FACTORS ASSOCIATED WITH INFANT FEEDING PRACTICES AND NUTRITIONAL STATUS AMONG CHILDREN AGED 6-24 MONTHS ATTENDING CHILD WELFARE CLINICS IN KAJIADO NORTH SUB-COUNTY.

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Factors Associated With Infant Feeding Practices and Nutritional Status among Children Aged 6-24 Months Attending Child Welfare Clinics In Kajiado North Sub-County.

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

To Almighty God, my husband who is the wind beneath my wing, my daughter and son who are the joy of my life, my parents and my siblings for their lifetime love and support.

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ABBREVIATIONS AND ACRONYMS

AAP: American Academy of Pediatrics

CMS: Centimeters

DF: Degree of freedom

EBF   Breast Feeding

ECF   Exclusive Complementary Feeding Exclusive

H/A   Height for Age

KDHS   Kenya Demographic Health Survey

KGS   Kilograms

KSHS   Kenya shillings

MCH   Mother Child Health

MNTHS   Months

MUAC/A   Mid-Upper Arm Circumference for age

MUAC/H   Mid-Upper Arm Circumference for Height

MUAC   Mid-Upper Arm Circumference

NEBF   Non Exclusive Breast Feeding

SPSS   Statistical Package for Social Sciences

UNICEF   United Nations Children's Fund

W/A   Weight for Age

W/H   Weight for Height

W.H.O   World Health Organization

WT   Weight

DALYS   Disability adjusted years

DEFINITIONS OF TERMS

Anthropometry   It refers to the measurement of the human individual for the purposes of understanding human physical variation

Complementary feeding Refers to the process starting when breast milk is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are introduced to the infant, along with breast milk

Growth monitoring   process of assessing growth adequacy by following the growth rate of a child in comparison to a standard by periodic, frequent anthropometric measurements

Malnutrition   refers to both under nutrition where nutrients are not enough resulting to stunting, wasting and underweight and over-nutrition where nutrients are too much resulting to overweight and obesity

Multiparous   Having delivered more than one time

Optimal Feeding practice Initiation of breastfeeding within first hour of birth; exclusive breastfeeding for the first six months of life; introduction of nutritionally-adequate and safe complementary foods at six months together with continued breastfeeding up to two years of age or beyond

Overweight   Refers to a condition of having high weight for height (>3SD to 3SD) from median weight for age of a reference population

Parity   Number of children born by a woman

Pre lacteal feeds   Foods or drinks given to newborns before breastfeeding initiation usually on the first few days of life other than human breast milk

Stunting   It's a condition characterized by low height for age; classified into moderate stunting (< 2 to -3SD) and severe stunting (<-3SD) from median height for age of a reference population.

Underweight   It's a condition characterized by low weight for age mainly due to chronic under nutrition or acute malnutrition classified into moderate underweight (< 2 to -3SD) and severe underweight (<-3SD) from median weight for age of a reference population

Wasting   It's a condition characterized by low weight for height; classified into moderate wasting (< 2 to -3 SD) and severe wasting (<-3SD) from median weight for height of a reference population

Z scores   The deviation of anthropometric value(s) for an individual child from the median value of the reference population.

ABSTRACT

Having adequate nutrition during infancy is leads to the development of each child's full human potential. The first two years of life are important stage for child's growth and development. Any damage caused by malnutrition during this period can lead to impaired cognitive development, compromised educational achievement and low economic productivity later in life. This study aimed at determining infant feeding practices selected by mothers, nutritional status of children aged 6 to 24 months attending mother child health clinic in Kajiado North Sub-county and factors associated with choice of infant feeding practice by mothers. The study was carried out in three public health facilities located in Kajiado North Sub-county. A total of 350 mother-child pairs were systematically sampled from the three facilities. A self administered questionnaire was used to collect information from mothers and anthropometric measurements were taken from their children. Data analysis was conducted using SPSS version 20 and EPI-info version 7. Descriptive statistics summarized data from univariate analysis. Chi-square tested association between dependent and independent variables, all independent variables identified to significantly associate with dependent variables were further analyzed by ordinal regression. All mothers breastfed their children, 55.1% of them breastfeeding immediately after birth. A quarter of infants 25.8% were not exclusively breastfed for the first six months. A small proportion 4.0% of children had not been introduced to complementary foods during time of study. Stunting was found in 26.5% of children, 11.1% underweight and no child was wasted. Majority of children 84.5% were 12 months and below, most mothers 92.6% were married, maternal mean age was 25. Marital status (X^2=26.716, P<0.05, df=1), children age distribution (X^2=53.733, P<0.05, df=5), child gender (X^2=10.253, P<0.05, df=1) mother's occupation (X^2=38.556, P<0.05, df=5), spouse's occupation (X^2=29.505, P<0.05, df=3) and major source of income (X^2=23.059, P<0.05, df=4) were significantly associated with stunting. Children age distribution (X^2=0.018, P<0.05, df=5) and spouse level of education (X^2=41.404, P<0.05, df=4) were significantly associated with wasting. Marital status and children age groups 6-15 months were found to be predictors of stunting (p<0.05). Children age groups 6-15 months were found to be predictors of wasting (p<0.05). There is need of creating more awareness by educating mothers on optimal infant feeding practices. This will enable them to practice exclusive breastfeeding for the first six months as well as introducing nutritionally adequate complementary foods at the right time, improving nutritional status of all children.

<div align="center">**CHAPTER ONE**</div>

<div align="center">**INTRODUCTION**</div>

1.1: Background Information

In 2002, the World Health organization (WHO) and United Nations Children's Fund (UNICEF) jointly adopted Global Strategy for infants and young children feeding (WHO, 2003). This involved encouraging mothers to initiate breastfeeding within the first hour of birth, breastfeeding their infants exclusively for the first six months and continue breastfeeding for two years or more, accompanied by sufficient quantities of nutritionally adequate, safe and appropriate solid, semi-solid and soft foods starting in the sixth month (WHO, 2003). To achieve the optimum growth and development among infants and young children, are required to be given the right foods at the appropriate time. The most critical time for good nutrition is in the brief 1,000 days' period from the start of a woman's pregnancy until a child's second birthday (UNICEF, 2017).

World Health Organization recommended some actions to protect, promote and support some feeding practices like breastfeeding. This included:

1. Adoption of the International Labor Organization's policies "Maternity Protection Convention 183" and "Recommendation No. 191", which complements "Convention No. 183" by suggesting a longer duration of leave (WHO, 2003).

2. Implementation of the "Ten Steps to Successful Breastfeeding" specified in the Baby-Friendly Hospital Initiative, including: skin-to-skin contact between

<div align="center">1</div>

mother and baby immediately after birth and initiation of breastfeeding within the first hour of life; breastfeeding on demand that is, as often as the child wants, day and night; rooming-in allowing mothers and infants to remain together 24 hours a day; not giving babies additional food or drink, even water, unless medically necessary; provision of supportive health services with infant and young child feeding counseling during all contacts with caregivers and young children, such as during antenatal and postnatal care, well-child and sick child visits, and immunization and community support, including mother support groups and community-based health promotion and education activities (WHO, 2016).

Poor breastfeeding and complementary feeding practices have been widely documented in developing countries. For example, only about 36% of infants aged 0–6 months worldwide were exclusively breastfed over the period of 2007-2014 (WHO, 2016). In Kenya, according to Kenya Demographic Health Survey (KDHS), 61% of children under the age of six months are exclusively breastfed (KNBS, 2015). As a result, substantial levels of malnutrition and poor child health and survival are being experienced in the country and globally. Stunting is affecting 159 million children around the world, wasting is threatening the lives of 50 million children and 41 million children are underweight globally (UNICEF, 2012). Nationally, 26% of children below five years are stunted with proportion of severely stunted children being 14%, 11% underweight and 4% wasted (KNBS, 2015). Deriving from the broad principle of the joint WHO and UNICEF global strategy for the infant and young child feeding developed in 2002 (WHO, 2003), government of

Kenya is implementing a strategy aimed at improving infant feeding practices in Kenya through revitalization of Baby Friendly Hospital Initiative (MOH, 2007).

The choice of an infant feeding method is a big challenge that is not well understood. In all societies women make decisions on feeding practices, regardless of the method of infant feeding. Mothers therefore, need to be supported for them to feed their infants and young children optimally. Numerous factors that include social, economic, demographic, cultural, biological, maternal and paternal affect mother's choice of infant and young children feeding method. A study showed that, high level of maternal education enhances the understanding of mothers and their appreciation of the benefits of exclusive breastfeeding thus empowering them to resist external interferences and pressures that discourage exclusive breastfeeding (Uchendu *et al.,* 2009). A study carried out in Kenya; found that mother's occupation affected time spent with the child leading to introduction of complementary feeding before six months (Lucia, 2008).

Sore nipples, mother's perceptions of producing inadequate milk and societal barriers such as employment, length of maternity leave affect exclusivity and duration of exclusive breastfeeding (Thurman & Allen, 2008). Lack of familial and societal support, lack of guidance and encouragement from health care professionals affects choice of infant and young children feeding (Cherop *et al.,* 2009). Inadequate breastfeeding knowledge also has been documented to influence breastfeeding (Ku & Chow, 2010).

1.2: Statement of the Problem

Malnutrition is a major public health problem of great importance in the world due to its effect on physical and intellectual growth, contribution in child morbidity, mortality and disability adjusted life years (DALYS). Malnourished children have a higher risk of death from common childhood illness such as diarrhea, pneumonia and malaria. Undernutrition is associated with 45% of children deaths estimated to be 2.7 million annually (Marriot *et al.,* 2012) and accounts for 11% DALYS globally (Black *et al.,* 2010). Malnutrition has an impact on economy, productivity losses to individuals are estimated at more than 10% of lifetime earning and gross domestic product (GDP) lost to malnutrition runs as high as 2% to 3% (Health system trust, 2015).

Suboptimal breastfeeding and poor complementary feeding practices are responsible for under nutrition among young children (Imdad *et al.,* 2011). Globally the prevalence of stunting, wasting and underweight in under five is reported to be 26%, 8% and 16% respectively (UNICEF, 2012) while in Kenya, the national prevalence of stunting, wasting and under weight is 26%, 4% and 11% respectively in under five (KNBS, 2015). This indicates that poor infant feeding methods are still being practiced in the society since not all children have the optimal growth. Pre-lacteal feeding is reported in 16% of infants (KNBS, 2015).

Although almost all mothers in Kenya, 99% breastfeed their children, 60% in the first hour after delivery, non-exclusive breastfeeding is reported as a feeding practice by 31% of mothers (KNBS, 2015). This shows that recommended feeding practice is not universal and everyday a proportion of children in Kenya face risk of illness,

malnutrition and death.

1.3: Justification of the Study

Every infant and child has a right to proper nutrition. Poor infant feeding practices directly or indirectly contributes to under nutrition, mortality and morbidity in children especially during the first two years of life. Over 800 000 children's lives could be saved every year among under five if all children aged below two years are optimally breastfed (Marriot *et al.,* 2012). The growth pattern of a healthy and well fed child is reflected in positive changes in height and weight.

The importance of exclusive breastfeeding for the first six months followed by timely, nutritional, safe adequate complementary feeding and continued breastfeeding for a minimum period of two years is known. Breastfeeding is associated with higher income in adult life, improved IQ as well as school attendance which results to economic gains for both individual family as well as national level (Marriot *et al.,* 2012).

Despite the level of awareness, the rate of exclusive breastfeeding still remains low; 43% of infants aged 0-6 months are exclusively breastfed globally and 61% in Kenya (Marriot *et al.,* 2012 and KNBS, 2015). This is evidence that notable proportion of mothers introduce complementary foods to their children before the recommended age. Therefore, there is need to understand factors that contribute to improper feeding of children in the community.

Reduction of levels of child malnutrition was a key factor in achieving millennium development goals number two and four which were; "achievement of universal

primary education" and "reduction of child mortality" respectively (United Nations, Department of Economic, 2008). It will also help achieving sustainable goals (Griggs *et al.,* 2013). Monitoring of nutritional status in children provides information on the progress made in achieving millennium development goals as well as target set in economic recovery of reducing by half proportion of malnourished children (WHO, 2012a).

Kajiado North Sub-county is multi-ethnic hence mixed cultures, resulting in different practices on infant and young children feeding. It's an urban Sub-county with developed and developing slums which is a major challenge nutritionally due to high level of poverty. Residents depend mainly on open air markets for complementary food. Quantity and quality of food may be inadequate or may not be introduced at the right time, affecting infant's nutritional status. It is important to identify those at risk of improper feeding practices for further interventions. This study will obtain information regarding awareness and feeding practices, challenges in regard to infant and child feeding practices and nutritional status of children. The information will be used by policy makers and implementers for further interventions, improving nutritional status of children as well as the general health of children.

1.4: Research Questions

i. What is the proportion of mothers who practice optimal feeding practice?

ii. What is the nutritional status of children aged 6-24months attending Mother Child Health Clinics in Kajiado North Sub-county?

iii. What are the socio-economic and demographic factors that influence choice of infant feeding practice on children aged 6-24 months attending Mother

Child Health Clinic in Kajiado North Sub-county?

1.5: Objectives of Study

1.5.1: Broad objective

To determine factors associated with infant feeding practice and nutrition status of children aged 6 to 24 months attending child welfare clinic in Kajiado North Sub-county.

1.5.2: Specific objectives

1. To determine the proportion of mothers who practice optimal feeding practice

2. To determine the nutritional status of children aged 6-24 months attending Mother Child Health Clinic in Kajiado North Sub-county.

3. To determine the socio-economic and demographic factors that influence choice of infant feeding practice on children aged 6-24 months attending Mother Child Health Clinic in Kajiado North Sub-county

CHAPTER TWO

LITERATURE REVIEW

2.1: Epidemiology of malnutrition in children

Malnutrition continues to be a major public health concern mainly caused by sub-optimal breastfeeding and poor complementary feeding practices among infants and young children (Imdad *et al.,* 2011). A report by International Food Policy Research Institute shows that every country is facing a serious public health challenge from malnutrition (Haddad *et al.,* 2014). It results from the interaction of poor-quality diets, poor-quality health, poor care environments and behaviors (Black *et al.,* 2013). Malnutrition presents itself in three forms: as children who do not grow and develop to their full potential, as children who are skin-and-bone or prone to infection and as children who carry too much weight or whose blood contains too much sugar, salt, or cholesterol (Black *et al.,* 2013).

Worldwide undernutrition contributes to nearly half of all deaths estimated to be three million in children below five years and this burden is much higher in Asia and Africa (Black *et al.,* 2013). A report by WHO showed that children in Sub-Saharan Africa are 14 times more likely to die before age of five than children in developed region due to malnutrition (Marriot *et al.,* 2012). A study estimated 45% of deaths in children under age of five years are linked to malnutrition (Black *et al.,* 2013). Malnutrition and diet are reported to be the largest risk factors responsible for the global burden of disease (Forouzanfar *et al.,* 2015). Malnourished children have greater rates and severity of enteric and other infections and are at risk of dying

prematurely. It does not only put children at risk of dying from common infections but also increases frequency and severity of those diseases as well as delayed recovery. In addition, interaction between under nutrition and infection can lead to cycle of worsening illness and deteriorating nutritional status (Black *et al.,* 2008).

A report generated by WHO on the sixty third World Health Assembly showed that malnutrition is responsible for 144 million disability-adjusted life years, 33% of total disability-adjusted life years in children less than five years old (WHO, 2010a). Malnutrition has negative effects on income and on economic growth, increased mortality and morbidity due to malnutrition lead to loss of economic output and increased spending on health. It also means that individuals are less productive due to physical and mental impairment, and that children benefit less from education (Horton *et al.*, 2008). Several studies report that economic consequences due to malnutrition represent losses of gross domestic product (GDP), year in and year out, of 10 percent—far greater than the annual percentage loss in world GDP due to the global financial crisis of 2008–2010 (Horton and Steckel 2013; Haddad *et al.,* 2015). According to a report by World Bank, it is estimated that Kenya lost 1.15 billion U.S. dollars in 2010 due to stunting, while the cost of child malnutrition globally reached about 12 billion dollars (WHO, 2012b).

Many countries experience a sharp increase in the prevalence of malnutrition in children who are below 5 years (WHO, 2008a). In 2011, an estimated 165 (26%) children under five years were stunted globally, with a high prevalence of them in Africa and Asia. Worldwide, 101 million children under five were underweight and an estimate of wasted children was 52 million with 70% of wasted children living in

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Asia, majority in South-Central Asia (UNICEF, 2012). In Kenya according to Kenya Demographic Health Survey (KDHS) 2014, 26% of children below five years were stunted, 11% were underweight and 4% wasted (KNBS, 2015). This is a drop from 2010 national value of 2009, where 35% of children below five years were reported to be stunted, 16% were underweight and 7% were wasted (KNBS, 2010).

2.2: Infant Feeding Practices

As a global public health recommendation for proper feeding practice, infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health. Thereafter, to meet their evolving nutritional needs, infants should receive safe and nutritionally adequate complementary foods at six months while breastfeeding continues for two years of age or more. Breastfeeding is recommended to be initiated within first hour of life (WHO, 2009a). The World Health Organization (WHO) has developed eight core infant and young child feeding indicators to monitor and to guide the feeding practices of young children including: early initiation of breastfeeding; exclusive breastfeeding under six months; continued breastfeeding for two years; the introduction of solid, semi-solid or soft foods; minimum dietary diversity; minimum meal frequency; minimum acceptable diet and consumption of iron rich or iron fortified foods (WHO, 2008b).

Globally and nationally poor infant feeding practices are highly documented. A report by Center for Disease Control and Prevention estimates that in USA, while 70% of mothers' initiate breastfeeding after birth of their infants, only 13.5% are exclusively breastfed for the first six months (Centers for Disease Control & prevention, 2011). In 2010 a report by WHO indicated that only 35 % of infants in

Sub-Saharan Africa are exclusively breastfed (Marriot *et al.,* 2012). According to 2014 KDHS, 61% of infants were exclusively breastfed for the first six months, an increase from 2008-2009 KDHS where only 32% of infants in Kenya were exclusively breastfed (KNBS, 2010). Kenya is rated among 22 countries in Africa with poor infant feeding practices with a resultant high burden of undernutrition among the under-five (UNICEF, 2011).

To achieve appropriate nutrition in infants and young children aged 6-23 months, interventions are required across the life span, from pregnancy into the first two years of life (WHO, 2008b). They include: Support for maternal nutrition, early initiation of breastfeeding, exclusive breastfeeding for 6 months, and the introduction of adequate complementary foods at 6 months with continued breastfeeding for 2 years of age or beyond; Quality counseling of mothers and caregivers and appropriate behavioral change communication to other family and community decision-makers; Maximizing utilization of locally produced foods in any given setting and considering the promotion of additional products only if they can fill a critical gap in nutrients in an acceptable, feasible, affordable, sustainable and safe way, as a complement to continued breastfeeding and the local diet, not as a replacement; Where locally available foods alone will not satisfy nutritional requirements, various types of products can be used, including centrally produced fortified foods, micronutrient powders, and lipid-based nutrient supplements. However, research and carefully monitored applications at scale are needed to generate more evidence on which product is best for which circumstance, how best to promote their correct utilization, and their contribution to improving nutritional, developmental and health status in different circumstances (WHO, 2008b).

2.2.1: Exclusive breastfeeding

According to WHO, exclusive breastfeeding is defined as giving no other food or drink, not even water except breast milk to infants for the first six months of life. Infants are however allowed to receive oral dehydration salt (ORS), drops and syrups of vitamins, minerals and medicines (WHO, 2017). United Nations reported that breastfeeding is linked to the eight sustainable development goals, poverty, hunger, health, education, gender equality, and sustainable consumption (United Nations, 2015). Almost all mothers can breastfeed exclusively, except for few with medical conditions like; breast abscess, mastitis, hepatitis B, maternal medicine, sepsis, substance abuse among others (WHO, 2009b).

Breast milk is safe, requires no preparation, and is available even in environments with poor sanitation and unsafe drinking water (UNICEF, 2017). Breastfeeding is a cost effective way of feeding an infant, providing nourishment for a child at a small cost to the mother (WHO, 2009b). Breast milk contains all the essential nutrients and elements to nurture healthy growth for the first six months of life and beyond (Mullany *et al.,* 2008). Exclusive breastfeeding provides all infants nutritional and fluid needs in the first six months and is a perfect combination of proteins, fats, carbohydrates and fluids (UNICEF, 2009).

Exclusive breastfeeding during the first six months of life is one of the key interventions for reducing childhood deaths. Different studies show that exclusive breastfeeding for the first six months can help reduce infant mortality rates because of antibodies and other immunity boosters naturally found in breast milk (UNICEF, 2009). A study showed that lymphocytes in breast milk including T-cells (83%) and

B-cells provide helpful immunity important in the destruction of viruses (Wambach & Riordan, 2014). Its composition is perfectly suited for a baby's delicate digestive system, making exclusively breastfed babies experience few of the digestive upsets, diarrhea or constipation that are often associated with the use of milk formulas (WHO, 2009a). When exclusive breastfeeding is continued during diarrhea illness, it diminishes the adverse impact on nutritional status (WHO, 2010b). Breastfeeding continues to provide up to half or more of a child's nutritional needs during the second half of the first year, and up to one third during the second year of life (Marriot *et al.,* 2012). Mortality rates can drop further if mothers continue breastfeeding until their children are 2 years old (UNICEF, 2009).

Breastfeeding benefits are not to the child but also to the mother as well. Breastfeeding immediately after delivery helps to reduce the risk of post-partum hemorrhage. In the short term, breastfeeding delays the return to fertility and in the long term, it reduces type 2 diabetes and breast, uterine and ovarian cancer (UNICEF, 2015). Studies showed that mothers who breastfed their babies were less likely to suffer from hypertension (Lupton *et al.,* 2013) and increased breastfeeding duration decreased the risk of developing cardiovascular disease in 50 years old mothers (Natland *et al.,* 2012). Breastfeeding has also been found to help women restore their body shape after delivery (Victora *et al.,* 2016). Exclusive breastfeeding for the first six months of life has been shown in a study to be beneficial to HIV positive mothers and their children too. It significantly reduces transmission to infant, providing the infant with a greater chance of survival in the first year of life and helping the mother recover from the negative health effects of birth much more quickly (Stein & Kuhn, 2009).

2.2.2: Complementary feeding

Complementary feeding is the process starting when breast milk alone or infant formula alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are introduced, along with breast milk or a breast-milk substitute (WHO, 2008b). Foods consumed between 6 months and 2 years of life are called complementary foods because they ideally complement an already breast milk-based diet. The 18-month period between 6 months and age 2 is referred to as the complementary feeding period (UNICEF, 2017).

World Health Organization has provided guiding principles for appropriate complementary feeding as follows: continue frequent, on-demand breastfeeding until 2 years of age or beyond; practice responsive feeding for example, feed infants directly and assist older children. Feed slowly and patiently, encourage them to eat but do not force them, talk to the child and maintain eye contact; practice good hygiene and proper food handling; start at 6 months with small amounts of food and increase gradually as the child gets older; gradually increase food consistency and variety; increase the number of times that the child is fed: 2–3 meals per day for infants 6–8 months of age and 3–4 meals per day for infants 9–23 months of age, with 1–2 additional snacks as required; use fortified complementary foods or vitamin-mineral supplements as needed and during illness, increase fluid intake including more breastfeeding, and offer soft, favorite foods (WHO, 2016).

Complementary foods may be either prepared specially for the young child, both to meet age related nutritional needs and to mitigate immaturity in chewing and swallowing, or may be selected from the same foods consumed by other family

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members. During the complementary feeding period, UNICEF recommends that children eat a frequent and diverse diet of nutrient-rich and hygienically prepared complementary foods in addition to breast milk (UNICEF, 2017). A study has shown that a diet comprising at least four food groups a day is associated with improved growth in young children (Onyango *et al.,* 2014). The complementary feeding should not be hyper-caloric, in order to prevent obesity in adulthood (Mastinu *et al.,* 2013). A study indicated that inappropriate complementary feeding practices such as untimely introduction of complementary food, improper feeding frequency, and low dietary diversity of complementary food have negative effects on children's health (Saha *et al.,* 2008).

2.2.3: Mixed feeding

Mixed feeding is giving other liquids and/or foods together with breast milk to infants below six months of age (UNICEF, 2015), that is non-exclusive breastfeeding. Mixed feeding, results in a shorter duration of exclusive breastfeeding therefore, compromising the nutritional status of children (UNICEF, 2010). It carries risks of additional illness and death, particularly where the levels of infectious diseases are high and access to safe water is poor (UNICEF, 2015). Water is needed for preparation of foods; cleaning utensils used for feeding especially bottles should be adequately cleaned.

Introduction of solids and other liquids before six months among infants has been reported by studies to increase the risk of overweight and obesity during childhood and adulthood (Mihrshah *et al.,* 2011). A meta-analysis by the Agency for Healthcare Research and Quality reported harms brought about by mixed feeding as: Infants

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experiencing increased incidence of infectious morbidity, including otitis media, gastroenteritis, and pneumonia, as well as elevated risks of childhood obesity, type 1 and type 2diabetes and sudden infant death syndrome. There is increased risk of necrotizing enterocolitis among premature infants. Other studies have associated early introduction of solid foods before six months of age increased risk of diarrheal disease or gastro-intestinal infection in infancy (Kramer & Kakuma, 2009), food allergies (Symon & Bammann, 2012) and overweight or higher Body Mass Index (BMI) in childhood (Huh *et al.,* 2011). It may also change the composition of gastro-intestinal bacteria, the microbiome, which has implications for health (Martin & Sela, 2013). It is also expensive as compared to giving breast milk only for the first six months (UNICEF, 2015).

2.3: Factors influencing choice of feeding practice

Numerous factors including, Maternal factors, social factors, economic factors, demographic factors, cultural factors as well as knowledge and attitude towards feeding practices can be a barrier to proper nutrition or a promoter of optimal infant feeding practices. A study concluded that, high level of maternal education enhances the understanding of mothers and their appreciation of the benefits of exclusive breastfeeding thus empowering them to resist external interferences and pressures that discourage exclusive breastfeeding (Uchendu *et al.,* 2009). Studies from Asian countries have positively associated mother's education with infant feeding practices; timely initiation of complementary food and minimum acceptable diet (Fein *et al*., 2008, Khanal *et al.,* 2013). In nationwide survey in Finland, differences in duration of both exclusive and total breastfeeding between mothers having the highest

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compared with lowest education level were about 2.5 fold; 42 % of mothers with high education were exclusively breastfeeding at four months and 88% were breastfeeding at six (Uusitalo *et al.,* 2012).

Giving birth through, Caesarean section is a barrier that inhibits breastfeeding within the first hour of life. Analgesia for the mother may result in delay and impairment of the first breastfeeding (Vieira *et al.,* 2010). The support after delivery is one of the environmental and emotional factors that influence the decision of the women for breastfeeding and it improves their self-esteem, confidence and promotes a healthy behavior (Ku & Chow, 2010). According to 2008-2009 KDHS survey, female infants were exclusively breastfed at 1.3% compared to males at 0.6% up to six months (KNBS, 2010).

Maternal infant feeding attitude has been shown by studies to be a strong independent predictor of breastfeeding initiation and duration. Maternal positive attitudes toward breastfeeding are associated with continuing to be breastfeeding longer and have a greater chance of success (Madhu *et al.,* 2009) while, negative attitudes of women toward breastfeeding is considered to be a major barrier to initiate and continue breastfeeding (Dungy *et al.,* 2008). A study in Malawi reported that, grandmothers were likely to give or direct new mothers to give supplementary root infusions to infants based on the belief that breast milk alone would not satisfy an infant's hunger.

Maternal age has been associated with appropriate timing and quality of complementary foods (Betoko *et al.,* 2013; Kasahun *et al.,* 2017). In a study breastfeeding duration was shorter among less than 25 years-old compared to older

mothers (Uusitalo *et al.,* 2012). Rates of the initiation of the breastfeeding among adolescent mothers, has been found to be significantly lower than among older mothers (Centers for Disease Control & Prevention, 2011). A study carried out in Kenya, on factors associated with introduction of complementary foods in infants below six months found that mother's occupation affected time spent with the child leading to introduction of complementary feeding before six months (Lucia, 2008).

2.4: Assessment of Nutritional Status

Nutritional status is most commonly assessed through anthropometric measurement of child weight and height (UNICEF, 2014). Stunting reflects chronic under nutrition defined as the percentage of children aged 0-59 months whose height for age is below minus two standard deviation (moderate stunting) and minus three standard deviations (severe stunting) from the median of the WHO Child Growth Standards (UNICEF, 2014). Wasting is a reflection of acute under nutrition, defined as the percentage of children aged 0-59 months whose weight for height is below minus two standard deviation (moderate wasting) and minus three standard deviations (severe wasting) from the median of the WHO Child Growth Standards (UNICEF, 2014). Underweight includes elements of stunting and wasting, defined as the percentage of children aged 0-59 months whose weight for age is below minus two standard deviation (moderate underweight) and minus three standard deviations (severe underweight) from the median of the WHO Child Growth Standards (UNICEF, 2014). Severe acute malnutrition can also be defined by a mid –upper arm circumference (MUAC) less than 115mm with or without nutritional oedemas. A child is defined as overweight if his /her weight is above two standard deviation

and obese if it is above three standard deviations (UNICEF, 2014).

CHAPTER THREE

MATERIALS AND METHODOLOGY

3.1: Study Site

The study was carried out in three Public health facilities; Ngong Sub-District Hospital, Ongata Rongai and Olo-Sirkon Health Centers in Kajiado North sub-county in Mother Child Health Clinics (MCH). Kajiado North sub-county is one of the five sub-counties in Kajiado County which is located in southern part of Kenya. It has a diverse background comprising of rural and urban set-ups as well as a rich ethnic and cultural diversity composition with Maasai being dominant community. Its population is comprised of three groups which are unique and special: Indigenous nomadic pastoralist community who often move in search of pasture and water; a group of workers that reside in peri-urban areas (Ngong and Ongata-Rongai) while working in capital city of Kenya and other residents who conduct their activities within the county. Population served by these facilities is of mixed ethnicity, cultures and lifestyle, cosmopolitan urban population.

Kenya's Health Care system is structured from level one to level six. The three public health facilities where the study was carried were of different levels;

Olo-sirkon is in the level two of a dispensary, managed and run by nurses, Ongata-Rongai is in the level three of a health centre managed by a clinical officer, had technicians, clinical officers, nutritionist and public health officers in addition to nurses found at the dispensary. Ngong is in the level four of sub-county hospital managed by a medical doctor, had variety of surgical services, medical doctors in

addition to the services and staff found at Health centre.

3.2: Study Design

The study was a hospital based cross-sectional quantitative study. Questionnaire was the main data collection tool, MUAC tape, weighing scale and a stadiometer were used to take anthropometric measurement

3.3: Study Population

The study population was mother-child pair, children aged 6-24 months, of both sexes who visited these facilities for child welfare services that is immunization and growth monitoring only.

3.3.1: Inclusion criteria

1. Mother and child pair aged 6-24 months
2. Mother who gave a consent

3.3.2: Exclusion criteria

1. Mother and their children aged 6-24 months' pair (with more than one child)
2. Mothers who never gave a consent
3. Mothers who were less than 18 years, not accompanied by parents since they were not of legal age of giving a consent.

3.4: Sampling

3.4.1: Sample size determination

The sample size was determined using Cochran, 1977 formula (Cochran, 1977)

$n=z^2pq/d^2$

Where:

n= minimum sample size.

z= the standard number deviate at the confidence level. [Critical level corresponding to 95% confidence interval obtained from standard normal distribution (two sides)] =1.96

p= an estimate of the proportion of people falling into the group in which we are interested in the population, in this case, based on Kenya Demographic Health Survey, 2009 that 35% of Kenyan children are stunted (KNBS, 2010).

q= 1-p (the proportion of population without characteristics.)

d= degree of precision with which p was determined, in this case set at 5%.

$n= z^2 x\ p\ (1-p)\ /d^2$

$= \underline{1.96^2\ x0.35x0.65}$

0.05^2

=349.5

=350.

Sample size was 350.

3.4.2: Sampling Procedure

In this study, systematic sampling method was used:

1. Three public health facilities were purposively selected from Kajiado North sub-county. This represented rural and urban population living in this sub-county. These were Ngong Sub-county hospital represented urban and rural population , Ongata Rongai health centre represented urban population and

Olo-Sirkon dispensary represented rural population

2. Proportionate distribution of sample size among the facilities depending on the work load of each facility was done; Ongata Rongai was the busiest facility with a population of 680 children, followed by Ngong Sub-District hospital with a population of 450 children and Olo-sirkon was less busy with a population of 60 children. Sampling interval (K) =N/n was every 4th mother at Ongata Rongai Health MCH ,3rd mother at Ngong sub-district hospital MCH   and 2nd at Olo-sirkon MCH. In Ongata Rongai health centre, 170 samples were obtained, Ngong Sub-district hospital 150 samples while Olo-Sirkon dispensary 30 samples totaling to 350 samples

3. Random sampling was used to pick the first mother-child (6-24 months) pair. This was by folding ten papers which the first ten mothers who attended the MCH clinic picked. The rest were picked at an equal interval depending on each facilities workload

3.5: Data Collection Method

3.5.1: Questionnaire

A pre-tested, semi-structured questionnaire both in English and Kiswahili was used to collect information from participant. The questionnaire was pretested on 20 respondents on a population similar to target population to ensure that its content was suitable, understandable and questions had a flow. The questionnaire was fine tuned with the help of the supervisors to suit in the study. The questionnaire had three parts (Appendix A);

Part A:

Comprised questions on:

Basic child demographics: age, gender, current weight, weight at birth, mode of birth, place of birth.

Child feeding practice: time of initiating breast and complementary feeding, breastfeeding status, mother's knowledge on infant feeding, infant care giver and feeding problem.

Part B:

Consisted questions on: parent demography; mother's age, marital status, parity, delivery method, level of education and occupation; household characteristics; source of income, total monthly income, house ownership and membership.

Part C

Child's anthropometric measurement: weight, height; any clinical signs of rickets; bow legs, edema and hair color change

3.5.2: Anthropometric measures

This assessed the nutritional status of children:

1. Salter scale measured weight

2. Stadiometer measured height/ length

3. MUAC tape measured mid upper arm circumference.

4. Clinical assessment identified presence of edema and signs of rickets

3.5.3: Data Collection Procedure

Consenting and questionnaire filling was conducted in the waiting bay for the participants who qualified to be included in the study. Anthropometric measurements

and assessment of rickets signs was conducted as the patient received services to minimize undressing of child twice. This was seen to be cumbersome and exposed children to cold, since the research was carried out during cold season in this area. Anthropometric measurements were taken by the researcher together with assistance who verified the measurement for accuracy.

Mid upper arm circumference (MUAC) was taken on the left mid upper arm at the point between acrimion process of scapular and olecranone process of ulna bone by use of non- elastic MUAC tape to the nearest 0.1centimetre (cm). Left hand was selected, because for most children, right hand is the most active leading to muscle building, therefore, giving exaggerated measurement. Recumbent length was taken by help of a stadiometer since all children were below two years. The board was laid on the surface; the child was placed in a supine position with the head held firmly in position by the mother touching a horizontal rigid head board. Legs were straightened with feet at right angle to the legs; another rigid board was brought into contact with the heel and their length taken to the nearest 0.1 cm.

Weight was taken by help of a salter scale weighing machine recorded to nearest 0.1 kilogram. Salter scale was calibrated by suspending weighing pants on the scale and readjusting the scale to zero **(fig 3.1).**

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              ┌─────────────────────────────────────┐
              │   Mothers and children at MCH clinic  │
              └─────────────────────────────────────┘
                    │                        │
                    ▼                        ▼
         ┌──────────────┐          ┌──────────────────────┐
         │  6-24 months │          │  <6months>24months   │
         └──────────────┘          └──────────────────────┘
                 │
                 ▼
  ┌──────────────────────────────────┐
  │  Explain to the mother the nature,│
  │  purpose procedure, expected      │
  │  duration, benefits and risks     │
  └──────────────────────────────────┘
             │                  │
             ▼                  ▼
    ┌─────────────────┐   ┌──────────────────────┐
    │  Consent/assent │   │  No consent or assent │
    └─────────────────┘   └──────────────────────┘
             │
             ▼
    ┌─────────────────┐
    │  Questionnaire  │
    └─────────────────┘
             │
             ▼
    ┌──────────────────────────────┐
    │  Anthropometric measurement  │
    └──────────────────────────────┘
             │
             ▼
    ┌──────────────────────────────┐
    │  Immunization then home      │
    └──────────────────────────────┘
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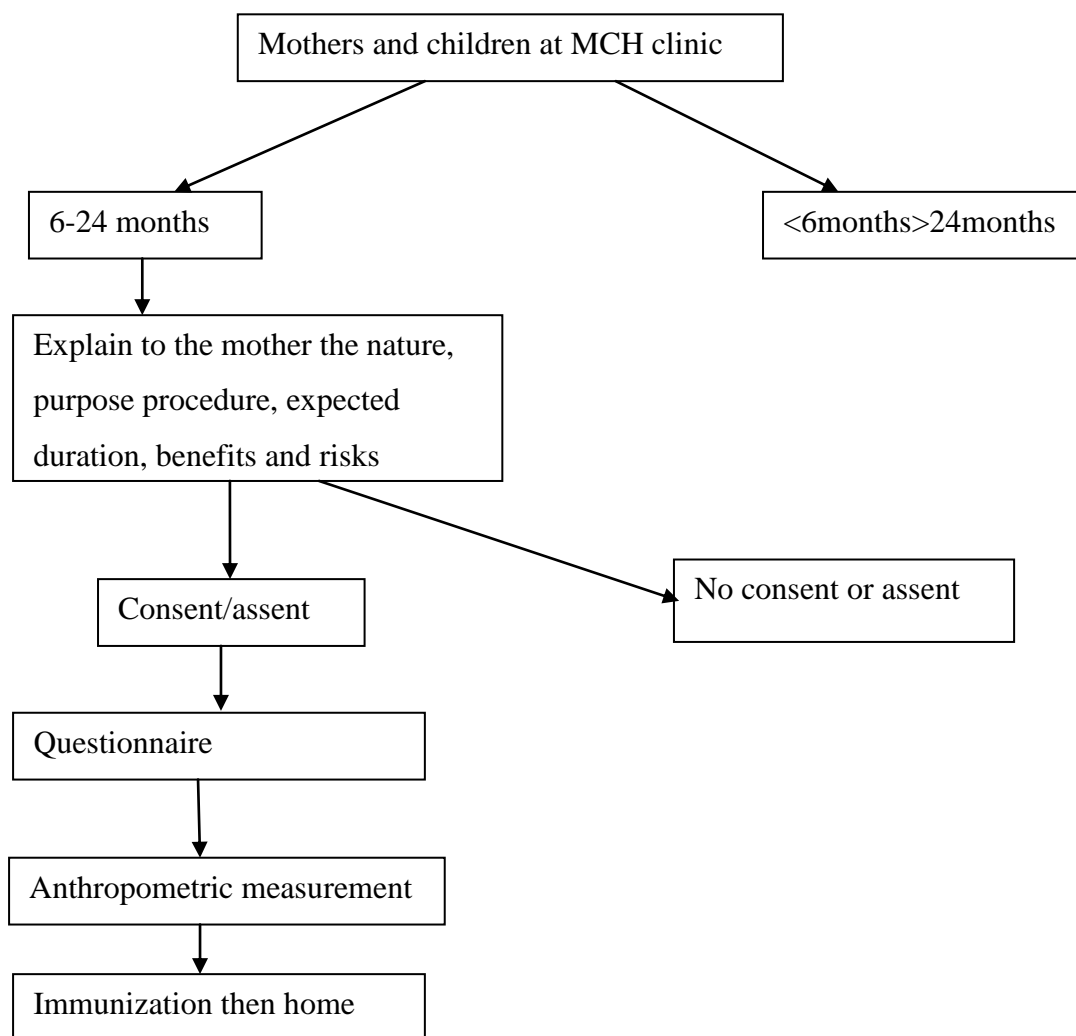
Figure 3.1: Data collection procedure Kajiado North Sub-county, July to September 2013

3.6: Data Management and Analysis

3.6.1: Data management

Filled questionnaires were thoroughly checked, validated for their completeness and accuracy and coded before entering in a database. Data was entered in SPSS version 20 and EPI-info 7 which computed Z-scores for anthropometric measurements based on WHO reference point. Computed Z-scores were then transferred to SPSS version

20 for further analysis. Data was thoroughly cleaned and validated by checking for any wrong entry, double entry and consistence and then corrections were made.

Data was stored in several backup, for retrieving in case of data damage or loss of original data. Back up included three flash disks, compact disk and email. Electronically stored data was password protected to limit unauthorized access.

3.6.2: Data analysis

Tables, pie-charts and figures were used to summarize data. Descriptive statistics used were measures of location (mean, median, and mode) and spread (range) for continuous variables and percentages and frequencies for categorical variables. Pearson's Chi- square test was used to test the strength of association between categorical variables. All independent variables were associated with dependent variables to determine which had significant association. Odds ratio (OR) and 95% CI was used to estimate the strength of association between independent and dependent variables, the threshold for statistical significance was set at $p<0.05$. All independent variables identified to be significantly associated with dependent variables at bivariate analysis level were further analyzed at multivariate level by use of ordinal regression to determine predictors.

3.7: Variables

3.7.1: The dependent variable

The dependent variables were;

1. Infant nutritional status at the time of study. Status was based on anthropometric measurements; stunting, wasting, weight, MUAC and presence or absence of rickets sign.

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2. Infant feeding practices: The type of infant feeding method in the first six months of infant's life, different methods of feeding for infants included:

a. Exclusive breastfeeding; infants who received only Breast milk and no water, fluids like juice, non-human milk or foods up to six months but prescribed medicines are allowed.

b. Non exclusive breastfeeding (mixed feeding); combination of breast milk with other fluids or food or formula milk, the combination must have been started at least before the first six months of life, and percentage of breast milk to other feeds was not taken in consideration in this study.

c. Exclusively complementary feeding; infants who received non-human Milk or other types of food without breast milk before six months of life.

3.7.2: The independent variables

3.7.2.1: For the children;

1. Child's gender: (male, female).

2. Status at time of birth: (preterm, term).

3. Weight at birth

4. Age

5. Place of birth

3.7.2.2: Parent socio-economic and demographics

1. Mother's marital status (single, married)

2. Mother's age

3. Parity

4. Type of delivery (Vaginal, Caesarean)

5. Mother's level of formal education: (none, primary secondary, tertiary).

6. Mother's knowledge on infant nutrition (medical or cultural)

7. Mother's occupation

8. Spouses' level of formal education: (none, primary, Secondary, tertiary).

9. Spouses' occupation

10. Size of nuclear family

11. Major family income

12. Housing (ownership, size, floor, walls, roofs, toilet facility and source of water

3.8: Ethical Consideration

Clearance for this study was obtained from both KEMRI Scientific Steering Committee and Ethical Review Committee who allowed commencement of the study (Appendix C and D). Approval letter from KEMRI Ethical Review Board was forwarded to Ministry of Health Scientific Steering Committee and Ethical Review Committee for permission to carry out the study in the public health facilities (Appendix F). Approval from Ministry of Health was handed to the District Medical Officer of Health (DMOH) who gave permission for research to be carried out in Olo-sirkon dispensary and Ongata-Rongai health centre and Medical Officer in-charge of Ngong Sub-District hospital.

Consent for participation was obtained by the researcher by explaining nature of study, its purpose, procedures, expected duration, benefits and risks of participation (Appendix B). The potential participants were informed of their rights to privacy and confidentiality. A review and discussion of the consent then occurred between the

researcher and participant. The participant was encouraged to ask questions; given an opportunity to review the question alone and more time to consult. The participant who was unable to read or with poor reading comprehension, the consent was read to her by the researcher. The participant, who spoke and understood either English or Kiswahili but did not read or write, was enrolled in the study by putting a thumb mark on the consent document.

This research provided no harm to either the mother or child; it was entirely based on the principal of voluntary participation. No coercion or intimidation was used to obtain any information. Data collected was strictly based on issues of confidentiality and privacy by restricted access to information collected. Participants were given unique identifications instead of their names and consented before participating in the study. Filled questionnaires were filed and all files kept under lock and key, until final submission of the thesis and its approval had been granted.

CHAPTER FOUR

RESULTS

4.1: Infant Feeding Practices

4.1.1: Breastfeeding practice

All mothers 350(100%) who participated in the study breastfed their children. A high proportion of mothers 193(55.1%) started breastfeeding their children immediately after birth, a fifth within the first 30 minutes after birth and 24(6.9%) within the first hour of birth. A small proportion however, 63(18%) initiated after two hours or more **(Figure 4.1).**
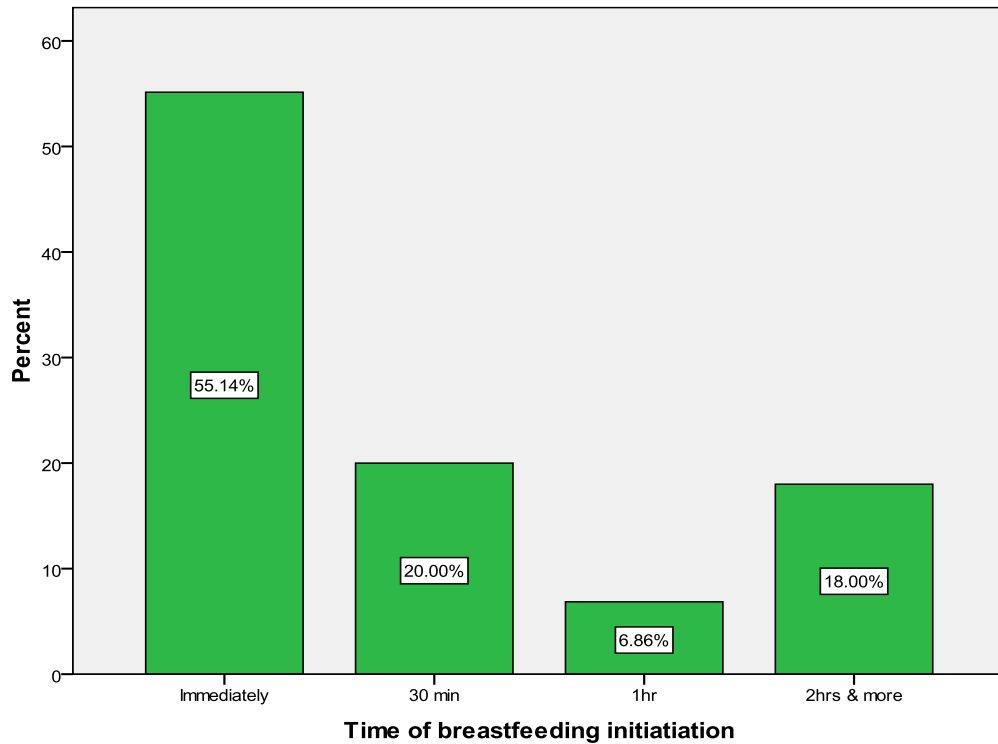
Figure 4.1: Time at which breastfeeding was initiated among children in Kajiado North Sub-county, July to September 2013

Results indicated that a quarter of children 90(25.8%) were not exclusively breastfed for the first six months as recommended. During the time of this study, a high proportion 327 (93.43%) of mothers was still breastfeeding their children. Among the 23 mothers who were not breastfeeding their children, 5 terminated breastfeeding practice before the age of six months, 2 at 6 months of age, 3 in the last half of first year and 13 within second year of life. The reasons these mothers gave for early termination of breastfeeding were: 10(2.86%) sickness of breast and health conditions like Pregnancy, HIV, effect of family planning, lack of milk by the mother and pregnancy; 7 (2.0%) voluntary refusal by the child to breastfeed; 5 (1.43%) child refusal to feed on complementary foods (appetite) and 1(0.29%) work **(Figure 4.2)**
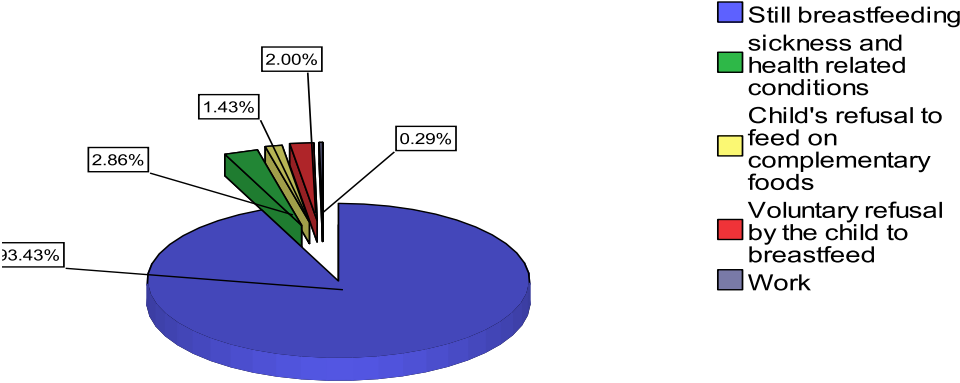
Figure 4.2: Reasons for early termination of breastfeeding among children in Kajiado North Sub-county, July to September 2013

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4.1.2.: Complementary feeding practice

A small proportion of children, 14 (4%) was not on complementary feeding during the time of the study even if they had attained the age recommended for receiving complementary foods. Among children on complementary feeding, majority, 211(60%) were introduced to complementary feeding at the age of 6 months as recommended. (**Figure 4.3)**
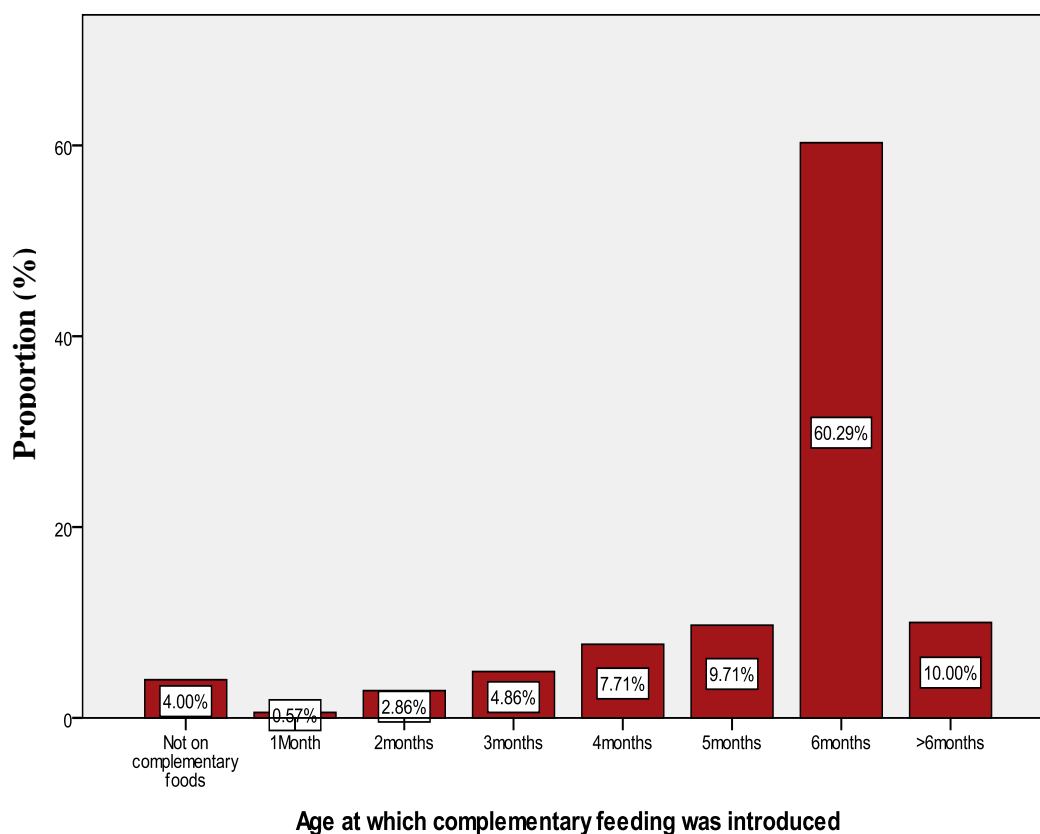
Figure 4.3: Age at which weaning was introduced among children in Kajiado North Sub-county, July to September 2013

During introduction of complementary feeding, 121 (34.6%) of the mothers reported to have fed their children twice, 124 (35.4%) thrice, 64 (18.3%) once and 27 (7.7%) frequently, majority 232 (66.3%) of them had changed feeding pattern from the initial pattern when study was going on. When asked what had changed, 137 (39.1%) reported feeding frequency and increase in food varieties, 94 (26.9%) had started giving their children family food and 1 (0.3%) was on nutritional diet. Majority 308 (88.0%) bought food from the market, 22 (6.3%) produced food on their own farms and 20 (5.7%) partly bought from the market and partly own farm. A high proportion of children 314 (89.7%) ate food from their own plate while 22 (6.3%) shared a plate. Majority of children 237 (67.7%) did not have any infant feeding problem. Those who experienced infant feeding problem reported, the major problem to be lack of appetite in 65 (18.6%), lack of food 16 (4.6%), sick children 11 (3.1%) and in 7 (2.0%) lack of time by the mother for feeding the child **(Table 4.1).**

Table 4.1: Complementary feeding characteristics of children in Kajiado North Sub-county, July to September

Variable	Frequency n=350	Percentage %	95% Confidence Interval Lower	Upper
On complementary feeding				
Yes	336	96.0	94.0	98.0
No	14	4.0	2.0	6.0
Feeding frequency during initiation of weaning				
Not on complementary food	14	4.0	2.8	7.3
Once	64	18.3	15.2	23.5
Twice	121	34.6	31.0	40.8
Thrice	124	35.4	31.8	42.3
More frequent	27	7.7	5.4	10.7
Change from initial pattern				
Not on complementary food	14	4	1.9	6.1
Yes	232	66.3	64.0	74.1
No	104	29.7	25.9	36.0
Pattern that had changed				
Not on complementary food	14	4.0	2.8	7.1
No change	104	29.7	25.3	35.2
Frequency of feeding/increase food types	137	39.1	35.6	45.1
Started eating with other family members	94	26.9	24.1	37.0
On nutrition diet	1	0.3	0.0	1.3
Major source of food				
Market	308	88.0	84.3	91.1
Own farm	22	6.3	4.8	9.1
Partly own farm and market	20	5.7	4.4	8.0
Child feeding method				
Not on complementary food	14	4.0	1.7	5.7
Own plate	314	89.7	84.8	96.1
Sharing plate	22	6.3	3.9	9.2
Infant feeding problem				
Not on complementary food	14	4.0	1.8	6.3
Yes	99	28.3	25.0	34.5
No	237	67.7	65.5	75.5
Type of problem experienced				
Not on complementary food	14	4.0	2.9	7.0
Lack of infant appetite	65	18.6	11.1	23.2
Lack of food	16	4.6	3.0	7.1
Lack of time	7	2.0	0.6	4.7
Sick child	11	3.1	2.1	7.2
No infant feeding problem	237	67.7	62.6	73.1

On food preparation, large proportion of children's food 221 (65.8%) was prepared separately, 78 (23.2%) of children ate with other family members while 37 (11%) fed on food partly prepared separately and partly as part of family meals **(Figure 4.4).**
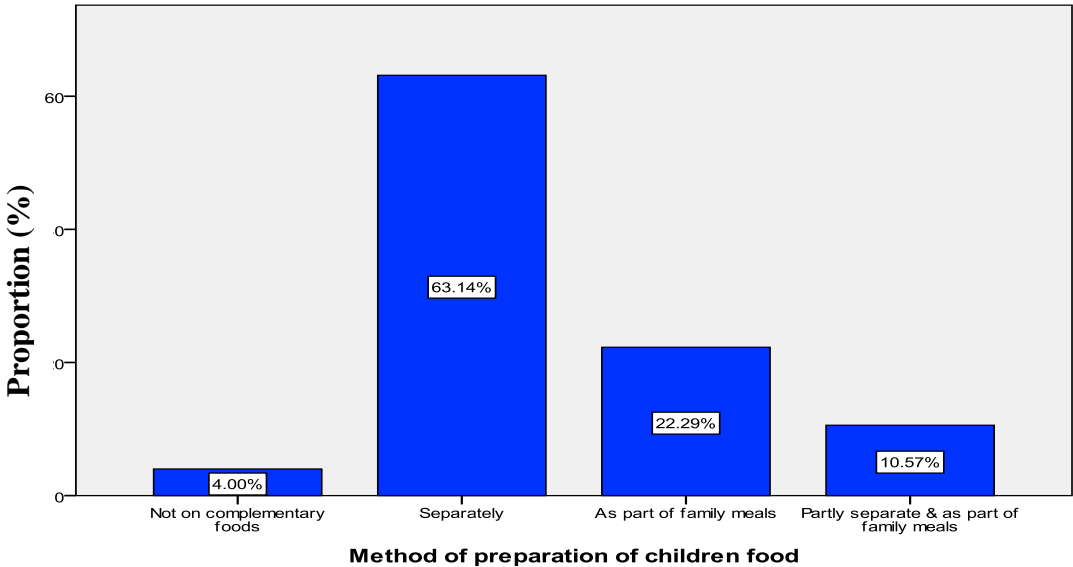
Figure 4.4: Method of food preparation for children in Kajiado North Sub-county, July to September 2013

Study subjects were asked who was the caregiver of children most of the time, majority 324 (92.6%) reported mothers, 15 (4.3%) house girls, 4 (1.1%) fathers while 7 (2.0%) others like sisters, grandmother **(Figure 4.5).**
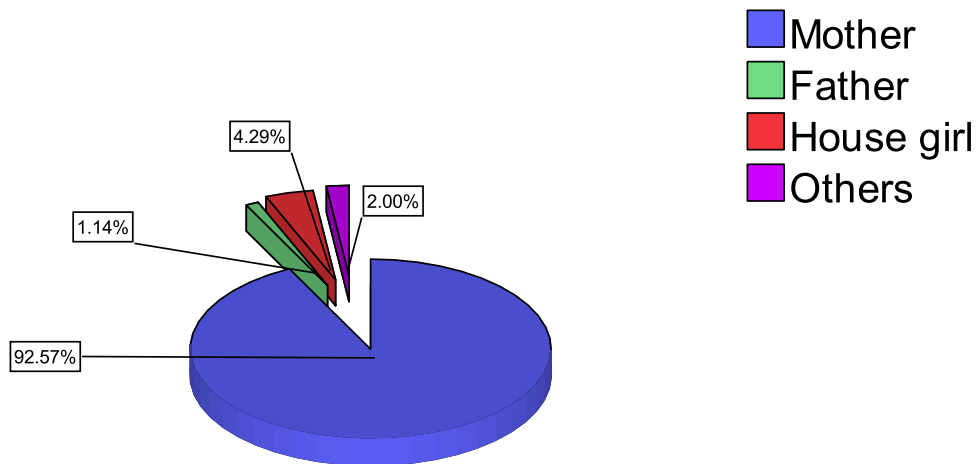
Figure 4.5: Person who fed children most in Kajiado North Sub-county, July to September 2013

4.2: Nutritional Status.

4.2.1: Anthropometric measurements.

More than two thirds 247 (70.6%) of the children were normal height for age, 93 (26.5%) were stunted, 10 (2.9%) had high length for age. Majority 317 (90.5%) of the children were normal for wasting while 33 (9.4%) had high weight for height. A small proportion 39 (11.1%) of children were underweight and 14 (4.0%) had high weight for age. The rest, 297 (84.4%) of the children had normal weight for age. More than half 188 (53.3%) of the children were normal (MUAC), 58(16.6%) had acute malnutrition, 55 (15.7%) and 104 (29.7%) were at risk of acute malnutrition **(Table 4.2).**

Table 4.2: Anthropometric measurements of children in Kajiado North Sub-county, July to Sept 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval Lower	Upper
Stunting				
Normal	247	70.6	65.7	75.1
Stunting	93	26.5	20.6	31.9
High length for age	10	2.9	1.0	3.3
Wasting				
Normal	317	90.5	87.4	93.4
High weight for height	33	9.4	6.6	12.6
Underweight				
Normal	297	84.4	80.9	88.3
Underweight	39	11.1	8.7	14.8
High weight for age	14	4.0	2.1	4.6
MUAC				
Normal	188	53.3	47.7	58.9
Acute malnutrition	58	16.6	11.3	20.7
Risk of acute malnutrition	104	29.7	25.1	34.9

4.2.2: Presence or absence of signs of rickets.

Less than a quarter 44 (12.6%) of the children had one or more sign of rickets, 1 (0.3%) had all the signs of rickets. Signs of rickets present were; 40 (11.4%) were underweight, 25 (7.1%) had delayed milestone, 15 (4.3%) had weak and painful bones, 6 (1.7%) had wide wrists, 4 (1.1%) had bowed legs while 2 (0.6%) had box-like face. Edema, 5 (1.4%) and change of hair color 1(0.3%) was found in small percentage of infants **(Table 4.3).**

Table 4.3: The Presence or Absence of signs of rickets among children in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval Lower	Upper
Signs of Rickets				
Present	44	12.6	9.1	16.3
Absent	306	87.4	83.7	90.9
Bowed legs				
Present	4	1.1	0.3	2.3
Absent	346	98.9	97.7	99.7
Weak and pain full bones				
Present	15	4.3	2.3	6.6
Absent	335	95.7	93.4	97.7
Delayed milestone				
Present	25	7.1	4.6	10.0
Absent	225	92.9	90.0	95.4
Underweight				
Present	40	11.4	8.3	14.8
Absent	310	88.6	85.2	91.7
Widening of wrist				
Present	6	1.7	0.6	3.1
Absent	344	98.0	96.9	99.4
Oedema				
Present	5	1.4	0.3	2.9
Absent	345	98.6	97.1	99.7
Change of hair colour				
Present	1	0.3	0.0	0.9
Absent	349	99.7	99.1	100
Box like forehead				
Present	2	0.6	0.0	1.4
Absent	348	99.4	98.0	100.0

4.3: Social-Demographic Characteristics

4.3:1: Social-demographic characteristics

A total of 350 mother-child pair participated in this study. The range of mothers age was 18-45 years, half of them 178 (50.9%) being between 18-24 years and least 3 (0.9%) were 39 years and above. The mean maternal age was 25 years with a standard deviation of 5.03, modal age 22 years and median 24 years. Most of the mothers 324 (92.6%) were married. Most of the children 228 (65.1%) were aged 6-9 months and the least 4 (1.1%) were aged 22-24 months. Data regarding infants were obtained from mothers and review of the child's health card. The children mean age was 9 months with a standard deviation of 3.58, modal age 6, median 9 and the range was between 6-23 months. Male children 197 (56.3%) were at a higher proportion than females 153 (43.7%). **(Table 4.4)**

Table 4.4: Socio-demographic characteristics of Mothers and children in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval	
			Lower	Upper
Mothers age distribution				
18-24	196	56.0	49.9	60.4
25-31	98	28.0	23.2	32.3
32-38	43	12.3	8.9	16.0
39-45	13	3.8	1.1	4.6
Marital status				
Married	324	92.6	89.7	95.1
Single	26	7.4	4.9	10.3
Child gender				
Male	197	56.3	50.9	61.4
Female	153	43.7	38.6	49.1
Child age distribution				
6-9 months	228	65.1	60.0	70.0
10-12 months	68	19.4	15.4	23.7
13-15 months	28	8.0	5.1	10.9
16-18 months	17	4.9	2.9	7.1
19-21 months	5	1.4	0.3	2.9
22-24 months	4	1.1	0.3	2.3

Majority of the mothers 330 (94.3%) had attended formal school. Out of the 330 who had attended a formal school, 172 (49.1%) had primary education, 111 (31.7%) had secondary education and only 47 (13.4%) had tertiary education. Study participants

were asked on the level of education of their spouses, similarly a high proportion 311 (88.9%) of the spouses had attended formal schools. Among spouses with formal education, 170 (52.5%) had secondary education, 83 (25.6%) had primary education and 58 (17.9%) had secondary education.

The highest proportion of mothers 217 (62.0%) were house wives, 52 (14.9%) were self-employed, 45 (12.9%) were in formal employment, 24 (6.9%) were casual laborers and 12 (3.5%) were students or didn't have a job. Study participants were asked on the occupation of their spouses, 129 (39.8%) were in formal employment, 97 (29.9%) were self-employed and 98 (30.3) were casual laborers.

Out of the 350 study participants, majority 234 (66.9%) reported their major source of income to be from salary, 105 (30.8%) business, while 11 (3.1%) from parental or sibling support **(Table 4.5).**

Table 4.5: Socio-demographic characteristics of mothers and their spouses in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval	
			Lower	Upper
Mothers level of formal education				
None	20	5.7	3.4	8.3
Primary	172	49.1	43.7	54.0
Secondary	111	31.7	27.1	36.8
Tertiary	47	13.4	10.0	17.4
Spouse level of education				
None	13	4.0	2.9	5.9
Primary	83	25.6	20.7	30.2
Secondary	170	52.5	46.9	58.0
Tertiary	58	17.9	13.9	22.5
Mothers occupation				
House wife	217	62.0	57.1	66.9
Self employed	52	14.9	11.1	18.9
Formal	45	12.9	9.1	16.3
Casual labourer	24	6.9	4.3	9.7
Student/none	12	3.5	1.7	5.8
Spouse occupation				
Formal	129	39.8	34.3	45.7
Self employed	97	29.9	25.0	35.2
Casual labourer	98	30.3	26.8	33.7
Major source of income				
Business	105	30.8	25.1	34.6
Salary	234	66.9	59.7	71.8
Parental /sibling support	11	3.1	1.4	5.1

On monthly income, majority, 185 (52.86%) earned kshs0-10,000, 114 (32.57%) earned kshs11, 000-20,000, 31 (8.85%) earned kshs21, 000- 50,000 while only 12 (3.42%) earned above kshs50, 000. A small proportion 6 (1.71%) refused to disclose their income, 2 (0.57%) reported not to know since their spouses' had never disclosed on the amount he gets **(Figure 4.6)**
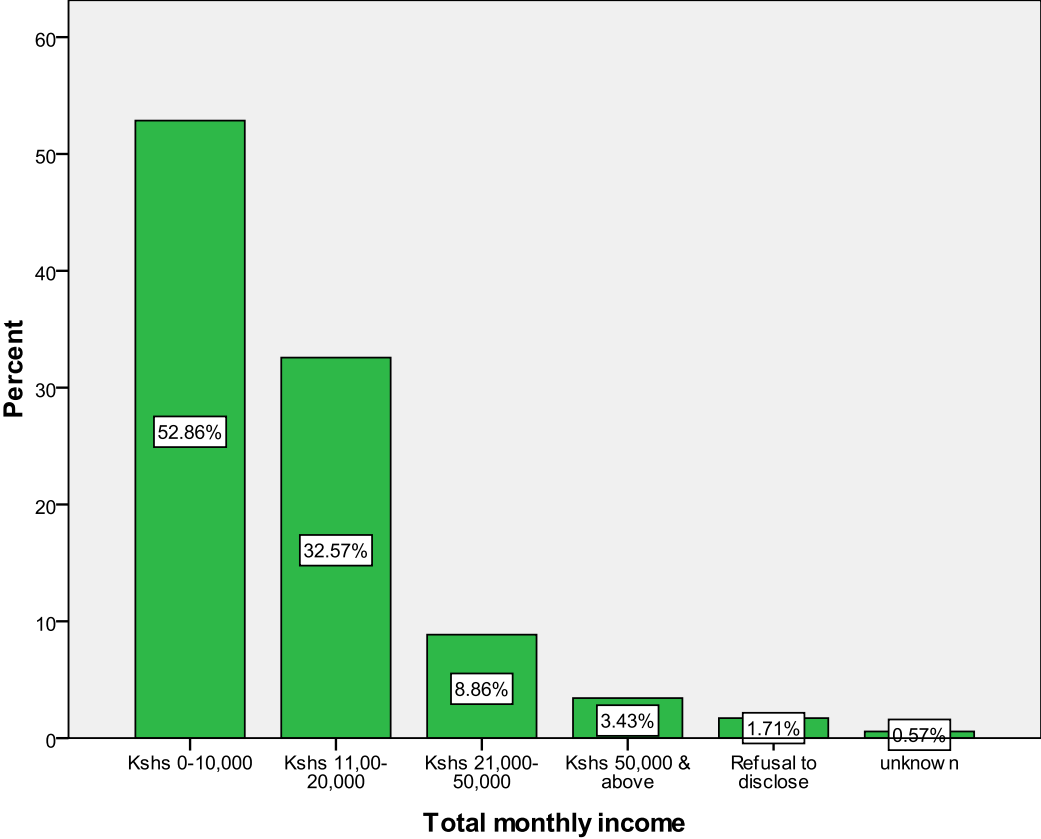
Figure 4.6: Total monthly income of study participants in Kajiado North Sub-county, July to September 2013

4.3.2: Household characteristics

The household with highest members was 12 and the least had 2; mother and the child. The average members were 3.94 with a standard deviation of 1.37; most households had 3 members with a median of 4.0 **(Figure 4.7).**
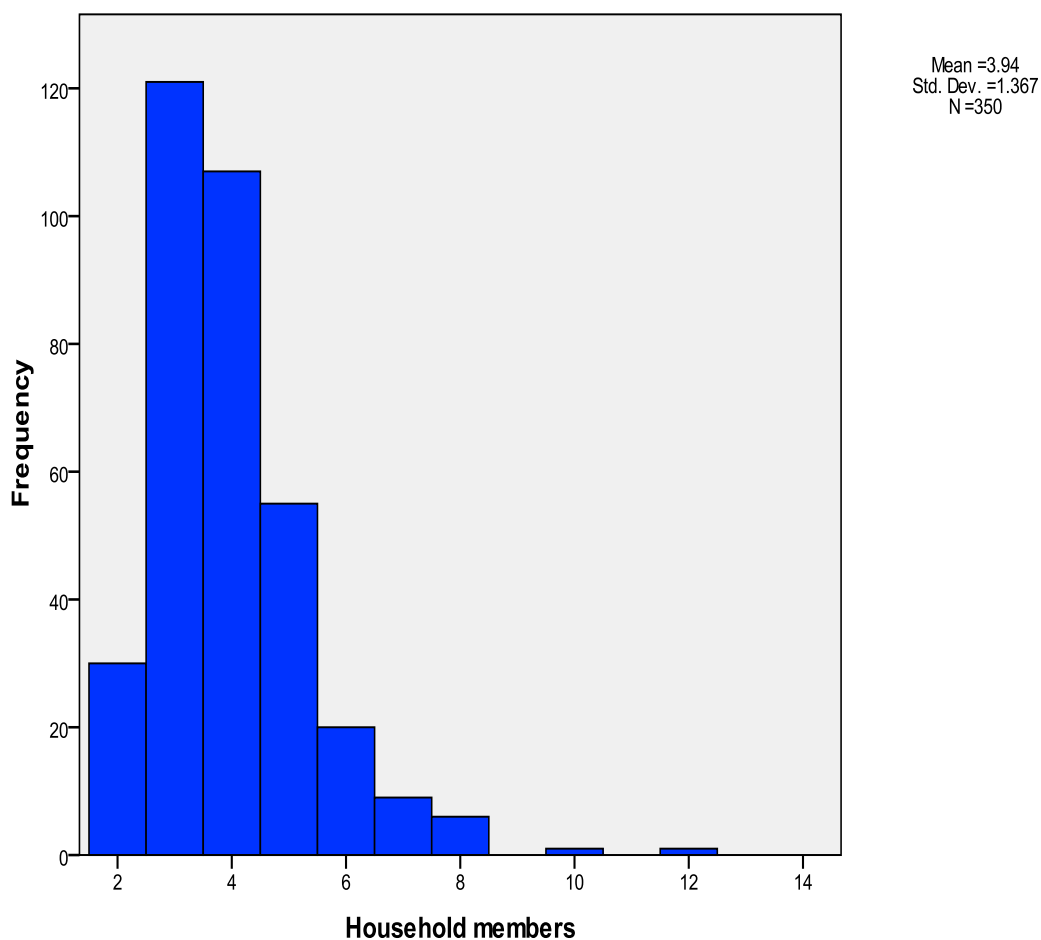
Figure 4.7: Household size in Kajiado North Sub-county, July to September 2013

The highest proportion 293 (83.7%) of study participants lived in rental houses while 57 (16.3%) lived in houses they own (**Figure 4.8**)
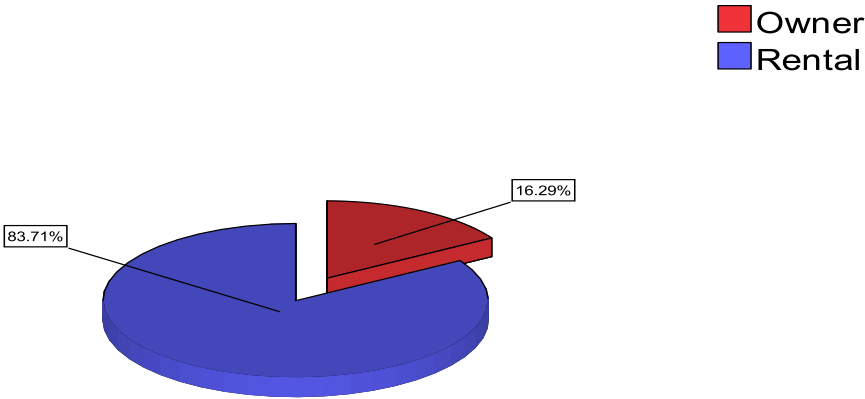
Figure 4.8: House ownership status in Kajiado North Sub-county, July to September 2013

Majority of study participants 205 (55.6%) lived in a one room house while 2 (0.6%) lived in a six roomed house. On the type of floor of the house they lived in, the highest proportion 290 (82.9%) reported it was made of cement with the lowest 20 (5.7%) reporting wooden floor or tiles. On the type of walls of the house they lived in, majority of the study participants 202 (57.8%). Highest proportion of households 261 (74.6%) shared toilet facility, however, 1 (0.3%) lacked a toilet facility. Majority of households 296 (84.6%) used pit latrine. Concerning source of water slightly

above half 181 (51.1%) used pipe water **(Table 4.6).**

Table 4.6: Household characteristics in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval	
			Lower	Upper
Size of the House				
1 Room	205	58.6	53.4	63.7
2 Rooms	31	24.3	19.4	28.9
3 Rooms	85	8.9	6.0	12.3
>3 Rooms	29	8.4	5.8	10.7
Floor				
Cemented	290	82.9	78.6	86.9
Tiles/wooden	20	5.7	3.2	7.7
Soil	40	11.4	8.0	15.1
Walls				
Semi-permanent	202	57.8	48.4	60.7
Permanent	148	42.3	37.4	47.7
Ownership of toilet facility				
Own household	88	25.1	20.9	30.0
Sharing with other households	261	74.6	69.7	79.1
No toilet	1	0.3	0.0	0.9
Type of toilet facility				
Pit	296	84.6	80.9	88.0
Water Closet	53	15.1	11.7	18.9
No toilet	1	0.3	0.0	0.9
Source of water				
Pipe	181	51.7	46.6	57.1
Bore hole	46	13.1	9.7	16.9
Vendors	123	35.1	29.7	40.0

4.3.3: Obstetric characteristics

The highest proportion 309 (88.3%) of children in the study were born in the hospital. Only 8 (2.29%) of children were born pre-term. Most of the children 293 (88.7%) were delivered through vaginal birth. Majority of children 294 (84.0%) had normal birth weight; 2.5kgs-4.5kgs, 27 (7.7%) had low birth weight of <2.5kgs. A small proportion of mothers 29 (8.3%) did not know the birth weight of their children especially those born at home since some of them took several days before they visited health facilities after giving birth. The mean birth weight was 3.0kgs with a standard deviation of 0.49, modal weight was 3.0kgs, median 3.1kgs and the range was between 1.5kgs-4.5kgs. Parity range was 1-7 pregnancies with an average of 2, standard deviation of 1.085, mode of 1 and a median of 2. The mothers were asked on the total number of children who were alive the range was 1-6 children with a mean of 1.85, standard deviation of 0.912, mode of 1 and a median of 2 **(Table 4.7)**

Table 4.7: Obstetric characteristics of last pregnancy among Mothers in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Confidence Interval	
			Lower	Upper
Place of delivery				
Health institution	309	88.3	79.7	87.4
Home	41	11.7	12.6	20.3
Mode of delivery				
Vaginal	293	88.7	79.7	87.4
Caesarean	57	11.3	12.6	20.3
Status of child during birth				
Term	342	97.71	96.0	99.1
Preterm	8	2.29	0.4	4.0
Weight at birth				
<2500gms	27	7.7	4.8	10.1
2500-4500gms	294	84	80.2	88.6
Unknown	29	8.3	5.1	10.9
Parity				
1	135	38.6	33.4	43.7
2	123	35.1	30.3	40.0
3	67	19.1	15.1	23.4
>3	25	6.5	3.7	8.4
Children alive				
1	148	42.3	37.1	47.7
2	126	36.0	31.4	40.9
3	61	17.4	13.4	21.4
>3	15	4.3	2.7	5.9

4.3.4: Knowledge on infant feeding practice

To determine mother's knowledge on feeding practices, mothers were asked questions with regard to breastfeeding, complementary feeding, foods they were to initiate with complementary feeding, if they had information on infant feeding practices and the source of information. The respondents were asked a total of three questions (Appendix A); if they had been given information, source of the information and what they were taught on breastfeeding and complementary feeding. Maternal knowledge was determined based on the score for the questions. Scores were coded as 1 for a correct response and 0 for incorrect response resulting in a total of 4 scores.

The overall complete nutrition knowledge score for each respondent was determined by number of correct responses. Respondents with all the scores were determined to have complete information. A high proportion 240 (68.6%) of mothers reported to have information on infant feeding practices, type and quality of information was determined. Some had right information others not, 93 (26.6%) had complete knowledge on exclusive breastfeeding, when and how to introduce complementary and right duration of breastfeeding, 106 (30.3%) had knowledge on exclusive breastfeeding only, 19 (5.4%) had knowledge on the food to wean with and 8 (2.3%) on quantity of food to wean with. Some were also given wrong information, 2 (0.6%) were told to wean at 3 months and 3 (0.9%) were told that crying of the infants shows mother's milk is not enough hence introduce other foods. A few mother 5 (1.4%) reported they were taught but could not remember what they were taught and

4 (1.1 %) were taught on hygiene. More than half of mothers 198 (56.5%) reported

to obtain information from health worker, 21 (6.0%) mother/mother in law,11 (3.1%)

friends and neighbors,9 (2.6%) books and internet and 1 (0.3%) observed employer.

(Table 4.8)

Table 4.8: Knowledge on infant feeding practices Among Mothers in Kajiado North Sub-county, July to September 2013

Variable	Frequency n=350	Percentage %	95% Interval Lower	Confidence Upper
Given information on when and how to feed the infant				
Yes	240	68.6	63.7	73.4
No	110	31.4	26.6	36.3
Informant				
Health worker	198	56.5	46.1	66.1
Mother in law	22	6.3	5.4	9.5
Friend and neighbours	11	3.1	2.1	5.4
Internet and books	9	2.6	1.7	6.3
Not given information	110	31.4	26.6	36.3
Type of information				
Exclusive breastfeed for six months, wean at six months and continue to breastfeed for two years	93	26.6	22.9	37.2
Exclusive breastfeed for six months only	106	30.3	27.9	40.4
Type and quantity of food to wean	27	7.7	4.0	9.7
Hygiene	4	1.1	0.4	3.3
Exclusively breastfeed for three months or wean when the child cry	5	1.5	0.3	2.1
Cannot remember	5	1.4	0.4	3.8
Not given information	110	31.4	26.6	36.3

4.4: Bivariate Analysis

4.4.1: Association between feeding practices and socio-demographic characteristics.

The chi square test of association was used to find association between feeding practices and socio demographic characteristics. It was found that married mothers were 0.711 OR, (CI 0.161-3.140) likely to practice exclusive breastfeeding compared single mothers. It was also found out that mothers who had male children were 1.171 OR, (CI 0.587-2.338) times more likely to practice exclusive breastfeeding than mothers who had female children. Age of the mother (X^2=3.948, p>0.05, df=5), marital status (X^2=0.102, p>0.05, df=1), child gender (X^2=0.334, P>0.05, df=1) and children age distribution (X^2=4.368, p>0.498, df=5) were not significantly associated with feeding practice. There was no statistically significant association between socio economic variables; mothers level of education (X^2=0.420, p>0.05, df=3), spouse's level of education (X^2=2.020, p>0.05, df=4), mothers' occupation (X^2=0.424, p>0.05, df=5), spouse's occupation (X^2=3.653, p>0.455, df=3) and major source of income (X^2=1.142, p>0.050, df=3) with feeding practice **(Table 4.9).**

Table 4.9: Association between feeding practices and socio-demographic characteristics

Variable		Feeding practice		Total	Pearson chi-square	P-value
		Exclusive breastfeeding	Mixed feeding			
Age of the mother	18-24	149	47	196	3.948	0.557
	25-31	71	27	98		
	32-38	32	11	43		
	39-45	8	5	13		
Marital status	Married	240	84	324	0.102	0.749
	Single	20	6	26		
Child gender	Male	144	53	197	0.334	0.564
	Female	116	37	153		
Mothers level of education	None	14	6	20	0.420	0.925
	Primary	129	43	172		
	Secondary	81	30	111		
	Tertiary	36	11	47		
Spouse level of education	None	8	5	13	2.020	0.846
	Primary	59	24	83		
	Secondary	126	44	170		
	Tertiary	46	12	58		
Mothers occupation	Housewife	161	56	217	4.244	0.515
	Self employed	37	15	52		
	Formal	31	14	45		
	Casual laborer	18	6	24		
	Student/none	7	5	12		
Spouses occupation	Formal	94	35	129	3.653	0.455
	Self employed	77	20	97		
	Casual laborer	69	29	98		
Major source of income	Salary	170	64	234	1.142	0.767
	Business	82	23	105		
	Parental/sibling support	6	5	11		

*Significance level (p<0.05) n=350

There was no statistically significant association between obstetric characteristics; mode of delivery ($X^2=0.301$, p>0.05, df=1), place of birth ($X^2=0.873$, p>0.05, df=1)

and parity (X^2=4.806, p>0.05, df=6) with feeding practices **(Table 4.10).**

Table 4.10: Association between feeding practices and obstetric characteristics

| Variable | | Feeding practices | | Total | Pearson chi-square | P-value |
		Exclusive breastfeeding	Mixed feeding			
Mode of delivery	Vaginal	216	77	293	0.301	0.357
	Cesarean	44	13	57		
Place of birth	Health facility	232	77	309	0.873	0.350
	Home	28	13	41		
Parity	1	105	30	135	4.806	0.569
	2	89	34	123		
	3	48	19	67		
	>3	18	7	25		

*Significance level (p<0.05) n=350

There was no statistically significant association between feeding practices (X^2= 2.393, p>0.05, df=1) with the mother having complete information **(Table 4.11)**

Table 4.11: Association between feeding practices and knowledge

| Variable | | Mother's knowledge | | Total | Pearson chi-square | P-value |
		Yes	No			
Feeding practice	Exclusive breastfeeding	80	180	260	2.393	0.122
	Mixed feeding	20	70	90		

*Significance level (p<0.05) n=350

4.4.2: Association between nutritional status of children aged 6 to 24 months attending child welfare clinic and socio- demographic characteristics

4.4.2.1: Association between stunting and socio- demographic characteristics

Stunting as an indicator of nutritional status of children was subjected to bivariate analysis with socio demographic characteristics; marital status (X^2=26.716, P<0.05, df=1), children age distribution (X^2=53.733, P<0.05, df=5) and child gender (X^2=10.253, P<0.05, df=1) were significantly associated with stunting. Age of the mother (X^2=17.246, P>0.05, df=6) was not statistically associated with stunting. Spouse's level of education (X^2=44.500, P<0.05, df=4), mothers' occupation (X^2=38.556, P<0.05, df=5), spouse's occupation (X^2=29.505, P<0.05, df=3) and major source of income (X^2=23.059, P<0.05, df=4) were significantly associated with stunting. Mothers level of education (X^2=12.762, P>0.05, df=3) was not statistically associated with stunting **(Table 4.12)**

Table 4.12: Association between stunting and socio-demographics characteristics

Variable		Normal	Stunted	High length for age	Total	Pearson Chi-square	P value
Marital status	Married	233	35	6	324	26.716	**0.000**
	Single	14	8	4	26		
Child gender	Male	134	61	2	197	10.253	**0.036**
	Female	113	32	3	153		
Children age distribution	6-9mnths	171	53	2	228	53.733	**0.000**
	10-12mths	48	19	1	68		
	13-15mnths	15	10	3	28		
	16-18mnths	10	6	1	17		
	19-21mnths	2	2	1	5		
	22-24 mnths	1	2	1	4		
Spouse level of education	None	6	6	1	13	44.530	**0.001**
	Primary	60	22	1	83		
	Secondary	125	42	3	170		
	Tertiary	41	15	2	58		
Mothers occupation	Housewife	158	57	4	219	38.556	**0.008**
	Self employed	38	13	1	52		
	Formal	31	12	2	45		
	Casual laborer	18	5	1	24		
	Student/none	4	6	2	12		
Spouses occupation	Formal	93	34	2	129	29.505	**0.021**
	Self employed	70	25	2	97		
Major source of income	Salary	174	54	6	234	23.059	**0.027**
	Business	69	34	2	105		
	Parental/sibling support	4	5	2	11		

*Significance level (p<0.05) n=350 normal length for age (2to-1 z-score), low length for age-stunting (-2 z-score and below), high length for age (above 2 z-score)

There was no statistically significant association between obstetric characteristics; mode of delivery (X^2=5.292, p>0.05, df=4), place of birth (X^2=5.837, p>0.05, df=4)

and parity (X^2=25.347, p>0.05, df=6) with stunting **(Table 4.13).**

Table 4.13: Association between stunting and obstetric characteristics

Variable		Normal	Stunting	High length for age	Total	Pearson Chi-square	P value
Mode of delivery	Vaginal	207	80	6	293	5.292	0.259
	Cesarean	39	13	5	57		
Place of birth	Health facility	212	87	10	309	5.837	0.212
	Home	30	6	5	41		
Parity	1	91	37	7	135	25.347	0.387
	2	90	27	6	123		
	3	40	20	7	67		
	>3	20	14	5	39		

*Significance (p<0.05) n=350 normal length for age (2to-1 z-score), low length for age-stunting (-2 z-score and below), high length for age (above 2 z-score)

There was no significance association between, stunting (X^2=1.953, p>0.744, df=4) and mother's knowledge on infant feeding practices **(Table 4.14).**

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Table 4.14: Association between stunting and mother's knowledge on infant feeding practices

Variable		Complete information		Total	Pearson chi-square	P-value
		Yes	No			
Stunting	Normal	67	179	246	1.953	0.744
	Stunting	28	65	93		
	High length for age	5	6	11		

*Significance (p<0.05) n=350 normal length for age (2to-1 z-score), low length for age-stunting (-2 z-score and below), high length for age (above 2 z-score)

4.4.2.2: Association between underweight and socio-economic and demographic characteristics

Socio demographic characteristics were subjected to bivariate analysis with underweight using chi-square test of association. Results showed that only children age distribution was statistically associated (X^2=0.018, P<0.05, df=5) with underweight. Age of the mother (X^2=10.194, P>0.05, df=5), marital status (X^2=2.960, P>0.05, df=4), child gender (X^2=35.328, P>0.05, df=4) were not significantly associated with underweight **(Table 4.15).**

Table 4.15: Association between underweight and socio-demographic characteristics

Variable		Normal	Under weight	High weight for age	Total	Pearson Chi-square	P-value
Marital status	Married	274	37	13	324	2.960	0.565
	Single	23	2	1	26		
Child gender	Male	166	23	8	197	1.119	0.891
	Female	131	16	6	153		
Children age distribution	6-9months	195	25	8	228	35.328	**0.018**
	10-12mths	58	7	3	68		
	13-15mths	23	3	2	28		
	16-18mths	13	3	1	17		
	19-21mths	3	1	1	5		
	22-24mths	1	1	2	4		
Mothers level of education	None	16	3	1	20	8.246	0.076
	Primary	150	16	6	172		
	Secondary	93	12	6	111		
	Tertiary	38	8	1	47		
Spouse level of education	None	9	3	1	13	41.404	**0.003**
	Primary	73	7	3	83		
	Secondary	145	17	8	170		
	Tertiary	47	10	1	58		
Mothers occupation	Housewife	184	23	10	217	23.913	0.246
	Self employed	45	5	2	52		
	Formal	39	5	1	45		
	Casual laborer	19	3	2	24		
	Student/None	8	3	1	12		
Spouses occupation	Formal	113	11	5	129	19.071	0.265
	Self employed	80	13	4	97		
	Casual laborer	81	13	4	98		
Major source of income	Salary	204	20	10	234	19.588	0.075
	Business	85	17	3	105		
	Parental/sibling support	8	2	1	11		

*Significance level (p<0.05) n=350 normal weight for age (2to-1 z-score), low weight for age (-2 z-score and below), high weight for age (above 2 z-score)

Obstetric characteristics were significantly associated with underweight, mode of delivery (X^2=2.085, p>0.05, df=4), place of birth (X^2=3.918, p>0.05, df=4) and parity (X^2=14.093, p>0.05, df=6) were not significantly associated with underweight **(Table 4.16).**

Table 4.16: Association between underweight and obstetric characteristics

Variable		Normal	Under weight	High Weight for age		Total	Pearson Chi-square	P-value
Mode of delivery	Vaginal	247	33	13		293	2.085	0.720
	Cesarean	50	6	1		57		
Place of birth	Health facility	259	36	14		309	3.918	0.417
	Home	31	5	5		41		
Parity	1	110	18	7		135	14.093	0.945
	2	111	9	3		123		
	3	54	8	5		67		
	>3	14	5	6		25		

*Significance (p<0.05) n=350 normal weight for age (2to-1 z-score), low weight for age (-2 z-score and below), high weight for age (above 2 z-score)

There was no significance association between underweight (X^2=3.361, P>0.05, df=4) and mother's knowledge on infant feeding practices **(Table 4.17).**

Table 4.17: Association between underweight and mother's knowledge on infant feeding practice

Variable		Mother's knowledge		Total	Pearson chi square	P-value
		Yes	No			
Wasting	Normal weight for age	85	212	297	3.361	0.499
	Underweight	11	28	39		
	High weight for age	4	10	14		

*Significance level (p<0.05) n=350 normal weight for age (2to-1 z-score), low weight for age (-2 z-score and below), high weight for age (above 2 z-score)

4.4.2.3: Association between wasting and socio-demographic characteristics

Chi-square test of association was applied to find out association between socio demographics variables and wasting. Results showed that there was no significant association between age of the mother (X^2=4.347, P>0.05, df=5), marital status (X^2=0.146, P>0.05, df=1), child gender (X^2=0.0276, P>0.05, df=1) and children age distribution (X^2=4.616, P>0.05, df=5) with weight for height. There was no significant association between socio-demographic variables; mothers level of education (X^2=1.260, P>0.05, df=3), spouse level of education (X^2=2.154, P>0.05, df=5), mothers' occupation, (X^2=4.637, P<0.05, df=4), spouses' occupation (X^2=0.878, P>0.05, df=4) and major source of income (X^2=0.091, P>0.05, df=3) with wasting (**Table 4.18**).

Table 4.18: Association between wasting and socio-demographics characteristics

Variable		Normal	High weight for height	Total	Pearson Chi-square	P-value
Marital status	Married	294	30	324	0.146	0.702
	Single	20	5	26		
Child gender	Male	177	20	197	0.0276	0.599
	Female	140	13	153		
Children age distribution	6-9months	209	19	228	4.616	0.465
	10-12months	58	10	68		
	13-15months	26	2	28		
	16-18months	16	1	17		
	19-21months	4	1	5		
	22-24 months	3	1	4		
Mothers level of education	None	19	1	20	1.260	0.739
	Primary	155	17	172		
	Secondary	99	12	111		
	Tertiary	44	3	47		
Spouse level of education	None	12	1	13	2.154	0.827
	Primary	73	10	83		
	Secondary	154	16	170		
	Tertiary	55	3	58		
Mothers occupation	Housewife	194	23	217	4.637	0.462
	Self employed	47	5	52		
	Formal	43	2	45		
	Casual laborer	22	2	24		
	Student/none	11	1	13		
Spouses occupation	Formal	116	13	129	0.878	0.928
	Self employed	90	7	97		
	Casual laborer	88	10	98		
Major source of income	Salary	212	12	224	0.091	0.993
	Business	95	10	105		
	Parental/sibling support	10	1	11		

*Significance level (p<0.05) n=350 normal weight for height (2to-1 z-score), low weight for height (-2 z-score and below), high weight for height (above 2 z-score)

There was no statistically significant association between obstetric characteristics; status at birth (X^2=0.852, p>0.05, df=1), mode of delivery (X^2=0.649, p>0.05, df=1), place of birth (X^2=1.126, p>0.05, df=1) and parity (X^2=2.270, p>0.05, df=6) with wasting **(Table 4.19).**

Table 4.19: Association between wasting and obstetric characteristics

Variable		Normal	High weight for height	Total	Pearson Chi-square	P value
Mode of delivery	Vaginal	267	26	293	0.649	0.421
	Cesarean	50	7	57		
Place of delivery	Health facility	278	31	309	1.126	0.400
	Home	35	6	41		
Parity	1	125	10	135	2.270	0.893
	2	110	13	123		
	3	59	8	67		
	>3	20	5	25		

*Significance level (p<0.05) n=350 normal weight for height (2to-1 z-score), low weight for height (-2 z-score and below), high weight for height (above 2 z-score)

It was found that mothers whose children had normal weight for height were 0.582 (OR, CI 0.2771-1.220) times less likely to have complete information compared to mothers whose children had high weight for height. There was no significance association between weight for height (X^2=2.091, p>0.05, df=1) and mother's knowledge on infant feeding practices **(Table 4.20).**

Table 4.20: Association between wasting and mother's knowledge on infant feeding practice

Variable		Mother's knowledge		Total	Pearson chi-square	P-value
		Yes	No			
Weight for height	Normal	87	230	317	2.091	0.148
	High weight for height	13	20	33		

*Significance level (p<0.05) n=350 normal weight for height (2to-1 z-score), low weight for height (-2 z-score and below), high weight for height (above 2 z-score)

4.4.2.4: Association between MUAC and socio-demographic characteristics

Mid upper arm circumference as an indicator of nutritional status was subjected to bivariate analysis using chi-square test of association. The result indicates that; marital status (X^2=1.821, P>0.05, df=3) and child gender (X^2=6.650, P>0.05, df=3) were not statistically significantly associated with MUAC. Spouse level of education (X^2=120.66, P<0.05, df=4) and spouse occupation (X^2=29.681, P<0.05, df=3) were significantly associated with MUAC. Mothers level of education (X^2=14.535, P>0.05, df=3), mothers' occupation (X^2=8.022, P>0.05, df=5) and major source of income (X^2=15.136, P>0.05, df=3) were not statistically significantly associated with MUAC **(Table 4.21).**

Table 4.21: Association between MUAC and socio-demographic characteristics

Variable		Normal	Acute Malnutrition	Risk for acute Malnutrition	Total	Pearson chi-square	P-Value
Marital status	Married	172	53	99	324	1.821	0.610
	Single	16	5	5	26		
Child gender	Male	108	26	63	197	6.650	0.087
	Female	80	32	41	153		
Mothers level of education	None	9	7	4	20	14.535	0.105
	Primary	95	21	56	172		
	Secondary	59	19	33	111		
	Tertiary	25	11	11	47		
Spouse level of education	None	6	3	4	13	120.66	**0.000**
	Primary	46	11	26	83		
	Secondary	87	32	51	170		
	Tertiary	33	7	18	58		
Mothers occupation	Housewife	118	35	64	217	8.022	0.923
	Self employed	26	8	18	52		
	Formal	22	10	13	45		
	Casual laborer	16	2	6	24		
	Student/None	3	3	3	12		
Spouses occupation	Formal	83	19	27	129	29.681	**0.003**
	Self employed	43	18	36	97		
	Casual laborer	46	16	36	98		
Major source of income	Salary	135	38	61	234	15.136	0.087
	Business	46	18	41	105		
	Parental/sibling support	7	2	2	11		

*Significance level ($p<0.05$) n=350 normal >13.5 cm, risk for acute malnutrition 12.5 cm-13.5 cm, acute malnutrition <12.5

There was no statistically significant association between obstetric characteristics; mode of delivery (X^2=0.655, p>0.05, df=3), place of birth (X^2=4.178, p>0.05, df=3) and parity (X^2=19.701, p>0.05, df=6) with MUAC **(Table 4.22).**

Table 4.22: Association between MUAC and obstetric characteristics:

Variable		Normal	Acute Malnutrition	Risk for acute Malnutrition	Total	Pearson chi-square	P-Value
Mode of delivery	Vaginal	158	48	87	293	0.655	0.884
	Cesarean	30	10	17	57		
Place of delivery	Health facility	166	54	89	309	4.178	0.243
	Home	22	4	15	41		
Parity	1	71	23	41	135	19.701	0.350
	2	65	18	40	123		
	>3	52	17	23	92		

*Significance level (p<0.05) n=350 normal >13.5 cm, risk for acute malnutrition 12.5 cm-13.5 cm, acute malnutrition <12.5

There was no statistically significant association between MUAC (X^2=1.373, P>0.05, df=3) and Knowledge according to the results **(Table 4.23).**

Table 4.23: Association between MUAC and mother's knowledge on infant feeding practice

Variable		Mother's knowledge		Total	Pearson chi-square	P-value
		Yes	No			
MUAC	Normal	54	134	188	1.373	0.712
	Acute Malnutrition	17	41	58		
	Risk of acute Malnutrition	29	75	104		

*Significance (p<0.05) n=350 normal >13.5 cm, risk for acute malnutrition 12.5 cm-13.5 cm, acute malnutrition <12.5

4.5: Multivariate Analysis

The significant factors from bivariate analysis (with p<0.05) were then subjected to multivariate analysis (Ordinal regression) to determine the final independent factors that were associated with dependent factors. After fitting factors which showed significant association in bivariate analysis and specifying Logit as method of analysis, 6 factors were retained as in the final model **(Tables 4.24, 4.25 and 4.26).**

There was significant relationship between marital status and stunting (p<0.05). Children age group, 6-9months, 10-12months and 13-15 months were statistically associated with stunting. There was no statistical significance found in age group 13-15months, 16-18months, 19-21months and 22-24months. There was no significant relationship between gender of the child and stunting (p<0.05). Spouse level of education, mother's occupation, spouse occupation and major source of income were not statistically significantly associated with stunting (p>0.05) (Table 4.24)

Table 4.24: Ordinal regression for stunting against socio-demographic variables

Variable Predictor	Estimate	S.E	Chi-square	Df	Confidence interval Lower	Upper	P-value
STUNTING							
Marital status							
Married	-0.949	0.390	5.910	1	-1.714	-0.184	**0.015**
Single		Reference		0			
Children age distribution							
6-9months	-2.511	0.954	6.954	1	-4.381	-0.641	**0.008**
10-12months	-2.328	0.978	5.667	1	-4.245	-0.411	**0.017**
13-15months	-1.510	1.006	2.254	1	-3.481	0.461	0.133
16-18months	-1.750	1.053	2.761	1	-3.813	0.314	0.097
19-21months	-1.248	1.255	0.988	1	-3.708	1.212	0.320
22-24months		Reference		0			
Child gender							
Male	0.235	0.235	0.998	1	-0.226	0.696	0.318
Female		Reference		0			
Spouse level of education							
None	-0.711	1.943	0.134	1	-4.520	3.097	0.714
Primary	-1.178	1.872	0.396	1	-4.847	2.491	0.529
Secondary	-1.315	1.865	0.497	1	-4.969	2.340	0.481
Tertiary	-1.101	1.878	0.344	1	-4.781	2.579	0.558
Unknown		Reference		0			
Mothers occupation							
Housewife	-1.082	1.152	0.883	1	-3.340	1.175	0.347
Self employed	-1.255	1.168	1.153	1	-3.544	1.035	0.283
Formal	-0.900	1.185	0.577	1	-3.222	1.422	0.447
Casual laborer	-1.300	1.237	1.122	1	-3.734	1.114	0.290
None	-0.849	1.388	0.374	1	-3.569	1.872	0.541
Student		Reference		0			
Spouse occupation							
Formal	0.175	0.817	0.046	1	-1.426	1.776	0.831
Self Employed	-0.618	0.821	0.563	1	-2.227	0.990	0.451
Casual laborer	-0.217	0.805	0.073	1	-1.795	1.360	0.787
Unknown		Reference		0			
Major source of income							
Wages	-0.745	1.508	0.498	1	-2.816	1.324	0.480
Business	-0.235	1.094	0.047	1	-2.382	1.908	0.829
Salary	-1.212	1.107	1.198	1	-3.382	0.958	0.274
Parental /sibling support		Reference		0			

S.E. – Standard error   Df – Degrees of freedom   CI – confidence interval

 P Significance at <0.05

There was significant relationship between children age group (6-9months, 10-

12months, and 13-15months) and wasting (p<0.05). Children whose age group was 16-18months, 19-21months and 22-24 months were not statistically associated with wasting (p>0.05). There was no significant association between spouse level of education and wasting (p>0.05) **(Table 4.25)**

Table 4.25: Ordinal regression for wasting against socio-demographic variables

Variable Predictor	Estimate	S.E	Chi-square	Df	Confidence interval Lower	Upper	P.value
WASTING							
Children age distribution							
6-9months	-2.572	0.922	7.786	1	-4.379	-0.765	**0.005**
10-12months	-2.553	0.965	7.000	1	-4.444	-0.662	**0.008**
13-15months	-2.913	1.090	7.149	1	-5.048	-0.778	**0.008**
16-18months	-2.024	1.069	3.584	1	-4.119	-0.071	0.058
19-21months	-2.188	1.432	2.333	1	-4.995	0.619	0.127
22-24months	References			0			
Spouse level of education							
None	-1.175	1.951	0.363	1	-4.999	2.648	0.547
Primary	-2.153	1.873	1.322	1	-5.823	1.517	0.250
Secondary	-1.920	1.855	1.072	1	-5.555	1.715	0.300
Tertiary	-1.640	1.872	0.768	1	-5.310	2.029	0.381
Unknown	Reference			0			

S.E. – Standard error   Df – Degrees of freedom   CI – confidence interval

 P Significance at <0.05

There was no significant relationship between spouse level of education and spouse occupation with MUAC (p>0.05) **(Table 4.26).**

Table 4.26: Ordinal regression for socio-demographic variables against MUAC

Predictor Variable	Estimate	S.E	Chi-square	Df	Confidence interval Lower	Upper	P-value
MUAC							
Spouse level of education							
None	-0.004	1.970	0.000	1	-3.886	3.858	0.998
Primary	-0.186	1.905	0.010	1	-3.919	3.547	0.922
Secondary	-0.094	1.899	0.012	1	-3.816	3.621	0.960
Tertiary	-0.224	1.900	0.014	1	-3.968	3.519	0.907
Unknown		Reference		0			
Spouse occupation							
Formal	0.121	0.759	0.025	1	-1.367	1.609	0.874
Self employed	0.931	0.762	1.492	1	-0.536	2.424	0.222
Casual laborer	0.944	0.764	1.528	1	-0.553	2.441	0.216
Unknown		Reference		0			

S.E. – Standard error   Df – Degrees of freedom   CI – confidence interval

 P Significance at <0.05

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussions

5.1.1: Infant feeding practices

Early initiation of breastfeeding and exclusive breastfeeding of children for the first six months of infant life, are considered as the most decisive indicators for assessing breastfeeding practices (WHO, 2008a). Results of this study indicate that all mothers 100% breastfed their infants, therefore no mother practiced exclusive complementary feeding. This was in agreement with a similar study in Ghana, which revealed that all children in that study had been breast fed (Gyasi, 2008). A similar study carried out in an informal settlement in Nairobi reported that, 99% were breastfed (Kimani *et al.,* 2011) agreeing with this study finding. The current national rate of breastfeeding as per KDHS 2014 finding shows that 99% of children are breast fed at one point of their life (KNBS, 2015) agreeing with this study finding.

A high proportion of mothers 82.0% breast fed their children within the first hour after birth which was impressive. Previous studies in Nairobi revealed that 75% and 63% of mothers initiated breastfeeding within one hour after birth (Muchina & Waithaka, 2010, Kimani *et al.,* 2011). This proportion was higher than KDHS and UNICEF findings which show that 60% of mothers in Kenya and 39% in developing world breastfeed their infants within one hour after birth (KNBS, 2015, UNICEF, 2009) respectively. A high proportion of mothers 74.0%, exclusively breastfed their infants for the first six months a rate higher than national value of 61 % (KNBS, 2015) and global value of 37% (WHO, 2010b). Majority of children 93.4% were still

breastfeeding at the time of interview. A similar study in South Africa, reported 90% of children were still breastfeeding (Mushaphi *et al.,* 2008) when the study was being carried on.

Exclusive breast feeding has been on the rise from the time WHO and UNICEF adopted global strategy for infants and young children feeding in 2003 (WHO, 2003). That is from, 13.2% in 2003 (CBS & Macro, 2004) to 32% in 2009 (KNBS, 2010) and 61% in 2014 (KNBS, 2015). This positive breast feeding practices reflected in this study could be as a result of mother's occupation, mode and place of delivery and knowledge on breastfeeding practices. High proportion of children 88.7% were delivered through vaginal birth, 88.3% in a health facility. Mode of delivery affects feeding practice; caesarean section mothers experience complications, pain, prolonged recovery, readmission to hospital, fatigue and stress compared to those of vaginal birth (Lauwers & Swisher, 2015; Newman & Newman, 2014 and Smith & Kroeger, 2010). Mothers who deliver through cesarean section also experience longer delay in making their first contact with their infants (Newman & Newman, 2014). This may delay initiation of breastfeeding as well as interfere with milk supply. However, the rate of exclusive breastfeeding has not yet reached the WHO target value of 90% (WHO 2009a).

The reasons mothers gave for early termination of breastfeeding were; refusal by the child to breastfeed, refusal by the child to feed on complementary foods, maternal illness(sore breast, HIV mothers, drugs used for family planning or other illness), lack of breast milk from the mother and work. This was in agreement with a previous study in Nairobi in which reasons given for early termination of breast feeding were;

inadequate breast milk, child refusal to breast feed and maternal illness (Muchina &
Waithaka, 2010). About 96.0% of children were on complementary foods during the
time of the interview.

In more than a quarter of children 26.0% complementary feeding was introduced
before six months of age and 70% at six months and above. A guideline by World
Health Organization (WHO) on complementary feeding, state that all infants should
be introduced to complementary foods in addition to breast milk from 6 months
onwards (WHO, 2003). The finding was lower as compared to KDHS 2014 which
indicated that, introduction of complementary foods before six months was 39% and
over 80% of children aged 6-9 months received complementary foods (KNBS, 2015)
Feeding frequency is essential in ensuring optimal growth, WHO recommends
minimum meal frequency at: 2 times for breastfed infants 6–8 months old; three
times for breastfed children 9–23 months old and four times for non-breastfed
children 6–23 months old (WHO, 2008b). A high proportion of children 80% were
fed more than two times when weaning started and subsequently feeding patterns
changed by increasing frequency and food varieties. Meal frequencies were sufficient
in this study.

In this study, age of the mother, education level of the mother, occupation, major
source of income was not statistically associated with feeding practice (p>0.05), in
contrast with other studies. Other studies have shown that termination of
breastfeeding is negatively influenced by lower education levels (Morgan *et al.,*
2010; Memon *et al.,* 2010). Maternal education was found to be associated with non-
compliance of exclusive breast feeding guidelines (Kimani *et al.,* 2011; Lindsay *et*

al., 2012). In Nepal mother's level of education was associated with in appropriate feeding practices and not spouses' (Chapagain, 2013)

There was no statistical association between children age distribution and feeding practices. Two studies in Ethiopia identified child age to be associated with feeding practice though the results were contrasting; Berhe reported a positive association while Alemayehu *et al* reported a negative association (Berhe 2011, Alemayehu *et al.,* 2009). This study found out that male children were 1.17 times more likely to be exclusively breastfed compared to their female counterparts. In contrast a study in Nepal, found out that sex of the child is not important for feeding purpose (Chapagain, 2013). Current study demonstrates that boys are given more importance than girls in feeding practice.

In this study married mothers were 1.09 times more likely to be knowledgeable than single mothers on feeding practices, mothers with male children were 1.13 times more knowledgeable than those with female children. Mothers' level of education and occupation was statistically associated with having complete information on infant feeding practice ($P<0.05$) at bivariate level. This was in agreement with previous studies; a study in Dhaka city reported a significant association between mother's level of education and knowledge ($P<0.05$), where mothers with higher education were more knowledgeable than lower educated and illiterate mothers (Afrose *et al.,* 2012), another study found graduate mothers to be 3.56 times more likely to know the correct timing and consistency of food to be given to their children (Aggarwal *et al.,* 2008).

5.1.2: Nutritional status

Adequate growth and good health is achieved if the infants and young children receive proper nutrition, which means the choice of infant feeding method should be optimal.

Majority of children had normal weight for height; 26.5% were stunted with 9.4% and 17.1% being severely and moderately stunted respectively. However, 2.9% had a high weight for height. This finding was in agreement to the current KDHS survey that reported 26% of children to be stunted (KNBS, 2015) and in a previous study carried out in Nairobi (Gichana, 2013). Stunting dropped from 35% in 2009 to 26% in 2014 (KNBS, 2010, KNBS, 2015) respectively. This is also in agreement with UNICEF, WHO-World Bank joint report that stated that prevalence of stunting is decreasing globally from 33% in 2000 to 25% 2013 (UNICEF, 2012).

The prevalence of low weight for age (underweight) among children was 11.1% with 3.7% and 7.4% of children being severely and moderately underweight respectively. The finding was similar to Kenya Demographic Health Survey (KDHS) 2015 which showed 11% of children were underweight (KNBS, 2015). Underweight prevalence is on decrease from 16% in 2009 to 11% in 2014 (KNBS, 2010, KNBS, 2015) respectively. According to UNICEF, WHO-WORLD BANK joint report, Africa experienced a slight decrease in the underweight prevalence among children from 23% in 1990 to 17% in 2013 (UNICEF, 2012).

Additionally, 5.4% were overweight with 4% and 1.4% being overweight and obese respectively. Poor feeding practices lead to overweight and obesity too, which has serious health consequences. Malnutrition is defined as either; underweight, stunting,

and wasting or; overweight and obesity (Reddy *et al*, 2009). This result confirms global prevalence of overweight trend is on the rise in all regions from a burden of 32 million in 2000 to 42 million in 2013 (UNICEF, 2014).

No child was found to have low weight for height that is wasted in this study, 9.4% had high weight for height. This is in contrast to the national wasting prevalence reported by KDHS 2014 (KNBS, 2015) where 4% of children were found to be wasted. However, the rate of wasting was decreasing in Kenya from 7% in 2009 to 4 % in 2014 (KNBS, 2010, KNBS, 2015) respectively. A joint report by UNICEF, WHO-World Bank reported that only 8% of children in the world were wasted with a third in Africa (UNICEF, 2012), showing that prevalence of wasting was low compared to other indicators of malnutrition, that was stunting and underweight. Prevalence of stunting was found to be higher than low weight for age and wasting lower than low weight for age, this was in agreement with KDHS 2008-2009 report where prevalence of wasting was lower than stunting as well KDHS 2014 (KNBS, 2010, KNBS, 2015)

A high proportion 53.7% of children was well nourished according to MUAC finding, with 29.7% of children being at a risk for acute malnutrition. Prevalence of moderate and severe acute malnutrition was 15.7% and 0.9% respectively. This result contrasted with a study in Nigeria, in which only 2.6% were moderately malnourished (Akorede & Abiola, 2013) and in Kenya where only 3.4% of children were moderately malnourished and none was severely malnourished   (Gichana, 2013). Though MUAC is a determinant of malnutrition that gauges both fat and muscle levels and requires minimal equipment, only few studies have been done as

compared to those of wasting, stunting and underweight showing a gap in literature.

Several studies have shown demographic and socio-economic parameters such as occupation and educational level of mothers and spouses, major source of income, marital status, child gender and age to be strongly associated with child nutritional status (Adeladza, 2009). A study in Tanzania reported that mother's education was a determinant and had a positive effect on child nutrition (Maseta *et al.,* 2008).

In this study, statistical significance relationship was found between marital status, children age distribution and child gender, mother's and spouse's occupation, spouse's level of education and major source of income and stunting ($p<0.05$) and further ordinal regression (multivariate analysis) identified marital status and children age group 6-9 months and 10-12 months ($p<0.05$) to be predictors of stunting. In the KDHS 2008-2009 survey, it was reported that stunting was least common among children of more educated mothers and those from wealthier families (KNBS, 2010). Children age and spouse's level of education were significantly associated with wasting ($p<0.05$) at bivariate level and further analysis identified children age as a predictor of wasting at multivariate level. In Kwale, it was reported that occupation of household heads and mothers appeared to be a major factor influencing level of wasting ($p<0.05$) (Adeladza, 2009).

No statistical significance was found between all the socio-demographic factors and being underweight ($p>0.05$). This contradicted previous studies which found out; children in female-headed households were more likely to be underweight than their counter parts in male-headed households ($p<0.05$) (Adeladza, 2009), attributed to poverty in female-headed household, children of non-educated mothers were more

likely to be underweight than those of secondary-educated mothers (p<0.05) (Adeladza, 2009; Gichana 2013).

Spouse's level of education and occupation were associated with MUAC. No literature has been found regarding association of MUAC anthropometric measurement with socio-demographic factors. A previous study documented that, maternal nutritional knowledge about appropriate food and feeding practices significantly influenced complementary feeding practices and is often a greater determinant of malnutrition than the lack of food (Aggarwal *et al.,* 2008).

The study findings showed that, mothers who had children with normal weight for height were 0.58 times less likely to have complete information on feeding practice compared to mothers of children with high weight for height. This was in agreement in other studies indicting mothers with greater infant nutritional knowledge complement their children appropriately with nutritious food (Romulus-Nieuwelink *et al.,* 2011, Korir, 2013).

5.1.3: Socio- economic and demographic characteristics of study participants

The finding of the study showed that children age was not evenly distributed. Majority, 84.5% were below one year. In contrast a similar study in Nepal showed that children age was evenly distributed; half of them were above one year (Chapagain, 2013). Mother Child Health clinics offer immunization and growth monitoring to children as well as nutritional counseling services of children to caregivers. Mothers are advised to take their children for growth monitoring up to five years as well as nutritional counseling in addition to immunization services.

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Most of the children were of the age that is immunized in this study, these results on age distribution show that most mothers put more emphasis on immunization as stipulated by WHO through Kenya Expanded Programme on Immunization (KEPI,) such that after nine months when measles vaccine is given, they stop taking their children for growth monitoring where anthropometric assessment is carried out. Frequent anthropometric assessment provides a diagnostic tool for health and nutrition surveillance of individual children and to instigate effective action in response to growth faltering (Ashworth *et al.,* 2008); in case of under or over nutrition, it can be corrected early in life.

Male children were more than female children in this study, 56.3% versus 43.7% respectively. Similar trend was observed in a study carried out in South Africa (Mushaphi *et al.,* 2008). This may be due to cultural influence where, in families' boys are valued, given more importance as compared to girls and higher expectations are placed for boys than girls.

Majority 92.6% of the study participants were married, a figure higher than that reported by the Kenya Demographic Health Survey (KDHS) 2014, in which 60% of women were married (KNBS, 2015). A similar study in Ethiopia reported similar findings where majority of mothers in the study were married (Fekadu *et al.,* 2015). The study revealed that most of study respondents who were mothers 94.3% as well as their spouses' 88.9% had attended formal education system at various levels. A high proportion of mothers, 52% attained primary education which contrasted with their spouses where 65.2% had more than primary education. This was in agreement with KDHS 2014 survey, which documented that 97% of males and 88% of females

are literate (KNBS, 2015). Education level, determines occupation, this has been demonstrated by differences in occupation of mothers and their spouses, most mothers 62.0% being housewives, only 12.9% being in formal employment while a higher proportion 39.8% of their spouses were in formal employment. This result was in agreement with findings from a similar study done in Nairobi (Gichana, 2013). A study established that greater education for mothers contributed to new skills, beliefs and choices about sound health and nutritional practices (Miller & Rodgers, 2009).

Household characteristics are important determinants of health status of household members especially children and are also indicators of the socio-economic status of household (KNBS, 2010). The average household members were 2.1, which were lower than that reported by the current KDHS which was 3.9 (KNBS, 2015). House hold size is associated with the duration and level of care a mother can give to the child, where if members are many, time and care reduces, because she will divide her time and attention to care for other members or assign some child's role to other members. Economic resources are also limited in large households as compared to small households (KNBS, 2010).

Only a quarter of households in this study used toilet separately from other households contrasting to KDHS 2014 survey which showed that less than a quarter of households used toilet separately (KNBS, 2015). Toilets are important determinants of hygiene and sanitation levels in households. Proper hygiene and sanitation reduces communicable diseases like cholera, dysentery, diarrhea among

others which may lead to dehydration and loss of minerals compromising nutritional health of children.

Most of those studied 83.5%   lived in rental houses 55.6% being one room. Number of rooms is an indicator of the extent of overcrowding which leads to respiratory and skin illness and this may affect child's health leading to poor nutritional status. As expected most people living in rental houses get their food from the market which may be inadequate in terms of quantity and quality affecting feeding practice and nutritional status.

In this study, 68.6% of study participants had been taught on infant feeding practice, majority, 82.5% reporting the source to be from health workers, 8.8% mother/in-law, 6% friend and neighbors, 3.8% internet and books and 0.4% observed the employer. In contrast a study in South Africa indicated that most mothers 76% had not received any education on infant feeding, while those who were taught, 13.5% had been taught by health workers or nurses and 7% by mothers or mothers-in-law, and 3% had been influenced by the radio, by television or by magazines (Mushaphi *et al.,* 2008). Majority of those informed by health workers, had knowledge on breast feeding and when to start weaning. Only few of them received information on type and quantity of food to wean, showing a gap when it comes to knowledge on dietary diversity and accepted meal frequency. Earlier studies documented similar findings; mothers were more knowledgeable on recommendations related to breastfeeding but were less aware of solids, semi-solids and soft foods recommendations (Memon *et al.* 2010). A study in Korogocho and Viwandani reported that, frequency of giving solids, semi-solids and soft foods at 6 months of age was scored poorest on

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knowledge on complementary feeding indicator (Kimani *et al.,* 2011).

It was noted that, mothers received right information from other sources like mother/in laws and observation from employer especially on breastfeeding demonstrating the high level of exclusive breastfeeding awareness in this society. Few mothers were also given wrong information too, especially by mother/mother in-laws and friends and neighbors, like *"Crying is a sign of hunger, mother's milk is insufficient, introduce food"; "Wean at three months and if not child's health will deteriorate".* This is a demonstration of incorrect information which may lead to inadequate feeding practices that fail to benefit the child. Most of the mothers who were multiparous, reported that they were not given information on the feeding practice of the child who participated in this study, but used the previous experience, meaning trend in feeding practice, either appropriate or inappropriate of older children is passed to younger generation. Type and quality of information was determined, only 33.4% had correct information on complementary feeding and 44.2% had correct information on exclusive breastfeeding. As a whole, only 38.8% had complete correct information; that is on initiation and termination of breast feeding and when and how to complement despite a high proportion delivering at health facilities and reporting their informants to be health workers. This may be due to few number of health workers in public health facilities compared to patients hence being overwhelmed by workload, noting that some mothers who were informed by health workers were told to breastfeed for six months only and the rest they read from mother and child health booklet issued when they visited either ante-natal or post-natal clinic. Most mothers were multiparous with only 38.6% having one child. This means that most mothers had prior experience on infant feeding

practices unlike first time mothers who need more guidance and training on infant feeding practices.

5.2: Conclusions

1. The findings of this study indicated that not all mothers practiced optimal feeding practice. All children 100% were breastfed.

2. Initiation of breast feeding was impressive, 82.0% of children were breastfed within the first hour after delivery as recommended by WHO and UNICEF, though it did not meet UNICEF target rate of 90%.

3. Notable value of children 25.7% was not exclusively breastfed for the first six months and 6.57% were not being breastfed during time of study. This indicates mixed feeding was practiced by some of the mothers; however, no mother practiced exclusive complementary feeding.

4. Lack of appetite in children was the major infant feeding problem reported by 18.6% of mothers and it was also one of the reasons mothers gave for early termination of breastfeeding

5. More than a quarter of children 27.4% were stunted, 2.9% had a high weight for height; 11% were underweight, 4.4% were overweight, however, no child was found to be wasted.

6. Breast feeding and complementary feeding practices had no significant effect on nutritional status. Marital status and children age distribution of 6-12months ($p<0.05$) were found to be predictors of stunting. Children age

distribution of 6-15months (p<0.05) was a wasting predictor.

7. Children age was not evenly distributed, with majority 65.1% being in age bracket of receiving immunization which is 6-9 months. This demonstrates a gap in lack of awareness and importance of growth monitoring and nutritional counseling in this society.

8. More than half of the mothers 56.9% had correct knowledge on exclusive breastfeeding but only 30.3% had correct knowledge on when to introduce complementary feeding. Knowledge on food to introduce to children at six months was limited. Only 5.4% of mothers reported to have been informed, despite their informants being health workers, indicating a knowledge gap on complementary feeding.

5.3: Recommendations

1. Further awareness on breastfeeding and its importance was needed by educating mothers. This will enable and encourage all mothers to exclusively breastfeed for the first six months of life and continue to breastfeed for two years or more

2. Further research should be made to address problem of lack of appetite among children which was reported to be a major feeding problem and one of the reason that lead mothers to terminate breastfeeding early.

3. Mothers need more nutritional education on complementary feeding and should be guided on how to introduce complementary foods to their children. This includes: type of food to wean with, quantity of dietary intake and

frequency of meals per age categories and how to cook this food to retain their nutrient content.

4. Further studies should be carried out to establish why stunting and wasting is more prevalent in age group 6-15 months

5. Creating a lot of awareness through health education on importance of taking children for growth monitoring at MCH clinic since most of the children attending the clinic were of age of receiving immunization

6. Government and other stakeholders should sensitize the public on the issue of overweight which was noted in some children from this study.

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APPENDICES

Appendix 1: Questionnaire

SerialNumber…………………………………………………………………..

Date of data collection……………………………………………………………

Residence…………………………………………………………………………

A: Part one: Child Information.

i.   Date of Birth…………………………………………………….....................

          (Verify from clinic attendant card)

ii.   Place of birth: Health facility [ ]   Home [ ]   [   ]

iii.   Age…………………………………………………………………………

      .

iv.   Gender: Male [ ]   Female [ ]   [   ]

v.   Status of the baby at birth.   Term [ ]   Pre-term [ ]   [   ]

vi.   Weight at birth……………………………………………………………..

          (Verify from clinic attendant card)

vii.   Initiation of breastfeeding after birth

          Immediately [ ]   30 minutes [   ]   one hour [   ]   [   ]
          2 hours and more   [   ]

viii.   Is (name of child) still breastfeeding?

          Yes [   ]   No   [   ]   [   ]

          If No, how old was the baby when you stopped…………………………

          Why……………………………………………………………………

ix.   Has the child started complementary feeding?

        Yes [   ]   No [   ]   [   ]

    If Yes, how old was (name of the child) when you started weaning?

        1 month [   ]   2 months [   ]   3 months [   ]   4 months [   ]   [   ]

        5 months [   ]   6 months [   ]   > 6months [   ]

x.   How many times did you feed (name of the child) when you started weaning?

        1 time [   ]   2 times [   ] 3 times [   ] more frequent [   ]   [   ]

        List foods given at each meal:

            Meal 1……………………………………………………………
            Meal 2……………………………………………………………
            Meal 3……………………………………………………………
            Other meals………………………………………………………

xi.   Has there been a change on the feeding pattern of (name of the child)?

        Yes [   ]   No [   ]   [   ]

     If Yes, what has changed? …………………………………………………

xii.   The major source of foods is?

        Own farm [   ]   Buy from market [   ]   [   ]

xiii.   How is the food of (name of child) prepared?

        Separately   [   ] as part of family meals [   ]   [   ]

xiv.   Does (name of child) eat from own plate?

        Yes [   ]   No [   ]   [   ]

xv.   Were you given any information on when and how to wean the baby?

Yes.   [   ]   No [   ]   [   ]

If Yes, by who?

Mother/Mother-in-law [   ]   Health worker [   ] Friends and neighbors [   ]

Books and internet [   ] observed mother/in-law [   ]   [   ]

What were you taught regarding breastfeeding and complementary feeding?

…...

....

xvi.   Who helps most in the feeding of the child?

Mother [   ]   Father [   ] House girl [   ] others [   ]   [   ]

xvii.   Is there any infant feeding problem experienced by the mother?

Yes [ ]   No [   ]   [   ]

If Yes, which?

Lack of food   [   ]

Lack of time   [   ]   [   ]

Lack of infant appetite   [   ]

Sick Child   [   ]

Others……………………………………………………………………………………

……………………………………….

B: Part two: Mother Information:

  i.   Age…………………………………………………………………

 ii.   Marital status

Married   [   ]   Single [   ]   [ ]

 iii.   Parity……………………………………………………………

100

iv.   How many children are alive? …………………………………………..

v.   Mode of delivery of (name of the child)

        Vaginal   [   ]   Cesarean [   ]   [   ]

vi.   Mother's level of formal Education

        None   [   ]   Primary [   ] Secondary [   ] Tertiary [   ]   [   ]

vii.   Mother's
        occupation……………………………………….…………………

viii.   Spouse's level of formal education (husband)

ix.   None [   ]   Primary [   ]   Secondary [   ]   Tertiary[   ]   [   ]

x.   Spouse's occupation………………………..……………..…….…………

xi.   The major source of income for the family……………….…..…..………..

xii.   Total monthly family income

        0-10,000 [   ] 11,000-20,000 [   ]   21,000-50,000 [   ]   [   ]
        50,000 and above [   ]

xiii.   How many feed from your household? …………………………………..

xiv.   Housing:

        A) Ownership: Owner [   ]   Rental [   ]   [   ]

        B) Size (number of rooms)……………........................

        C) Floor : cement [   ]   tiles [   ] soil   [   ] wooden [   ]   [   ]

        D) Walls: iron sheet [   ] wooden [   ] bricks [   ] mud [   ]   [   ]

        E) Toilet facility: Own household [   ] sharing with other households [   ]
        Eii) Type of toilet: pit   [   ]   WC [   ]   [   ]
        F) Source of water: pipe   [   ]   borehole [   ] vendors [   ]   [   ]

C: Part three: Anthropometric measures:-

  i.   Height…………………………………………………………………………..
       .

 ii.   Weight…………………………………………………………………………
       .

iii.   MUAC…………………………………………………………………………
       .

iv.   Change in hair color………………………………………………………………

 v.   Edema…………………………………………………………………….

vi.   Signs of Rickets

                    A) Bowed legs   [   ]

                    B) Weak and painful bones [   ]

                    C) Delayed milestone   [   ]

                    D) Box-like forehead   [   ]

                    E) Under-weight   [   ]

                    F) Widening of wrists   [   ]

Appendix 2: Informed consent

Title of Study: Factors associated with infant feeding practices and nutritional status of children aged 6 to 24 months attending child welfare clinic in Kajiado North District.

RESEARCHER STATEMENT

I am Florence Nkirote Kinoti student at Jomo Kenyatta University for Agriculture and Technology. I'm doing a research on Infant feeding practices and nutritional status of infants. Infant feeding practices contribute to child's survival and development. I invite you to be part of this research. You have to decide voluntarily whether or not you will participate in this research. You can talk to someone you feel comfortable with about the research before making a decision. Please ask me to stop at any time as we go through the information, I will take time to explain.

PURPOSE OF THE STUDY

Poor feeding practices cause malnutrition. Malnutrition can be linked to socio-demographic factors. This study will determine factors that influence mother's decision on a feeding option. That is either exclusively breastfeed for the first six months, introduce other foods from six months and continue to breastfeed for two years or more as directed by WHO/UNICEF or not follow that directive. The study will also assess the nutritional status of the children of mothers who follow or not follow that directive.

STUDY PROCEDURES

This research will involve your participation by answering loosely structured questionnaire that will take about one hour to complete. In addition some measurement will be taken from the baby. You are being invited to take part in this research, your input as a resident of this area will contribute much on feeding practices.

RISKS/DISCOMFORTS

No direct risk/physical harm to the subjects is associated with participation in this study; however, some participant may have discomforts from the nature of some questions due to some personal or confidential information you have to share. I do

not wish this to happen. You do not have to answer any question or take part in the survey if you feel the questions are too personal or if talking about them makes you uncomfortable.

BENEFITS

Your participation is likely to identify the best infant feeding option and factors that influence infant feeding practices, in the community. This will guide policy makers and community leaders to formulate strategies that will advise and create awareness to mothers on the best feeding option.

CONFIDENTIALITY

All information given will be treated with high level of confidentiality; no name(s) will be used instead unique code will be used; the questionnaires will be locked up for information security. I will not share information about you to anyone or use it on anything apart from this research.

VOLUNTARINESS

This exercise is totally voluntary; It is your choice whether to participate or not to. You may change your mind later and stop participating. I will be very grateful for your participation. **Contact Information**

For any question regarding this study, you can contact me on:

Telephone number 0725 399 447

 Email: fnkirokins@yahoo.com For any question about your rights of participation as a research participant, contact:

 The Secretary KEMRI/National Ethics Committee,

 P.O BOX 54840-00200, Nairobi;

Telephone numbers: 020-272 2541; 0722 205901, 0733 400003

Email: erc@kemri.org

CONSENT FORM

The study your about to participate in, will determine factors that influence feeding practices and nutritional status of children on different feeding practices. Should you agree to participate in the study, you will be asked to fill in a questionnaire, and then body measurement; weight, height and MUAC will be taken from the child.

All data collected from you and your child will be coded to protect your identity. Only the researcher will have access to the information. At the end of this study, there will be no way to link your name to your data. Any additional information about the study will be provided to you including final study results. You are free to withdraw or refuse to answer any question at any time without any consequences.

Should you agree to participate in the study, please put your signature below, indicating that you have read and understood the nature of study, your responsibility as study participant, inconveniences associated with voluntary participation in the study and that all your questions and concerns about the study have been answered satisfactorily.

You will receive a copy of this signed consent form to take away with you.

……………………………………………….

Signature/ Thumb print of study participant

    Date…………………

…………………………………………….

Signature of person obtaining consent

    Date…………………

Appendix 1: Fomu ya maswali

Nambari mwandamano……………………………………………………………….

Tarehe……………………………………………………………………………….

Mkaaji wa wapi……………………………………………..………………………

A: Sehemu ya kwanza: Maswali kuhusu mtoto.

i.   Tarehe ya kuzaliwa………………………………………………………….

(Dhibitisha kutoka kadi ya kliniki)

ii.   (Jina la mtoto) alizaliwa wapi?   Kituo cha afya [ ]   Nyumbani [ ]   [   ]

iii.   Umri…………………………………………………………………………

iv.   Jinsia: Mume [ ]   Mke   [ ]   [   ]

v.   Hali ya mimba wakati wa kuzaa.   Imekomaa [ ]   Haija-komaa [ ]   [   ]

vi.   Uzito wa mtoto wakuzaliwa………………….…………………………

(Dhibitisha kutoka kadi ya kliniki)

vii.   Ulianza kumnyonyesha (jina la mtoto) lini baada ya kuzaa?

Mara hiyo [ ] baada ya dakika 30 [   ]   baada ya saa[   ]   [   ]

Masaa mawili na kuendelea   [   ]

vii. (Jina la mtoto) bado anyonya?

Ndio [   ]   La [   ]   [   ]

Kama ni la, mtoto alikuwa umri gani alipoacha kunyonya? …………………

Sababu……………………………………………………….…………………...

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Viii. Mtoto ameanza kula chakula badala?

Ndio [   ]   La [   ]   [   ]

Kama ndio, (jina la mtoto) alikuwa umri gani wakati Ulianza kumpa chakula badala?

mwezi [   ]   miezi miwili[   ]   miezi tatu [   ]   miezi nne[   ]   [   ]

miezi tano [   ]   miezi sita[   ]   zaidi ya miezi sita [   ]

ix.Ulimlisha(jina la mtoto) mara ngapi wakati ulimuazisha chakula badala?

moja [   ]   mbili] tatu [   ] zingine [   ]   [   ]

Orodha ya chakula kwa kila mlo:

Mlo 1…………………………………………………..……………

Mlo 2……………………………………………………………….

Mlo 3……………………………………………………………….

Nyingine……………………………………………………………. .

x.   Kumekuwa na mabadiliko ya kumpa (jina la mtoto) chakula kutoka vile ulimlisha mwazo chakula badala?

Ndio [   ]   La [   ]   [   ]

Kama Ndio nini imebadirika…………………………………………

xi. Chakula unachotumia kwa ko watoa wapi?

Shamba lako [   ]   Wanunua kutoka sokoni [   ]   [   ]

xii.   Chakula cha (jina la mtoto) chatayariswa aje?

Pekee   [   ]   Pamoja na chakula ya familia[   ]   [   ]

xii. (Jina la mtoto) anakula kwa sahani yake pekee?

ndio [   ]   la [   ]   [   ]

xiii. Ulipewa mawaidha yeyote kuhusu wakati na jinsi ya kupea mtoto chakula badala?

ndio.   [   ]   la [   ]   [   ]

kama ndio , na nani?

Mama/mama mume. [   ] mhudumu wa afya   [   ]   marafiki na majirani [   ]

Vitabu na mtandao [   ] kuangalia mama [   ]   [   ]

Ulifunzwa nini kuhusu unyonyeshaji wa mtoto na kumpa chakula badala?
…………………………………………………..
....
....

xiv. Nani anasaidia mara nyingi kumrisha mtoto?

Mama [   ]   baba [   ]   mfanyikazi [   ] wengine [   ]   [   ]

i.   Kuna tatizo lolote la lishe ya mtoto mama hupitia?

Ndio [ ]   La [ ]   [   ]

Kama ndio, lipi?

Kukosa chakula   [   ]
Kukosa wakati   [   ]   [   ]
Kukosa hamu ya chakula [   ]
Mtoto mgojwa   [   ]
Kadharika…………………………………………………………
…………………………………………………………………
…

B: **Sehemu ya pili: Maswali kuhusu mama:**

i) Miaka………………………………………………………….……………

ii) Hadhi ya ndoa

    Umeolewa   [   ] Hauja olewa [ ]   [   ]

iii) Umebeba mimba ngapi …………………………………………………..

iv) Ni watoto wangapi wako hai? …………………………………………....

v) Njia ya kujifunguwa (jina la mtoto) ilikuwa ipi?

    Uzazi wa kawaida   [   ]   upasuaji   [ ]   [   ]

vi) Kiwango cha elimu cha mama ni?

    Ujawai enda shule [   ]   shule ya msingi [   ] Shule ya sekondari [   ]

    Elimu ya juu [   ]   [   ]

vii) Mama hufanya kazi ipi ?………………………………………………….

viii)   Kiwango cha elimu cha mpenzi (mume).

    Ajawai enda shule [   ]   shule ya msingi [   ]   Shule ya sekondari [   ]

    elimu ya juu [ ]   [   ]

ix) Mpenzi (mume) hufanya kazi ipi……………………………………………

x) Mahitaji ya kila siku ya familia hutoka wapi………………………………

xi) Kiwango cha mapato ya familia kila mwezi.

    0-10,000 [   ] 11,000-20,000 [   ] 21,000-50,000 [   ]   [   ]

    50,000 na zaidi [   ]

xii) Kwa kila siku ya kawaida unarisha wangapi ndani ya nyumba yako? ………

xiii) Nyumba:

A) Umiliki: Yako [   ]   kukodisha[ ]   [   ]

B) Kiasi (nambari ya vyumba)…………….........................

C) Sakafu : Simiti [   ]   tiles [   ] mchanga   [   ] mbao [   ]   [   ]

D) Ukuta: mabati [   ] mbao[   ] mawe [   ] mchanga [   ]   [   ]

E) Choo: nyumba yako pekee [   ] unatumia na nyumba zingine[   ]   [   ]

F) Aina ya choo: shimo [ ] choo cha kupiga maji [ ]   [   ]

G) Maji unayotumia inatoka wapi: mfereji   [   ]   shimo [   ]   [   ]

wachuuzi [   ]

C: Sehemu ya tatu: Vipimo vya kisayansi vya kupima mwili:-

     i.   Urefu……………………………………………………………

     ii.   Uzito……………………………………………………………

     iii. Mzingo wa kati wa mkono (MUAC) ……………………………

     iv.   Kubadirika rangi ya nywele …………………………………

     v.   Uvimbe wa miguu/mwili ………………………………………

     vi.   Dalili za Matege …………………………………………………

         A) Miguu yenye upinde   [   ]
         B) Mifupa yenye udhaifu na maumivu   [   ]
         C) Kuchelewa hatua za kukua   [   ]
         D) Uso wenye kama sanduku   [   ]
         E) Uzito ulio chini   [   ]
         F) Kifundo kilichopanuka   [   ]

Appendix 2: Fomu ya kibali

Mada: Hali zinazouziana na lishe ya watoto wa umri wa miezi sita mpaka inshirini na minne wanaotembelea kliniki ya watoto wilaya ya Kajiado Kazkazini.

UTANGULIZI

Jina langu ni Florence Nkirote Kinoti mwanafunzi wa chuo kikuu cha kilimo na teknologia cha Jomo Kenyatta. Ninafanya utafiti kuhusu lishe ya watoto na hali ya kiafya ya lishe ya watoto.Lishe ya watoto uchangia sana kwa ukuaji wa mtoto.Nakualika kutoa maoni yako katika huu utafiti.Uamuzi wa kushiriki ni wako, hakuna lazima.

Fomu hii inaweza kuwa na majina usioyaelewa, usiwe na hofu, tafadhali niulize, nitachukua muda wangu kukueleza na kukufanulia.Jisikie huru kuniuliza swali lolote hata baada ya kumaliza kuisoma hii fomu.

LENGO LA UTAFITI

Lishe sizizofaa zinachangia utapiamlo. Utapiamlo unaweza kuhuzishwa na hali za mazingira,watu wanavyoishi na demogirafia.Huu utafiti utafafanua hali zinamfanya mama kuchangua haina ya lishe ya mtoto.Lishe hizi ni; kumnyonyesha mtoto kwa miezi sita bila kumlisha kitu kingine, hata maji, kumuazisha chakula badala kutoka miezi sita akiendelea kunyonya hadi miaka mbili au zaidi, kulingana na maagizo ya UNICEF/WHO ama kutofuata hayo maagizo. Huu utafiti pia utaangalia hali ya afya ya lishe kwa watoto wa wamama wenye wanafuata maagizo na wenye hawafuati.

UTARATIBU WA UTAFITI

Utafiti huu utakuwajibu kujibu maswali kadhaa kwa muda usiopita saa moja.vipimo vya kimwili vitachukua kutoka kwa mtoto.Unaalikwa kuchangia huu utafiti.Maoni yako kama mkaazi wa eneo hili yatachangia sana kufafanua lishe ya mtoto.

HATARI/MACHUNGU

Hakuna madhara yeyote kwa wale watashiriki katika utafiti huu, ila wengine wanaweza kutofurahishwa na maswali mengine.

FAIDA/MANUFAA

Kushiriki kwako kutadhibitisha lishe bora na hali zinazochangia kuchangua lishe ya mtoto kwa jamii.Hii itasaidia kuweka mikakati na sera za kuwafahamisha wamama lishe bora ya watoto. **KUTOJIHUSISHA**

Wahusika wako na uhuru wa kutoshiriki katika huu utafiti. Hakuna faini au kuadhihibiwa kwa mtu yeyote asiyeshiriki kwenye utafiti huu.

USIRI

Kila neno litakalotamkwa kwenye huu utafiti au siri italidwa kwa usiri wa hali ya juu. Hakuna jina la mhusika litatumika ila nambari maalum.Fomu zote za kuuliza maswali zitafungiwa. Maneno yako utakayonena hayatumiwa kwa hutafiti pekee na yatatolewa kwa mtu yeyote.

KUJITOLEA

Kujitoa kushiriki ni kwa moyo wako wote bila kulazimishwa na yeyote. Nitashukuru kwa kushiriki.

MAWASILIANO

Kama unaswali lolote kuhusu huu utafiti, wasiliana na mimi,

 Florence Nkirote Kinoti, nambari ya simu 0725 399 447,

barua pepe fnkirokins@yahoo.com

Kwa swali lolote kuhusu haki yako ya kushiriki kama mshirika,wasiliana na;

Sekiritari KEMRI/National Ethics Committee,
 P.O BOX 54840-00200, Nairobi
 Nambari ya simu: 020-272 2541; 0722 205901, 0733 400003
  Barua pepe: erc@kemri.org

Kibari cha kuhusishwa

Huu utafiti ambao huko karibu kujihusisha, utafafanua hali zinazochangia kuchangua lishe ya mtoto, na hali ya kiafya ya lishe ya watoto ambao wako katika kila aina ya

lishe.Ukikubali kuhusika kwenye huu utafiti, utaulizwa uijaze fomu ya maswali na vipimo vya kimwili vitachukuliwa kutoka kwa mtoto.

Matokeo na maneno yote yatakayotokana na huu utafiti, yatawekwa kwa usiri wa hali ya juu.Mtafiti pekee ndio atapata kibali cha kutumia matokeo.Hakuna jina la mshiriki wa huu utafiti litakalotumiwa ila nambari maalum. Kwa hivyo hakuna kulinganisha jina na matokeo.Huko huru kujitoa ama kutojibu swali lolote bila adhabu.

Kama umekubali kushiriki, tia sahihi, hii ni dhibitisho ya kwamba umesoma na umeelewa, huu utafiti na majukumu yako kama kama mshiriki wa huu utafiti, gharama ya kujitoleana kwamba maswali yote umejibiwa na ukaridhika na majibu.Utapatiwa fomu moja ya kibali uende nayo.

…………………………………………

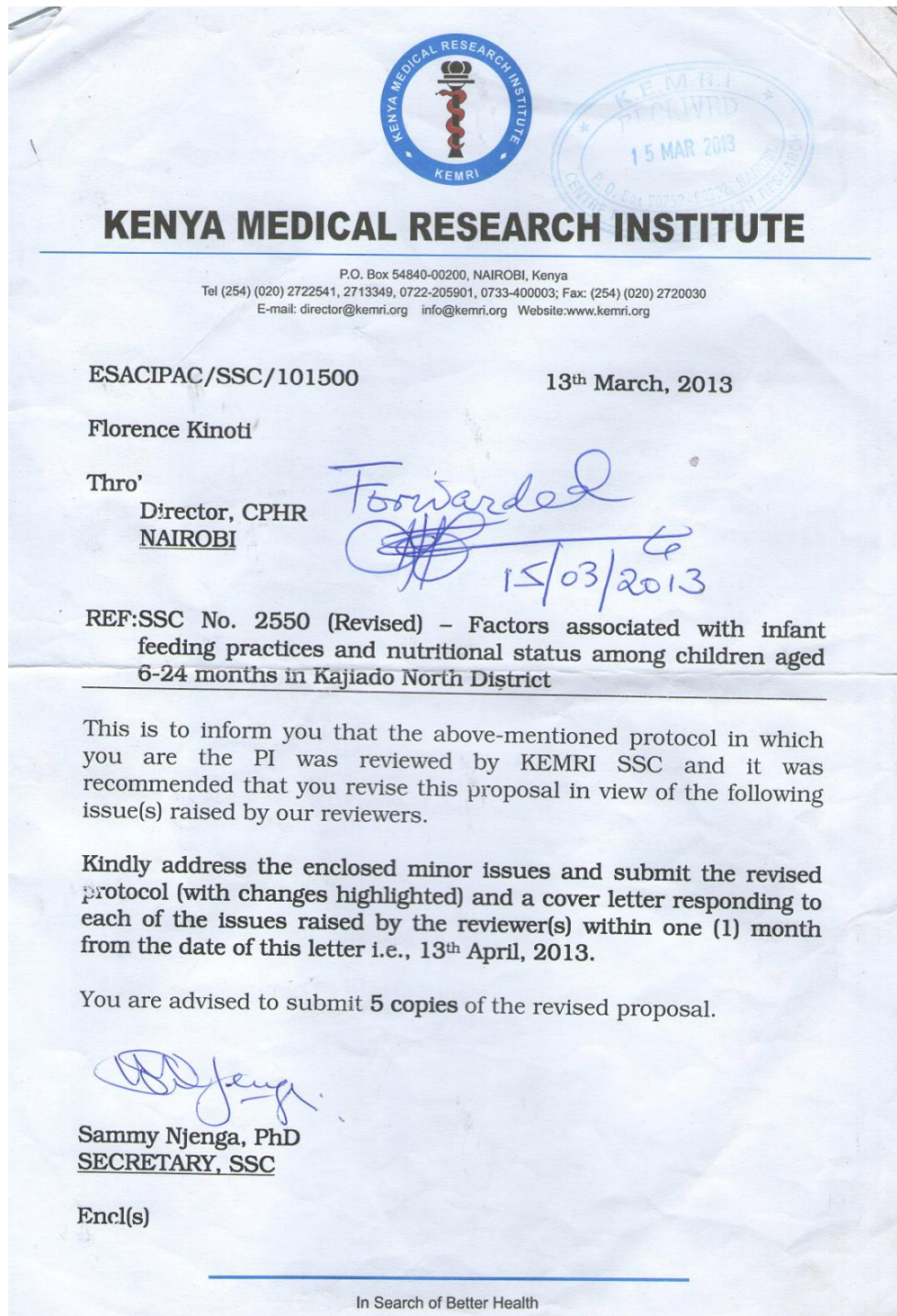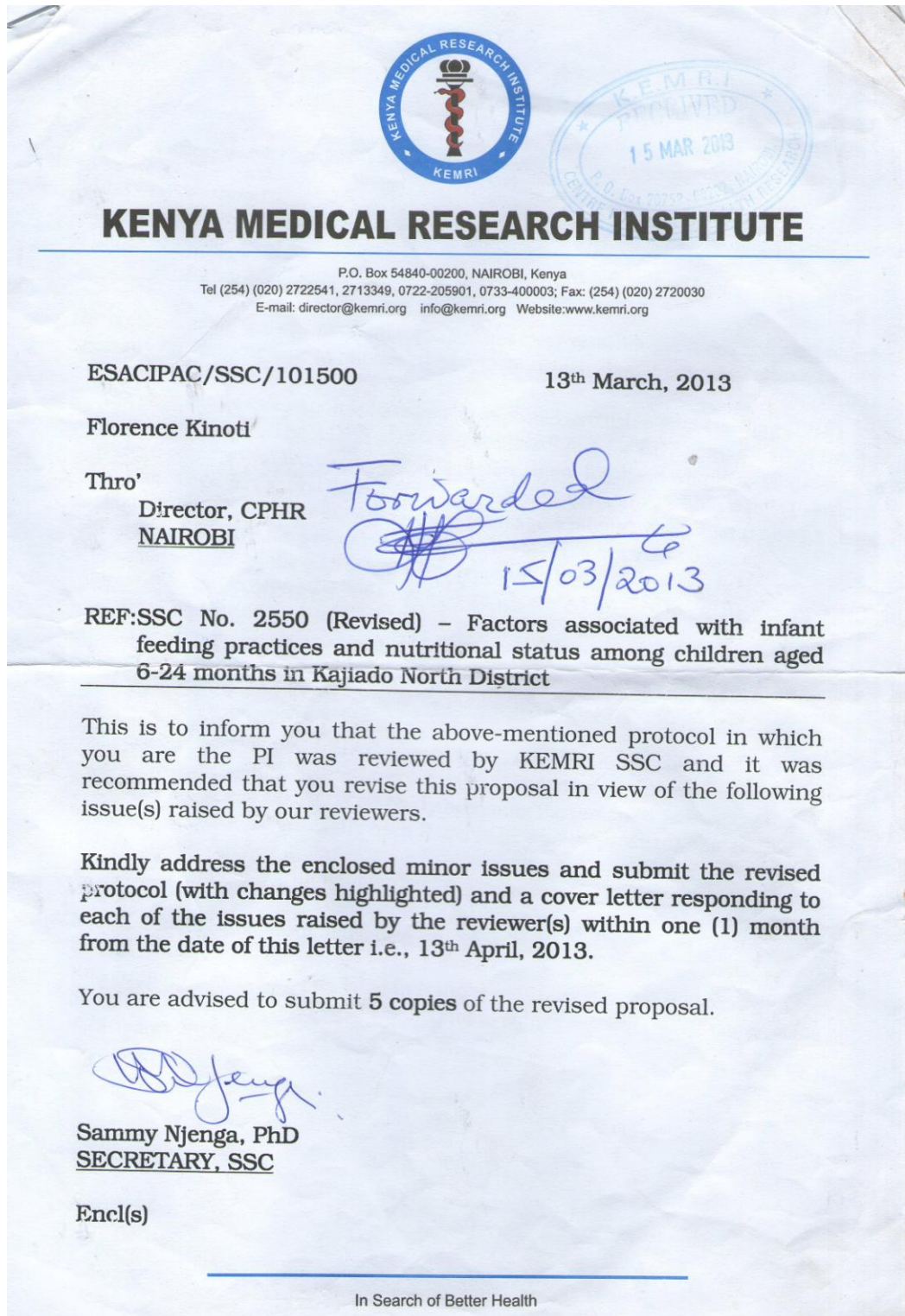Sahihi/alama ya kidole ya mhusika
        Tarehe………………………

……………………………..

Sahihi   ya   mtafiti
Tarehe……………………….

Appendix 3: SSC approval

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org   info@kemri.org   Website:www.kemri.org

ESACIPAC/SSC/101500   13th March, 2013

Florence Kinoti

Thro'

    Director, CPHR   *Forwarded*
    NAIROBI   *15/03/2013*

REF:SSC No. 2550 (Revised) – Factors associated with infant
    feeding practices and nutritional status among children aged
    6-24 months in Kajiado North District

This is to inform you that the above-mentioned protocol in which
you are the PI was reviewed by KEMRI SSC and it was
recommended that you revise this proposal in view of the following
issue(s) raised by our reviewers.

Kindly address the enclosed minor issues and submit the revised
protocol (with changes highlighted) and a cover letter responding to
each of the issues raised by the reviewer(s) within one (1) month
from the date of this letter i.e., 13th April, 2013.

You are advised to submit **5 copies** of the revised proposal.

Sammy Njenga, PhD
SECRETARY, SSC

Encl(s)

In Search of Better Health

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Appendix 4: ESACIPAC approval

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org   info@kemri.org   Website:www.kemri.org

ESACIPAC/SSC/101500   13th March, 2013

Florence Kinoti

Thro'
  Director, CPHR   *Forwarded*
  NAIROBI   15/03/2013

REF:SSC No. 2550 (Revised) – Factors associated with infant
feeding practices and nutritional status among children aged
6-24 months in Kajiado North District

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you are the PI was reviewed by KEMRI SSC and it was
recommended that you revise this proposal in view of the following
issue(s) raised by our reviewers.

Kindly address the enclosed minor issues and submit the revised
protocol (with changes highlighted) and a cover letter responding to
each of the issues raised by the reviewer(s) within one (1) month
from the date of this letter i.e., 13th April, 2013.

You are advised to submit **5 copies** of the revised proposal.

Sammy Njenga, PhD
SECRETARY, SSC

Encl(s)

In Search of Better Health

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Appendix 5: CITI certificate

CITI Collaborative Institutional Training Initiative

Social & Behavioral Research - Basic/Refresher Curriculum Completion Report
Printed on 1/11/2013

Learner: Florence Nkirote Kinoti (username: nkirote@2013)
Institution: Kenya Medical Research Institute
Contact Information Nairobi, Kenya 84540-00200 Kenya
Department: ITROMID
Phone: +254399447
Email: fnkirokins@yahoo.com

Social & Behavioral Research - Basic/Refresher: Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human subjects.

Stage 1. Basic Course Passed on 01/11/13 (Ref # 9432149)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	01/08/13	3/3 (100%)
Students in Research	01/08/13	8/10 (80%)
History and Ethical Principles - SBR	01/08/13	4/5 (80%)
Defining Research with Human Subjects - SBR	01/08/13	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	01/08/13	4/5 (80%)
Assessing Risk in Social and Behavioral Sciences - SBR	01/08/13	5/5 (100%)
Informed Consent - SBR	01/08/13	4/5 (80%)
Privacy and Confidentiality - SBR	01/09/13	4/5 (80%)
Research with Prisoners - SBR	01/09/13	3/4 (75%)
Research with Children - SBR	01/09/13	3/4 (75%)
Research in Public Elementary and Secondary Schools - SBR	01/09/13	4/4 (100%)
International Research - SBR	01/09/13	3/3 (100%)
Internet Research - SBR	01/09/13	4/5 (80%)
Research and HIPAA Privacy Protections	01/09/13	2/5 (40%)
Vulnerable Subjects - Research Involving Workers/Employees	01/11/13	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	01/11/13	4/5 (80%)
Kenya Medical Research Institute	01/08/13	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be

1/11/2013 6:46 PM

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Appendix 6: Ministry of Health approval

MINISTRY OF HEALTH
OFFICE OF THE DIRECTOR OF MEDICAL SERVICES

Telegrams: "MINHEALTH". Nairobi
Telephone: Nairobi 2717077
Fax: 2713234
When replying please quote

AFYA HOUSE
CATHEDRAL ROAD
P.O. Box 30016
NAIROBI

Ref. MMS/ADM/1/1/21

4th July, 2013

Florence Nkirote Kinoti
P.O. Box 503
Meru Central

MEDICAL OFFICER IN-CHARGE
NGONG SUB-DISTRICT HOSPITAL
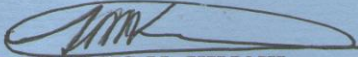P.O. Box 99, NGONG HILLS 00208
ngongsdh@gmail.com
received ... 13

RE: PERMISSION TO COLLECT DATA FROM HEALTH FACILITIES

The office is in receipt of your letter dated 2nd July 2013 on above subject.

I take note that the study intends to determine factors that are associated with infant feeding practice and the nutritional status of infants aged 6 – 24 months.

Permission is hereby granted to collect date from Ongata Rongai Health Centre, Ngong Sub-District Hospital and Olo-Osirkon Health Centres all in Kajiado North Districts.   Ensure that at all times patients confidentiality is maintained.

By a copy of this letter, the Medical Superintendent Ngong Sub-Disrict Hospital and Officers In-charges Ongata Rongai and Olo-Osirkon Health Centres provide the necessary assistance and support.

DR FRANCIS M. KIMANI
DIRECTOR OF MEDICAL SERVICES

Copy to: County Director of Health – Kajiado County
               Medical Superintendent – Ngong Superintendent
               Officer-In-Charge – Ongata Rongai – Olo-Osirkon Health Centres

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Appendix 7: Publication

F. N. Kinoti, BSc, Jomo KenyattaUniversity of Agriculture and Technology, P. O. Box 62000-00200, Nairobi, Kenya, C. Mutai, BSc, MSc, Department of Medical Laboratory Sciences, Masinde Muliro University, P. Wanzala, BSc, MSc, PhD, Centre for Public Health Research, Kenya Medical Research Institute, P. O. Box 20752-00202 and S. M. Karanja, BSc, MSc, PhD, Professor, College of Health Sciences, Jomo Kenyatta University of Agriculture and Technology, P.O. Box 62000-00200 Nairobi, Kenya

Request for reprints to: F. N. Kinoti, Jomo KenyattaUniversity of Agriculture and Technology, P. O. Box 62000-00200, Nairobi, Kenya

FACTORS ASSOCIATED WITH INFANT FEEDING PRACTICES AND NUTRITIONAL STATUS AMONG CHILDREN AGED 6-24 MONTHS ATTENDING CHILD WELFARE CLINICS IN KAJIADO SUB-COUNTY

F. N. KINOTI, C. MUTAI, P. WANZALA and S. M. KARANJA

ABSTRACT

Objective: To determine knowledge and practices on infant feeding, socio-demographic factors that influence choice of infant feeding method and nutritional status of children aged 6 to 24 months attending Mother Child Health Clinics (MCH) in Kajiado North Sub-county.

Design: A hospital based cross-sectional study.

Setting: Three public health facilities: Ngong sub-district hospital, Ongata Rongai and Olo-sirkon health centres in Kajiado North Sub-county.

Subjects: Three hundred and fifty mother-child pairs as participants.

Results: All mothers were of reproductive age, mean age was 25 years (95%= 25+-5.03) and 92.6% were married. A high proportion of mothers 94.3% and of their spouses 88.9% had attended formal education at varying levels. Out of the 350 children in the study, 56.3% were males while 43.7% were females, 84.5% of all children being one year and below. Majority of mothers 68.6% had knowledge on infant feeding practices, mainly obtaining information from health workers. Only 38.8% of mothers had complete correct information on both breast and complementary feeding. All children were breastfed at one point in their life, 55.1%, immediately after birth, not all children were exclusively breastfed for the first six months or for a total of two years as recommended. Main reasons for early termination of breastfeeding were, voluntary refusal by the child to breastfeed or feeding on complementary food. Stunting level among the children was 26.5%, underweight level was 11.1% and no child was wasted. There was a significant association between marital status, children age group and stunting using ordinal regression.

Conclusion: The study showed a knowledge gap on infant complementary feeding in area of quality and quantity of food. There is need for further interventions and more education regarding infant feding practices.

INTRODUCTION

Optimal infant and young child feeding involve mothers being empowered to initiate breastfeeding within one hour of birth, breastfeed exclusively for the first six months and continue breastfeeding for two years or more, accompanied by sufficient quantities of nutritionally adequate, safe and appropriate solid, semi-solid and soft foods starting in the sixth month. Such optimal feeding practices ensure good nutritional status and protects against illnesses (1).

Poor breastfeeding and complementary feeding practices have been documented especially in developing countries as major cause of malnutrition especially in children. Under nutrition is the underlying cause of 3.8 million deaths among, 35% of disease burden among under five and accounts for 11% of all adjusted life years globally (2).

The choice of an infant feeding method is a big challenge that's not well understood. In all societies women make decision on infant feeding, regardless of the method of infant feeding. Numerous factors affect mother's choice of infant feeding options, including socioeconomic status, cultural beliefs, level

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of social support, level of education, maternal work demands, maternal age, range of care interventions provided during pregnancy, childbirth and the early postpartum period, family pressures and commercial advertising (3,4). Biological factors including infant size, sex, development, interest/desire, growth rate, appetite, physical activity, and maternal lactation capacity may also influence the decision about the type of feeding for infant, supplementation, and determine the need and timing of complementary feeding too (3,4).

Only 37% of infants are exclusively breastfed for six months globally (5) and 61% in Kenya (6), demonstrating high levels of inappropriate feeding practices. As a result, substantial levels of malnutrition and poor child health and survival have been documented. Globally, 25% of children are stunted, 17% underweight and 8% wasted (7) while in Kenya,26% are stunted, 11% underweight and 4% are wasted (6). This study obtained information on knowledge and practices on infant feeding, socio-demographic factors that influence choice of infant feeding methods and nutritional status of children. The information obtained can be used by policy makers and implementers for further interventions

MATERIALS AND METHODS

Study design: Study design was a hospital based descriptive cross-sectional study that followed a quantitative approach. A questionnaire was the main data collection tool. A weighing scale and a stadiometer were used to take anthropometric measurement from children.

Study population: The target population was mother-child pairs, children of both sexes visiting, Mother Child Health clinics in three health facilities: Ngong sub-ditrict hospital, Ongata Rongai and Olo-sirkon Health Centres. Inclusion criteria for participation were; mother-child (6-24 months pair, mothers 18 years and above who consented or below 18 years, but were accompanied by their parent to give consent.The exclusion criteria were; mother-child (<6->24months) pair, mother-child (6-24 months) with more than one child, mothers who never gave consent and mothers less than 18 years, not accompanied by their parent since their were not of legal age of giving a consent. Approval to carry out the study was obtained from Scientific Steering Committee, Ethics and Research Committee of Kenya Medical Research Institute and Ministry of Health.

Data analysis: SPSS and EPI-INFO were used for data analysis. Descriptive statistics described measures of location (mean, median, and mode) and spread (range). Chi-square test was used to test the strength of association between dependent and independent

variables. Odds ratio (OR) and 95% CI were used to estimate the strength of association between independent and dependent variables. The threshold for statistical significance was set at $p<0.05$. Ordinal regression determined predictors at multivariate level.

RESULTS

Socio-demographics: Most (65.1%) of the children were aged 6-9 months, male children (56.3%) were at a higher proportion than female (43.7%). About half of the mothers (50.9%) were within the age range of 20-25 years (mean maternal age = 25 years, SD = 5.03) and most (92.6%) were married.
Most (94.3%) of all mothers were literate as well as their spouses' where (96.6%) were literate.Majority (62.0%) of the mothers were housewives while their spouses were in formalemployment.

Knowledge on Infant feeding practice: Mothers were asked if they had information on infant feeding practice, a high proportion (68.6%) of them had knowledge on infant feeding practice, Most (82.5%) obtained information on breast and complementary feding from health workers, (8.8%) from mother/in-law, (4.6%) friends and neighbours, (3.8%) books and internet while (0.04%) observed the employer. Quality and quantity of information was sought by asking them the kind of information they had, (44.2%) of mothers had correct information on breastfeeding and (33.4%) on complementary feeding. As a whole only (38.8%) of mothers had correct and complete information on both breast and complementary feeding.

Breast feeding practice: All children were breastfed at one point in their life though (21.6%) of them were not exclusively breastfed for six months.In majority of children, (82.0%) breastfeeding was iniated in their first hour of life. Only (6.6%) of children were not being breastfed during the time of study, (43.3%) stopped at an age below twelve months and (56.3%) at twelve months and above. Reasons given by mothers for early termination of breastfeeding were; a third (30.4%) cited voluntary refusal by the child to breast feed, (21.7%) cited refusal by the child to feed on complementary food, (43.4%) cited medical related condition like pregnancy, HIV, family planning methods and breast soreness, (4.3%) cited lack of milk from the mother and (4.3%) cited work

Complementary feeding practice: Majority (96.0%) of children, were on complementary feeding during the interview. In a quarter (26.8%), complementary feeding was initiated at an age below six months and (62.8%) at six months. On onset of weaning porridge was the major food used in majority (65.7%)

of children.

Nutritional status: Stunting was found in (26.5%) of children, underweight in (11.1%), no child was found wasted.

Bivariate statistics: Association between knowledge, practices and socio-demographic factors. Married mothers were 1.093 (OR, 95% CI 0.445-2.686) times more likely to be knowledgeable than single mothers. Mothers who had male children were 1.311 (OR, CI 0.817-2.103) times likely to be more knowledgeable than mothers who had female children. Mothers level of education (X^2=4.7, p<0.05), occupation (X^2=12.089, p<0.05) were statistically associated with having knowledge . Age (X2=10.187, p>0.05), Marital status (X^2=0.37, p>0.05), child gender (X^2=1.265, p>0.05) and children age distribution ((X^2=5.283, p>0.05) were not significantly associated with knowledge. Spouse level of education (X^2=8.340, p>0.05), occupation (X2=1.878, p>0.05) and major source of income (X^2=1.362, p>0.05) were not significantly associated with complete information. Married mothers were 0.711 (OR, CI 0.161-3.140) likely to practice exclusive breastfeeding compared single mothers. It was also found out that mothers who had male children were 1.171 (OR, CI 0.587-2.338) times more likely to practice exclusive breastfeeding than mothers who had female children. Age (X^2=3.948, p>0.05), marital status (X2=0.102, p>0.05), children gender (X2=0.334, P>0.05) and children age distribution (X2=4.368, p>0.498) were not significantly associated with feeding practice. There was no statistically significant association between education level (X^2=0.420, p>0.05), Spouse level of education (X^2=2.020, p>0.05), mothers occupation (X^2=4.244, p>0.05), spouse occupation (X^2=3.653, p>0.455) and major source of income (X^2=1.142, p>0.05) with feeding practice

Association between knowledge, practices and nutritional status of infants aged 6 to 24 months attending child welfare clinicIt was found that mothers whose children had normal weight for height were 0.582 (OR, CI 0.2771-1.220) times less likely to be knowledgable compared to mothers whose children had high weight for height. Stunting (X2=1.953, p>0.744), Wasting (X2=3.361, P>0.05), Weight for height (X2=2.091, p>0.05) were not statistically associated with knowledge . Stunting (X2=3.142, P>0.05), Wasting (X2=4.609, P>0.05), weight for height (X2=0.402, P>0.05) were not significantly associated with practices

Association between socio demographics characteristics and stunting: Marital status (X2=26.716, P<0.05), children age distribution (X2=53.733, P<0.05) and children gender (X2=10.253, P<0.05) were significantly associated with stunting. Spouse level of education (X^2=44.500, P<0.05), Mothers occupation (X^2=38.556,

P<0.05), Spouse occupation (X^2=29.505, P<0.05) and major source of income (X^2=23.059, P<0.05) were significantly associated with stunting. Mothers level of education (X^2=12.762, P>0.05), mother's age (X^2=17.246, P>0.05) were not statistically associated with stunting.

Association between Socio demographics characteristics and wasting: Child's age (X^2=0.018, P<0.05) and spouse level of education (X^2=41.404, P<0.05) were significantly associated with wasting. Mother's age (X2=10.194, P>0.05), marital status (X^2=2.960, P>0.05), child's gender (X2=35.328, P>0.05) were not significantly associated with wasting. Mothers level of education (X2=8.246, P>0.05), Mothers occupation (X^2=23.913, P>0.05) spouse occupation (X^2=19.071, P>0.05) and major source of income (X^2=19.588, P>0.05) were not significantly associated with wasting

Multivariate analysis: The significant factors from bivariate analysis (with p<0.05) were subjected to multivariate analysis (Ordinal regression) to determine the final independent factors that were associated with dependent factors. There was a significant relationship between marital status (p<0.015) and stunting , infant age groups, 6-9 months (p<0.008) and 10-12 months (p<0.017) were statistically associated with stunting. There was significant relationship between infant's age groups; 6-9 months (p<0.005), 10-12 months (p<0.008), 13-15 months (p<0.008) and wasting (p<0.05).

DISCUSSION

Majority of the children, (84.5%) were below one year. This contrasted a similar study in Nepal[8] which indicated that age was evenly distributed in all age groups.

A high proportion of mothers (68.6%) reported having information on feeding practices but on further determination of quality and quantity of information they had, only (38.8%) of them had complete correct information on exclusive breastfeeding for six months, continous breastfeeding for atleast two years as well as introducing complementary feeding at six months and type of food to wean with. Majority (82.5%) of the mothers reported the source of knowledge on feeding practices to be from health workers, (8.8%) mother/in-law, (6%) friend and neighbors, (3.8%) internet and books and (0.4%) observed the employer. Majority had knowledge on breast feeding and when to introduce complementary foods. Only few had information on suitable type and quantity of complementary foods. to wean, showing a gap when it comes to knowledge on dietary diversity and accepted meal frequency. Earlier studies documented similar findings (10,11) The findings of the study indicated that all children were breastfed at one point of their life. This was

in agreement with a similar study in Ghana (12) and slightly higher than KDHS 2014-2015 finding, (99.6%) of children are breastfed at one point of their life (6). A high proportion (82.0%) of children were breastfed within first hour of birth; (55.1%) breastfed immediately, (26.9%) within one hour.A previous study in Nairobi revealed that (75%) of mothers initiated breastfeeding within one hour of birth (13) .This proportion was higher than UNICEF finding where (39%) of infants in developing world are breast fed within one (14). This positive result on breastfeeding could have been contributed by most mothers delivering term babies in health facilities through normal delivery. An earlier study had indicated that caesarean deliveries were associated with delay in timely initiation of breastfeeding (15). Majority (93.4%) of children were still breastfeeding at the time of interview.This was slightly lower compared to a similar study in South Africa[16] in which (97%) of children were still breastfeeding at the time of study. The reasons given for early termination were, refusal by the child to breastfeed and maternal illness (sore breast, HIV mothers, drugs used for family planning or other illness), this was in agreement with a previous study in Nairobi (13). Majority (74.0%) of children had been exclusively breastfed for six months, a figure higher than the national rate of (61%)(6) and the global one of (37%) (5). This may be due to the fact that in the the rate of exclusive breast feeding has been on the rise in kenya, from (13.2%) in 2003 [28] to (32%) in 2009 (17) and recently to (61%) in 2014[6]. However, the number has not yet reached the WHO goal of 90% (18).

About(96.0%)of children were on complementary food during study time. For (10%) of the children, complementary foods were introduced at above six months, for (26.0%) the food was introduced before six months and for (60%) at six months. WHO guidelines on complementary feeding, state that all infants should start receiving complementary foods in addition to breast milk from 6 months onwards [19]. The findings were similar to KDHS 2014 (6) where (26.9%) of children are introduced complementary foods before six months.

Majority of children(70.6%) had normal weight for height, (26.5%) were stunted with (9.4%) and (17.1%) being severely and moderately stunted, respectively. This finding was similar to the current KDHS survey that reported (26.0%) of children to be stunted (6). However, (2.9%) had a high weight for height.

The prevalence of being underweight among children (weight for age) was (11.1%), with (3.7%) and (7.4%) being severely and moderately underweight, respectively. The finding was similar to current KDHS report, which shows (11%) of children are underweight(6). According to UNICEF, WHO-World Bank joint report, Africa experienced a slight decrease

in the underweight prevalence among children, from (23%) in 1990 to (17%) in 2013 (7).

Additionally, (5.4%) were overweight with (4%) and (1.4%) being overweight and obese, respectively. Poor feeding practices lead to overweight and obesity too, which has serious health consequences. This result confirms the, global prevalence of overweight trend is on the rise in all regions from a burden of 32 million in 2000 to 42 million in 2013 (7).

No child was found to be wasted (low weight for height) but (9.4%) had high weight for height. This is in contrast to the national wasting prevalence among children reported by KDHS 2014 that indicate only (4%) of children in Kenya are wasted[6] . A joint report by UNICEF, WHO-World Bank reported that only (8%) of children in the world are wasted with a third in Africa (7), showing that the prevalence of wasting is low compared to that of stunting and underweight

Married mothers were 1.09 times more likely to be knowledgeable on infant feeding practices than single mothers and mothers with male children were 1.13 times more knowledgeable on infant feeding practices than those with female children. Mothers' level of education and occupation was statistically associated with having complete information on infant feeding practice (P<0.05) at bivariate level. There was no statistical significance between marital status and feeding practice (p>0.05). Married mothers were 0.7 times likely to practice exclusive breast feeding compared to single mothers. Other studies have documented similar results that married women exclusively breastfeed their infants more than single women (20,21).

There was no statistical significance between feeding practice and stunting, wasting and being underweight (p>0.05) at bivariate level. This contrasted with several studies (13,22,23,24) which demonstrated a statistical significance.

A statistical significant was found between marital status, children age distribution and gender, mother's and spouse's occupation, spouse's level of education and major source of income and stunting(p<0.05). In the KDHS 2008-2009 survey, it was reported that stunting was least common among children of more educated mothers and those from wealthier families (6). A study in Alexandria associated stunting with age and mother's level of education, where stunting rapidly increased with age and children of non-educated mothers had a significant risk, 2.31 times more of being stunted than of mothers of high education level (25).

Infant age and spouse's level of education were significantly associated with wasting (p<0.05) at bivariate level and further analysis identified infant age as a predictor of wasting at multivariate level. In contrast a study in India, showed that all socio-demographic factors were not associated with wasting

(p>0.10). In Kwale, it was reported that occupation of household heads and mothers appeared to be a major factor influencing level of wasting (p<0.05) (22,26).

No statistically significant association was found between all the socio-demographic factors and underweight (p>0.05) (26,27).

In conclusion, breastfeeding was universal, though, not all were exclusively breastfed for six months or were breastfed for a period of two years as per the WHO and UNICEF guidelines demonstrating mixed feeding practice which is unacceptable. Breastfeeding initiation was impressive, 55.1% of children were breastfed immediately after birth and 82.0% in the first hour of delivery though not yet the UNICEF target value of 90%.

Most of the mothers had knowledge on exclusive breastfeeding and when to introduce complementary feeding but knowledge on quantity, quality and types of food to complement with was limited, demonstrating a knowledge gap on complementary feeding.

Children age was not evenly distributed, majority being of immunisable age, that is nine months and below, showing most mothers take their children to MCH for immunisation, therefore demonstrating awareness gap on growth monitoring and nutritional counseling in this society.

About a quarter 26.5% of the children were stunted, 2.9% had a high weight for height; 11% were underweight and 4.4% were overweight. No child was wasted.

Breast feeding and complementary feeding practices had no significant effect on nutritional status; marital status and child age group were found to be predictors of stunting, similarly child age was a wasting predictor.

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