)	**Feeding frequency per day**		
	2-3 times	**4+ times**	**Total (100%)**
6-11	79 (97.5)	2 (2.5)	81
12-17	45 (88.2)	6 (11.8)	51
18-23	77 (88.5)	10 (11.5)	87
Total	201 (91.8)	18 (8.2)	219

Chi-square = 5.63, p-value = 0.063

The mothers were asked to describe the usual consistency of the complementary foods they give to their children. Foods of semi-solid to solid consistency were reported in increasing proportions in relation to age in all the three age categories as depicted on Table 7. The increasing food consistency in relation to age were statistically significant (Fisher's Exact Test = 7.159, p = 0.024)

Table 7: Consistency of complementary foods offered to children in relation to their age

Age group (months)	Food consistency		
	Fluid	**Semi-solid/solid**	**Total (100%)**
6-11	8 (9.9)	73 (90.1)	81
12-17	1 (2.0)	50 (98.0)	51
18-23	1 (1.1)	86 (98.9)	87
Total	10 (4.5)	209 (95.5)	219

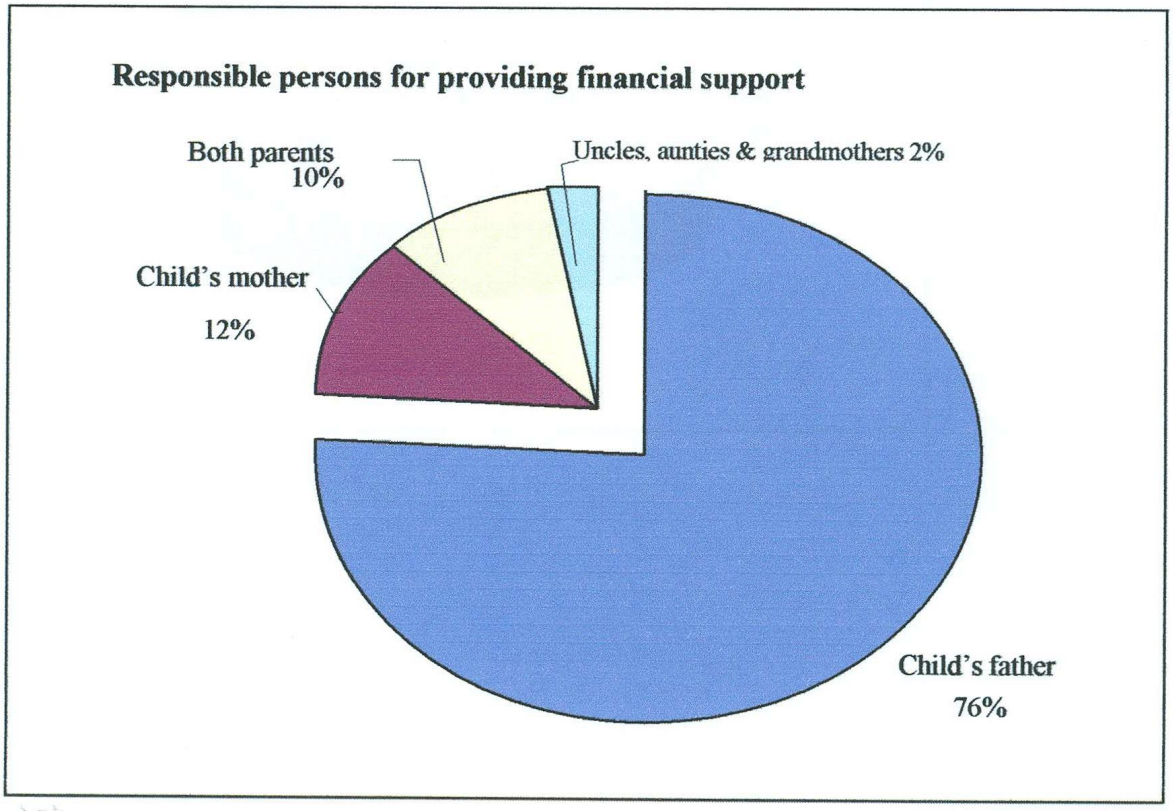
Fisher's Exact Test = 7.159, p-value = 0.024

Regarding persons who are usually responsible for preparing and/or feeding the young children and infants in the households, almost all mothers (99.1%) claimed to be the ones mostly responsible. When inquired about strategies which they commonly use to make sure that their children eat well, the mothers named a variety of tactics including monitoring the child's cues of appetite and satiety (34.4%), talking with the child while feeding him/her (21.0%) and minimizing distractions (17.4%). However, some mothers reported to coerce their children into eating by for example restraining them especially

When they fail to finish the intended meal, whereas others reported to experiment with a different variety in the next feed (13.7%).

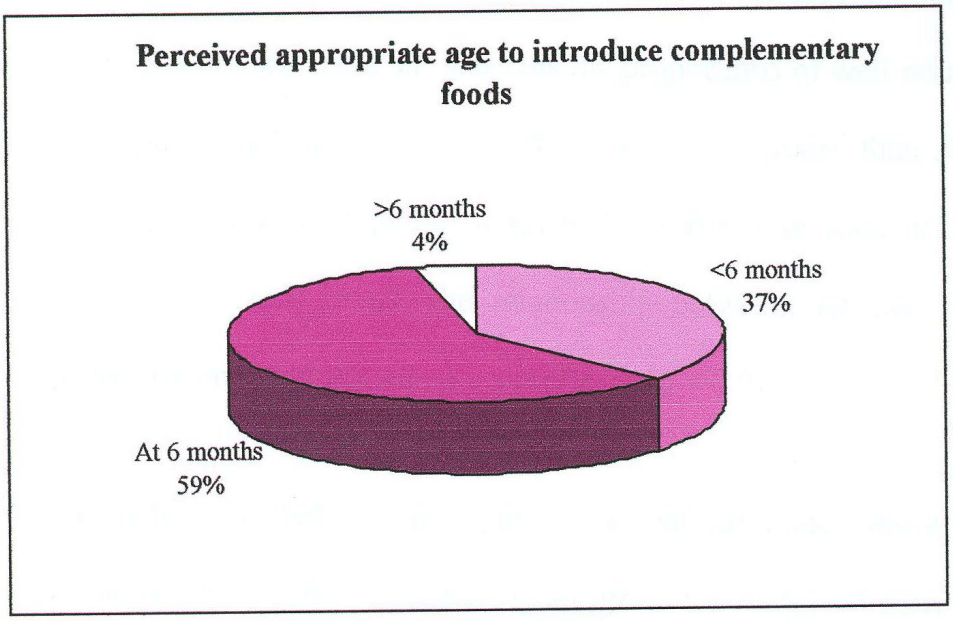
The mothers were likewise inquired about the persons mostly responsible for providing financial support in purchasing the complementary foods for their children (Figure 1). Findings suggest that 76% of the fathers either purchase the foods themselves or avail the required finances. Whereas fathers and mothers share the responsibility in 10% of the cases, 12% of the mothers are solely responsible.

Figure 1: Distribution of responsible people for providing financial support for the child's complementary foods



When the study respondents were asked about the age which they perceive to be the appropriate age for introducing complementary foods to their infants and young children, more than half of them (59%) said six months. A large proportion (37%) of the mothers were of the opinion that children could appropriately be complemented before they reach the age of six months, while 4% of them said more than six months provided the child is well breastfed (Figure 2).

Figure 2: Respondents' perceived age to introduce complementary foods.



4.4 The association between nutritional status and complementary feeding practices

The relationship between nutritional status of children and the mothers' complementary feeding practices was examined. From Table 8, results suggest that children who were still breastfeeding at the time of the survey were more likely to have good nutritional status compared to those who had stopped (81% and 79.2% respectively) although the difference is not statistically significant ($p = 0.8$).

The results further suggest that the highest proportion of children found with good nutritional status was amongst the ones who were introduced to complementary foods at the age of six months (81.8%). Whereas the proportions of well nourished children who were complemented before the age of six months or more than six months were the same, the proportions of poorly nourished children increased with increasing age at complementation. All in all, the relationship between nutritional status and age at complementation is not statistically significant ($p = 0.9$).

Children who were fed 4+ times per day as well as those whose food viscosity was described as fluid appeared to have higher proportions of good nutritional status (88.9% and 90% respectively) compared to their colleagues who were fed 2-3 times and whose food consistency was semi-solid/solid (80.1% and 80.4% respectively). However, neither the feeding frequency nor the consistency of the food is statistically associated with the nutritional status of the children as depicted on Table 8.

Regarding the type of feeding (Table 8), findings suggest that significantly ($p = 0.000$) higher proportion of children whose mothers did not practice responsive feeding had good nutritional status compared to their colleagues who were fed responsively (86.2% versus 55.2%).

Compared to children whose mothers stated that they had not received any information on complementary feeding, a lower proportion of children with good nutritional status belonged to mothers who had received such information (82.8% and 80% respectively). Nonetheless, the difference is not statistically significant ($p>0.05$).

Table 8: The association between nutritional status and complementary feeding practices

Variable	Nutritional status			
	Good (%)	Poor (%)	Number = 219	P-value
BF* Status				
Currently BF*	158 (81.0)	37 (19.0)	195	
Not currently BF*	19 (79.2)	5 (20.8)	24	0.8
Age started CF*				
< 6 months	110 (80.3)	27 (19.7)	137	
At 6 months	63 (81.8)	14 (18.2)	77	0.9
> 6 months	4 (80.0)	1 (20.0)	5	
Frequency of feeding				
2-3 times	161 (80.1)	40 (19.9)	201	
4+ times	16 (88.9)	2 (11.1)	18	0.2
Food consistency				
Fluid	9 (90.0)	1 (10.0)	10	
Semi-solid/solid	168 (80.4)	41 (19.6)	209	0.3
Responsive feeding				
Yes	21 (55.2)	17 (44.8)	38	
No	156 (86.2)	25 (13.8)	181	0.000
Information on CF*				
Received	105 (80.0)	27 (20.0)	132	
Not received	72 (82.8)	15 (17.2)	87	0.5

BF* =Breast feed/feeding, CF* = Complementary feeding/foods: wherever applicable.

4.5 The association between nutritional status of the children and socio-demographic characteristics of their mothers

The nutritional status of children and the socio demographic characteristics of their mothers were examined to establish whether a relationship exists between the two. The summary is shown on Table 9. The highest proportion of well nourished children was from mothers of age below 20 years, whereas the lowest proportion was among children whose mothers were aged 35 years and above (82.1% versus 76.4% respectively). Higher proportions of children whose mothers had formal education (81.6%), not employed (81%) and who were single parents (82.6%) at the time of the survey had good nutritional status comparatively. However, none of these maternal attributes has statistically significant association with the nutritional status of the children as shown Table 9.

Table 9: Nutritional status in relation to the socio-demographic characteristics of the mothers

	Nutritional status			
Characteristics	**Good (%)**	**Poor (%)**	**Number=219**	**P-value**
Mother's age				
<20 years	64 (82.1)	14 (17.9)	78	0.8
25-34 years	83 (81.4)	19 (18.6)	102	
35+ years	30 (76.9)	9 (23.1)	39	
Mother's occupation				
Peasants and others*	130 (80.8)	31 (19.2)	161	0.6
Housewives	47 (81.0)	11 (19.0)	58	
Mother's education				
Formal education	111 (81.6)	25 (18.4)	136	0.7
No formal education	66 (79.5)	17 (20.5)	83	
Marital status				
Married/cohabiting	139 (80.3)	34 (19.7)	173	0.8
Single*	38 (82.6)	8 (17.4)	46	

Single* include divorced, separated and widowed; others* include petty business and employed

4.6 Sources of information on complementary feeding

Of the 219 mothers who were interviewed, 132 (60.3%) reported to have had received information on complementary feeding. Further inquiry revealed that the most important source of information among the mothers was health care workers (87.2%). Other sources included friends (12.8%), mass media (radio, TV, newspapers) reported by 10.7% of the mothers while mothers, in-laws, traditional birth attendants, neighbors and

grandmothers were collectively reported by 8.3% of the respondents (as seen on Table 10).

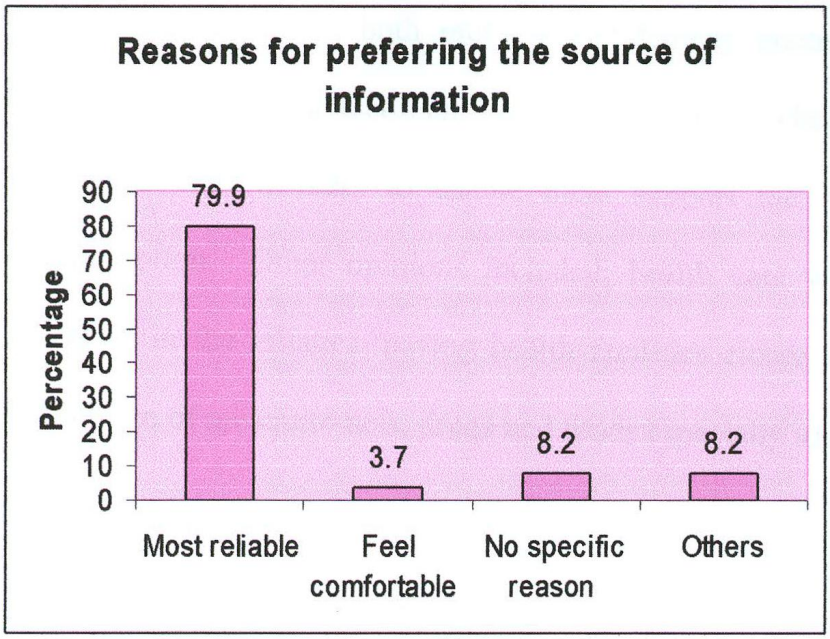
Regarding the source from which mothers would prefer to receive information on complementary feeding, health care workers were similarly ranked as the first priority followed by mass media and traditional birth attendants, mothers and in-laws (Table 10).

Table 10: Sources of information on complementary feeding among the study respondents

Sources of information	Source of information received (N = 132)		Preferred source (N = 219)	
	No	%	No	(%)
Health care workers	116	87.2	201	91.8
Friends	17	12.8	2	0.9
Mass media	14	10.7	15	6.8
Mothers/In-laws	5	3.8	9	4.1
TBA	2	1.5	9	4.1
Others(neighbor/grandmother)	4	3.0	1	0.5

Figure 3 summarizes the main reasons given by the mothers for preferring the source of information mentioned. Close to 80% of the mothers were of the view that they preferred the particular source of information because of its reliability while nearly a tenth of them did not have any exact reason for their preference. Only 3.7% chose a specific source because it makes them feel comfortable. Other reasons mentioned included the swiftness by which the information is passed across, having experience with infant feeding and easy accessibility when consultation is required (8.2%).

Figure 3: Distribution of respondent's reasons for preferred sources of information on complementary feeding



4.7 Opinions regarding infant and young child feeding in the study area

Opinions regarding infant and young child feeding practices among the mothers in the study area were explored. Various views were expressed by 122 (52.5%) of the women. Half of them were of the opinion that mothers are obliged to practice responsive feeding such as observing the cues of hunger and satiety as well as feeding the children themselves. Other important views included mothers following advice from health care workers i.e. practicing exclusive breastfeeding, attending postnatal clinic and peer counseling among the mothers themselves (29.5%). Some mothers were of the opinion

The mothers were additionally asked to give opinions on what should be done so as to improve the health status of the children in their area. Their responses included provision of health education to both mothers and fathers; encouraging fathers to attend the reproductive and child health clinics with their wives to benefit from the advice given by the health care workers to enable them support the mothers and therefore avoid misconception. Other opinions included; health care workers should deliver health education in the villages, having health facilities closer to the communities, and free distribution of mosquito nets, drugs and foods especially to malnourished children.

CHAPTER FIVE

5.0 DISCUSSION

The aim of the study was to determine the nutritional status, complementary feeding practices and associated factors among children aged 6-23 months in Mkuranga District, Tanzania.

5.1 Nutritional status of the children

Results show that malnutrition is a problem among infants and young children in the study area with 17.4% of the children having moderate to severe forms of undernutrition. This proportion is below the national average and that of the region i.e. 22 % and 31.7% respectively (TDHS 2004-05). The magnitude of malnutrition in Mkuranga is also less than what was observed by Nyaruhucha *et al*, (2006), in Simanjiro district where the prevalence of underweight was 31.2%. The difference could be attributed to differences in sample sizes and also to the fact that the other surveys involved children up to 59 months.

It was observed that nutritional status varied with increasing age among the children under study. Good nutritional status decreased with increasing age across the age groups; whilst on the other hand, the proportion of children with poor nutritional status increased with increasing age. It should be noted that the critical period of growth retardation coincides with the complementation period implying that there is either

inadequacy in quality or quantity of complementary foods, as most of the nutritional requirements were met in breast milk.

5.2 Complementary feeding practices and the associated factors

Breastfeeding together with timely introduction of complementary foods are important in attaining good nutritional status for children aged 6-23 months. In this study all mothers reported to have breastfed their children and 89% of them were still breastfeeding at the time of the survey. This is similar to findings by Haggerty and Rutsten (1999) that breastfeeding is universal in developing countries; and also the observations are in accordance with the WHO guidelines to continue breastfeeding up to two years (PAHO/WHO, 2003). Furthermore as per WHO guidelines, all mothers had started complementary foods to their children as they were already within the appropriate age for complementation.

Despite the fact that almost 60% of the mothers perceived six months to be the appropriate age at which children should be started on complementary foods, their actual practice was quite to the contrary. Only 35.2% of the children were appropriately complemented. Similarly, complementation has been reported to be generally at early ages in the country. For example, findings in the previous countrywide survey indicate that 39% of children under 3 months were given complementary foods (TDHS, 2004-05). Similar observations have also been documented by Mabilia (1996), Sellen (1999), Gebriel (2000), Shirima *et al* (2001), de Lima Parada (2004) and Wamani (2005).

Results revealed that most mothers (76.3%) made the decisions to introduce complementary foods to their children themselves while fathers and other influential people played a minor role. These findings are in contrary to an earlier study by Kasper in Gambia, (2007), who reported husbands and in-laws (mothers) to be the most significant people in the decision making process regarding infant feeding practices. This difference could be due to variations in study settings; decision making processes in different communities, the extent to which mothers are submissive to advices from significant others and the type of health education which mothers get during antenatal and postnatal visits in the reproductive and child health clinics

There were a number of reasons stated by the mothers regarding the timing of introducing complementary foods to their infants. The most common reasons were excessive crying (44.3%) and baby being grown up (35.6%). Such reasons were also documented in other studies in Tanzania (Shirima *et al*, 2001; Balati, 2003); Ethiopia (Gebriel, 2000) and Hussain, and Rafiquzzaman (1994) in Bangladesh. Reasons like baby crying or insufficient breast milk may indicate mother's malnutrition which leads to low production of breastmilk as a result of food insecurity in the household (poverty being the immediate factor) as documented by Hussain and Rafiquzzaman (1994)

In this study it was found that complementary foods given to the children were mainly made from maize flour in the form of plain porridge or stiff porridge which was consumed by more than half of the children. Rice was also commonly reported. The results agree with those found in the TDHS (2004/05) where 89% of food made from

grains was consumed. Similar observations have also been made in other areas as reported by Mamabolo *et al*, 2004 and Hotz and Gibson (2001). Similar to findings in Malawi (Hotz and Gibson, 2001), in this current study, foods of animal origin like fish, eggs, chicken and meat were minimally consumed by the children. This was expected since these types of food items are relatively expensive and Mkuranga residents do not practice animal husbandry. Other explanations could be related to poverty and probably food taboos. Likewise, vegetables were less reported among the complementary foods. This could be similarly due to minimal horticulture within the area, poverty, or ignorance in which case vegetables may be perceived as being of less importance in children's diets, leading to lack of essential vitamins and minerals in their foods.

The results also show that tea is the commonest type of drink given to the children. The same tendency was similarly observed in a study done by de Lima Parada *et al,* 2004, where tea was commonly consumed by children less than one year of age. Tea as a drink may be given by mothers due to ignorance and should therefore be discouraged. It is not nutritious and it contains caffeine which inhibits absorption of iron. Additionally, it displaces breast milk and other complementary food as it normally fills the stomach (de Lima Parada, 2004). A variety of fruits are grown in the study area and quite a big proportion of the children are given fresh fruit juices, a rich source of vitamin C in the body. However, almost a quarter of children are also given artificial juices while cow's and formula milk was reported to be given to 6.4% of the children.

The child feeding frequencies observed in this study are not appropriate for age as majority were fed two to three times a day. Despite insignificant relationship between feeding frequency and nutritional status of the children, still they should be fed more frequently (four times or more) as they have smaller stomach capacity (WHO, 2005). However, children elsewhere have also been observed to be inadequately fed. Similar findings have been reported in Western Uganda by Wamani *et al* (2005) where 42 percent of children of 12 months were fed complementary foods twice or less per day. Proportions of children given semi-solid /solid complementary foods significantly increased with increasing age. This is in line with WHO recommendations and the practice enables older children to receive nutrient dense foods (WHO, 2005).

Care during feeding is the most important practice and influences nutrient intake (Birch and Fisher, 1995). Most mothers are responsible to prepare and feed their children as portrayed in the results. These findings conform to what has been documented in other studies (Birch and Fisher, 1995; Bentley *et al*, 1999). Similar to observations by Balati (2003), where spouses create supportive environment on infant and young child feeding practices, fathers in this study were also reported to mostly provide financial support in purchasing complementary foods.

5.3 Association between nutritional status and the complementary feeding practices

Results show that nutritional status of the children is not statistically associated with complementary feeding practices (though a good proportion of children who were

complemented at appropriate age have a good nutritional status) except for the feeding style. Paradoxically, children whose mothers did not practice responsive feeding were significantly more likely to have good nutritional status. These results contradict the existing literature which underscores the importance of responsive feeding where feeding sessions should be free of interruption or distraction to enable enough nutrient intakes by the child (Bentley *et al*, 1999).

5.4 Association between nutritional status and the socio-demographic characteristics of mothers

The results show no statistically significant association between the nutritional status of the children and any of the socio-demographic characteristics of their mothers. This is contrary to previous studies which found a positive relationship between nutritional status and mother's occupation and educational level (Mamabolo *et al* 2004, Wamani *et al*, 2005); as well as their occupation and income level (Shirima and Greiner (2001). The variations may be due to the fact that majority of mothers in the current study are peasants and a big proportion of them do not have even primary education. Other explanations could be geographical differences, ignorance and the general poverty among residents of the study area.

5.5 Sources of information regarding infant and young child feeding practices

Majority of mothers reported receiving as well as preferring to receive information on infant and young child feeding from health care workers. The results are the same as those revealed in the study done by Balati, (2003) where health care workers ranked the first. These were mostly preferred because they are perceived to be a reliable source of health messages. However, a few mothers indicated that they would feel more comfortable if they receive the information from their in-laws and traditional birth attendants (TBAs).

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The survey findings show that malnutrition is a problem among infants and young children in Mkuranga district. Despite the fact that a good proportion of mothers are knowledgeable about the appropriate age of introducing complementary foods to their children, this knowledge is not reflected in their actual practice. The feeding frequencies are not appropriate to age, foods of animal origin and vegetables are less consumed in the area. The findings also show that neither the socio-demographic characteristics nor complementary feeding practices of the mothers have significance influence on the nutritional status of the children.

6.2 Recommendations

- Nutritional education should be emphasized among mothers in the area on the timing of introducing complementary foods to their children, appropriate feeding frequencies, choice of foods and the dangers of early complementation.
- Strategies to empower women e.g. by providing them with seed money for undertaking income generating activities in order to make them economically sound so that they can participate more in supporting their families.
- Further research should be done in the area to explore more on the link between the feeding practices, nutritional status of children and mothers' behaviors.

REFERENCES

ACC/SNC (2000). Fourth Report on the World Nutrition Situation. United Nations; Geneva Pp 20-34.

Agnarsson, I., Mpello, A., GunnLaugsson, G. *et al* (2001). Infant feeding practices during the first six months of life in rural areas in Tanzania. *East African Medical Journal;* 4(2):9-13.

Balati, J. (2003). Infant feeding and associated factors among mothers of infants less than six months in Kinondoni Municipality, Dar es Salaam: A Dissertation submitted in partial fulfillment of the requirement for the Degree of Master of Public Health in the University of Dar es Salaam.

Bentley, M., Gavin, L., Black, M. M. *et al.* (1999). Infant feeding practices in low-income African-American adolescent mothers: an ecological multi generational perspective. *Social Science and Medicine*; 49:1085-1100.

Birch, L.L and Fisher, J.O. (1995). Mother's child feeding practices influence daughter's eating and weight. *American Journal of Clinical Nutrition;* 71(5):1054-106.

Birch, L.L and Fisher, J.O (2000). Development of eating behavior among children and adolescents. *Official Journal of American Academy of Pediatrics;* 101 (3):539-549.

Black, M.M., Curetwo, P and Berenson-Howard, T. (2001). Behavior problems in feeding: Individual, family, and cultural influences. In D.A. Kessler and P. Dawson (Eds). Pediatric under nutrition and failure-to-thrive. A transdisciplinary approach (pp 151-172) Baltimore: Brooke.

Bland, M. (1995). An introduction to medical statistics. NewYork and Tokyo Oxford University Press. Pp 331-341.

Cohen, R.J., Brown, K. H. and Canahauti, J. (1994). Effects of age at introduction of complementary Foods on infant breast milk intake, total energy intake and growth: a randomized intervention study in Honduras. The Lancet; 344:288-293.

Cosminsky, S. and Mhloyi, M. (1993). Child feeding practices in rural area of Zimbabwe. *Social Science and Medicine;* 36(7):937-947.

de Lima Parada, C. M., Calvalhaes M. and Milena T. J. (2004). Complementary feeding practices to children during their first year of life: *Revista Latin-Americano de Enfermagen;* 15(2):282-289.

de Paoli M., Manongi, R., Helsing, E. and Klepp, K. I. *et al* (2001). Exclusive Breastfeeding in the Era of AIDS. *Journal of Human Lactation;* 17(4):313-320.

Dettwyler, K.A. (1989). Styles of infant feeding: Parental/caretaker control of food consumption in young children. *American Anthropology;* 91:696-703.

Domellof, M., Lonnerdal, B., Abrams. S. A. and Hornell, O. (2002). Iron absorption on breastfed infants: effects of age, iron status, iron supplements and complementary foods. *American Journal of Nutrition;* 76:198-204.

Engle, P.L. and Zeitlin, M. (1996). Active feeing behavior compensates for low interest in food among young Nicaraguan children. *Journal of Nutrition;* 126(17):1808-1816.

Gebriel A.W. (2000). Determinants of weaning practices. *Ethiopian Journal of Health Development;* 14(2):183-189.

Gibson, R.S. (1990). Principles of Nutritional Assessment. Oxford University Press New York. Pp 3-10.

Haggerty, P.A. and Rutsten, S.O. (1999). Demographic and Health Survey. Comparative Studies No. 30. Breastfeeding and Complementary Infant Feeding, and the Postpartum effects of Breastfeeding. Vol.30; Maryland: Macro International Inc Calverton, Maryland USA.

Hotz and Gibson (2001). Complementary feeding practices and dietary intakes from complementary foods amongst weanlings in rural Malawi. *European Journal of Clinical Nutrition;* 55: 841-849.

Hussain, A. M and Rafiquzzaman, M. (1994). Determinants of weaning age in rural Bangladesh. *Food and Nutrition Bulletin, Social Biology Spring -Summer;* 41 (1-2):78-82.

Kasper, S. (2007). The results of a barrier analysis on complementary feeding practices among mothers in the Central River Division of the Gambia. http//digitalcommons.library.tmc.edu.dissertations/AAI1444906. Accessed in May 2008.

Kramer, M.S. and Victora, C.G (2002). Low birth weight and perinatal mortality. In Semba R.D, Bloem M.W, editors. Nutrition and Health in developing countries. New Jersey, Humana Press; 1:57-69.

Kulwa, K B., Kinabo, J.L. and Modest, B. (2006). Constraints on good child-care practices and nutritional status in urban Dar es Salaam, Tanzania. *Food and Nutrition Bulletin;* 27 (3):230-244.

Lawrence, R.A. and Lawrence, R.M. (1999). Breastfeeding. A Guide for Medical Professionals. Fifth edition ed.; Missouri: Mosby, Inc, 922.

Mabilia, M. (1996). Beliefs and practices in infant feeding among the Wagogo of Chigongwe (Dodoma Rural District), Tanzania. *Ecology of Food Nutrition;* 35(3):195-207.

Mamabolo R.L., Alberts, M., Mbenyane, G. X. *et al* (2004). Feeding practices and growth of infants from birth to twelve months in the central region of the Limpopo Province of South Africa. *Nutrition;* 20(3):327-333.

Nyagawa, D. and Hussein, A. (2004). Report of the assessment for the planning meeting. Implementation of the Global Infant and Young Child Feeding Strategy. TFNC Report No. 2004.

Nyaruhucha, C. N. M., Mamiro, P. S., Kerengi, A. J. and Shayo, N. B. (2006). Nutritional status of underfive children in a pastoral community in Simanjiro District, Tanzania. *Tanzania Health Research Bulletin;* 8 (1):32-35.

Obmeyer, C.M. and Castle, S. (1997). Back to nature? Historical and cross-cultural perspectives on barriers to optimal breastfeeding. *Medical Anthropology;* 17:39-63.

Owino, V., Amadi, B., Sinkala, M., Filteau, S. and Tomkins, A. (2008). Complementary feeding practices and nutrient intake from habitual complementary foods of infants and children aged 6-18 months old in Lusaka, Zambia: *African Journal of Food, Agriculture, Nutrition and Development;* 8(1):28-47

Poggensee, G., Schulze, K., Moneta, I. and Mbezi, P. (2003). Infant feeding practices in Western Tanzania and Uganda: Implications for infant feeding recommendations for HIV –infected mothers. *Tropical Medical International Health;* 92(7):477-485.

PAHO/WHO (2003). Guiding principles for complementary feeding of the breastfed child. Washington D.C: Pan American Health Organization, World Health Organization, 2003.

Sellen, W. (1999). Infant and young child feeding practices among African pastoralists: The Datoga of Tanzania. *Journal of Biosocial Science;* 30(4):481-499.

Sellen, W. (2001). Weaning, complementary feeding and maternal decision making in a rural East African pastoral population. *Journal of Human Lactation;* 17(3):233-44

Shirima, R. and Greiner, T. (2001a). Information on socio-economic factors, associated with early breastfeeding practices in rural and urban Morogoro, Tanzania. *Acta Paediatrica;* 90:939-942.

Shirima, R., Gebre-Medhin, M. and Greiner, T (2001b). Exclusive breast-feeding is rarely practiced in rural and urban Morogoro, Tanzania. *Public Health Nutrition;* 4(2):147-154.

Stephenson, L.S., Latham, M.C. and Ottesen, E.A. (2000). *Global Malnutrition Parasitology;* 121, Suppl.S 5-22.

Tanzania Demographic and Health Survey-TDHS (2004-05). Bureau of Statistics and Marco International Inc. Children and Women's Nutrition: Pp 177-202.

Tanzania Ministry of Health (2004): Infant and young child feeding in Tanzania; Policies, Programmes and Practices. Dar es Salaam.

UNICEF (2006). Progress for Children. A Report Card on Nutrition, 2000-2006.

Wamani, H., Astrøm, A. N., Peterson, S., Tumwine, J. K. and Tylleskaär, T. (2005). Infant and young child feeding in Western Uganda: Knowledge, practices and socio-economical correlates. *Tropical Pediatrics;* 51(6):356-361

Wellstart International (1996). Exclusive breastfeeding promotion: A summary of findings from expanded promotion of breastfeeding (EPB) program. Final Report.

Williams, C. (2007). WABA World Breastfeeding Week. 2005 Action Folder.

Wilson, A. C., Greene, S. A., Hau, C., Irvine, L., Forsyth, J. S. and Howie, P. W (1998). Relation of Infant diet to childhood health: seven year follow-up of cohort of children in Dundee Infant Feeding Study. *British Medical Journal;* 316:21-25.

WHO, (1995) Physical Status, the Use and interpretation of Anthropometry. World Health Organization Expert Committee. Technical Report Series No. 854. Geneva; Switzerland. Pp 125.

WHO, (1996). The WHO Global Data Bank. Geneva: World Health Organization.

WHO, (2001). Expert consultation on the optimal duration of exclusive breastfeeding. Consultation on recommendations. Document A54/INF.DOC./14, Geneva.

WHO, (2002). Global Strategy for Infant and Young Child Feeding. WHA 55/2002/REC/1.Annex 2, 2002.Geneva: World Health Organization.

WHO, (2005). Guiding principles for feeding non-breastfed children 6 to 24 months of age. Geneva, Switzerland: WHO.