INFLUENCE OF MATERNAL NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICES ON NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS AT KENYATTA NATIONAL HOSPITAL, KENYA

BY: OBONYO KEVIN OMONDI

(BA: Political Science and Sociology)

A56/86406/2016

omondikevin87@yahoo.com

0723800809

A dissertation submitted in partial fulfillment of the requirement for the award of the Degree of Master of Science in Applied Human Nutrition of the University of Nairobi, Department of Food Science, Nutrition and Technology

DECLARATION

I, Kevin Omondi Obonyo hereby declare that the work contained in this dissertation is my original work and to my knowledge it has not been submitted to any other institution of higher learning.

Obonyo Kevin Omondi

Signature_____ Date _____

This dissertation has been submitted with our approval as University Supervisors:

Prof. Wambui Kogi-Makau

Signature_____ Date _____

Department of Food Science, Nutrition and Technology

University of Nairobi

Dr. Sophia Ngala

Signature_____ Date _____

Department of Food Science, Nutrition and Technology

University of Nairobi

UNIVERSITY OF NAIROBI

PLAGIARISM DECLARATION

Name of Student: OBONYO KEVIN OMONDI

Registration Number: A56/86406/2016

College: COLLEGE OF AGRICULTURE AND VETERINARY SCIENCES

Faculty/School/Institute: AGRICULTURE

Department: FOOD SCIENCE, NUTRITION AND TECHNOLOGY

Course Name: MASTER OF SCIENCE IN APPLIED HUMAN NUTRITION

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DEDICATION

I specially dedicate this work and my success to my loving and supportive wife, Dorcas Omondi through whose motivation and assurance this has been achieved.

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LIST OF ACRONYMS AND ABREVIATIONS

BMI	Body Mass Index
FFQ	Food Frequency Questionnaire
HAZ	Height for Age-Z score
HWZ	Height for Weight-Z score
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
KAP	Knowledge, Attitude and Practice
KNH	Kenyatta National Hospital
MoH	Ministry of Health
MDG	Millennium Development Goal
NGO	Non Governmental Organization
SES	Socio Economic Income
SD	Standard Deviation
UNICEF	United Nations Children's Fund
WAZ	Weight for Age (WAZ)
WFP	World Food Program
WHO	World Health Organization
ENA	Emergency Nutrition Evaluation
PASW	Predictive Analytical Software
SMART	Specific Measurable Attainable Realistic Timely
SPSS	Statistical Package for Social Science
DDS	Dietary Diversity Score

OPERATIONAL DEFINITIONS

Nutrition Attitude Refers to the way mothers feel and think about maternal nutrition and their opinion about providing nutrition care to their children

Anthropometry It refers to the study and technique of taking body measurements, especially for use on comparison or classification basis. It also refers to the measurement of the human individual for the purposes of understanding human physical variation.

Breast-feeding The child receives milk direct from the breast or after expression

Childcare Practices For this study refers to the practices of caregivers which translate to food and nutritional security and health care resources into a child's growth and development.

Complementary food Foods given to a child in addition to breast milk usually introduced between 4-6 months of age.

Food frequency In this study, food frequency will be used to assess individual dietary intake of foods and nutrients.

Knowledge Refers to verbalized or demonstrated ability to reproduce from memory facts and principles

Maternal nutrition Refers to the nutritional needs of women during the antenatal and postnatal period (i.e., when they are pregnant and breastfeeding) and also may refer to the pre-conceptual period (i.e., adolescence).

Malnutrition In this study malnutrition is defined using anthropometric indicators of height for- age, weight- for- age and weight- for- height Z scores. Moderate malnutrition will defined using the cut

	off points of less than minus 2 Z scores while severe malnutrition was defined using cut off points of less than minus 3Z scores.
Nutrition Status	Refers to whether or not the child is underweight, stunted or wasted.
Nutrition knowledge	Defined as the understanding of different types of food and how food nourishes the body and influences health.
Practice	Refers to the actual application of knowledge and skills in maternal nutrition by the nurses in their day-to-day work
Underweight	Refers to having low weight for age mainly due to chronic under nutrition or acute malnutrition (WAZ)
Wasting	Refers to having low weight for height according to WHO standard with a <-2 SD mainly due to acute malnutrition (WHZ)
Z score-SD	The deviation of anthropometric value(s) for an individual child from the median value of the reference population (WHO) divided by the standard deviation of the reference population.

ABSTRACT

According to UNICEF and WHO nutrition is a universal, crucial component that is recognized globally for the child to have a better health standard as stated in convention child's rights. Thus, women additionally have a right to access nutrition, decide on how appropriate to feed their babies on fulfilling information and better condition that will give them an opportunity to carry on with their decisions. In Kenya inadequate empirical evidence exists on the relationship between maternal nutrition knowledge, attitude, practices and nutritional status of children, it remains unclear whether mother's practical knowledge and attitude has an independent effect on child nutritional status. Furthermore the factors that influence translation of acquired knowledge into practice are not well understood. It is this problem that this study attempts to address.

This was cross-sectional and comparative study. It was both quantitative and qualitative in nature. Ten wards out of ten in pediatric department were selected using exhaustive simple random sampling, while systematic random sampling method was used at the ward level to enroll mother-child dyad into the study. The data were collected at Kenyatta National Hospital 146 mother-child pairs. A pretested questionnaire designed to collect data on mother's maternal nutrition knowledge, attitude, practices and dietary diversity score related to child care and nutrition was administered to the mothers. Data on mother's demographic and socio-economic income characteristics as well as child anthropometric data were collected.

Majority (52%) of the study population were not employed and had no any source of income, while (8.5%) had no formal education. Literacy levels was low among the caregivers with most (56.8%) not able to proceed with their education due to finances. Majority of mothers (55%) had more than three children compared to (45%) of mothers who had less than four children.

The mean dietary diversity score of the children was 4.07±1.1 food groups. Majority (61.6%) of the children had high dietary diversity scores. Most of the caregivers (68.5%) had adequate nutritional knowledge while 31.5% had inadequate knowledge. The qualitative discussion revealed that inadequate house hold income and lack of enough food were major constraints to availability and utilization of complementary foods for their children. The mean maternal nutrition knowledge score of mothers was 9.46±2.26. From the respondents 31.5% had appropriate nutrition practices while 68.5% had inappropriate attitude with a mean score 2.99±1.72. In conclusion, factors that are significantly associated with the nutritional status of children include; age of child (p=0.000), number of children (p=0.002), education level (0.049), nutrition attitude (p=0.031), dietary diversity scores (p=0.031), nutritional practices (p=0.006). The study recommends intensive nutrition counseling and follow-up on mother's nutrition practices through capacity building in health facilities by creating awareness on the effect of poor dietary practices and negative attitude on children's nutrition status and associated health risks to improve nutrition positive attitude and appropriate dietary.

CHAPTER ONE: INTRODUCTION

1.1Background Information

The child's rights convention illustrates that every child and infant has a right to proper nutrition (UN General Assembly, 1989). Based on the global strategy every young child and infant feeding is always strategized on the facilitation of human rights fulfillment and protection. Nutrition is a universal, crucial component that is recognized globally for the child to have a better health standard as stated on convention child's rights. Thus, women additionally have a right to access nutrition, choose how suitable to feed their babies on fulfilling information and better condition that will give them an opportunity to carry on with their decisions. In many environments these rights have not been realized (Wainaina C.W et al., 2018).

The free maternal system has been given under many local, regional and global mandates. The Constitution of Kenya 2010 article 43(1) (a) states that: Each individual has the privilege to the best health standard of wellbeing, which incorporates the privilege to medical service, including reproductive health services. Reproductive health has been generally perceived to incorporate family planning, postnatal, delivery, and antenatal health services (Ministry of Health Kenya, 2013). The 2010 constitution additionally states the privilege to emergency treatment article 43, national pride, nobility regarded ensured on article 28, and privilege to get relevant information on article 35. The Kenya National Patients' Rights Charter (2013) outlines the privilege to good health provisions, the privilege to be handled with dignity and honorability, the privilege to complain, access information, and among others (World Health Organization. and UNICEF.,2003).

Globally 156 million young children less than 5 years were assessed to be stunted, 50 million were also found to be wasted, and 42 million were overweight in 2015 (WHO, 2016).

Malnutrition is defined by World Health Organization as the imbalances or excess, deficiencies of an individual's intake of nutrition and energy (Marriott *et al.*, 2012). The WHO Overall Database on child development and malnutrition health uses a Z-score cut-off point of <-2 SD to classify low weight for age, low height for age and low weight for height as moderate undernutrition, and <-3 SD to portray extreme undernutrition. The cut-off point greater than +2 SD portrays weight for height that is high for children who are overweight (WHO, 2010).

Sub-Saharan Africa has the following most shocking number of nutrition stunting of young children, with 41% in Eastern and Southern Africa and 35%t in West and Central Africa; the estimate of children who are wasted is in Western and Central Africa at 10%, in the middle east and northern Africa is at 8 percent and the Eastern and Southern Africa stands at 17%. Similarly as with underweight, the Central and Eastern Europe and the Common Wealth of Independent States and Latin America or Caribbean regions shows the lowest prevalence of stunting, 14%, and 16% and wasting at 3% and 2%(UNICEF, 2006).

The growth and health of children has been greatly affected by malnutrition to an extent that even the society is not able to achieve desired developments. The children have suffered from infectious diseases and even losing life as a result of common childhood ailments and respiratory infections (UNICEF, 2006). Nutrition has been the pillar for survival, wellbeing and life achievements for the present generation. Women who are on better nutrition tend to experience no challenge in time of pregnancy, childbirth, and their infants are likely to have good growth and development. Children who are well fed have the capacity to do well in education, become nourished grown up and capable of doing the same to their children to have a good future in life (UNICEF, 2006).

1.2 Problem Statement

Six and a half million Children under five years die yearly due to malnutrition. Because children have not been well fed that is supposed to take place in their early life. Studies show that 35 percent of newborn globally in the beginning of 4 months are being breastfed exclusively this is because complimentary feeding starts late or early and the infants food is limited and not nutritious. Poor feeding practices has been an hindrance for children who can survive sicknesses and impaired development, this has also been a setback to socioeconomic development, because increase incidences of child malnutrition is alarming (Boor. FK, et al, 2018).

Child malnutrition is now commonly recognized as problematic in under-developing countries in Africa resulting in high rates of child mortality1,2,3,4.This is mainly attributed to the high rates of nutrition knowledge deficiency, negative attitude and inappropriate practices on health dietary practices of the children (Kujinga. P, et al., 2018).

In Kenya inadequate empirical evidence exists on the relationship between maternal nutrition knowledge, attitude, practices and nutritional status of children, it remains unclear whether mother's practical knowledge and attitude has an independent effect on child nutritional status. Furthermore the factors that influence translation of acquired knowledge into practice are not well understood. It is this knowledge gap that this study attempts to address (Ugwa, 2016).

1.3 Justification

At a global level, the SDGs system ought to be a key component of an empowering structure for nutrition. Notwithstanding proof demonstrating that improved nutrition is a key element for sustainable development. Malnutrition affects young children physically, socially and even psychologically. It interferes with their education and even their work performance at a later stage. No place is this more evident than in Kenya. We require the solution for this cycle, and it is urgent that we address it and set our objectives in life (Boor. FK, et al, 2018).

Health and nutrition are vital elements for the developing countries. There is big difference between developing world and developed world when it comes to nutrition; developed world is experiencing overnutrition while underdeveloped world is experiencing undernutrition. The maternal nutrition knowledge and nutrition status of children is essential particularly amid lactation period. Notwithstanding health and nutrition, variables, for example, maternal age, the quality of nutrition is of serious concern (Allin, S. and Stabile, M., 2012)

Data obtained from the study and the recommendation will be shared to the health center, policy makers and fellow researchers. The hospital staff will be enlightened on current maternal nutrition knowledge, attitude and practice with reference to what they offer to lactating mothers. Through the health center, parents and families of children will be informed of factors that contribute to the nutritional status of their children and how they can deal with the factors to ensure the children are well nourished. From the study findings, policy makers in the public health sector will be able to plan for maternal education awareness with knowledge of what is being currently offered versus the expected hence be able to fill the gap. The study will also contribute to the knowledge base on public health programs in the country; the findings can be used to advocate for better planning of the health centers in the country.

1.4 Aim of Study

The aim of the study is to contribute towards better understanding of the contribution made by maternal nutrition knowledge, attitude and practices of mothers towards nutritional status of their children below five years at Kenyatta National Hospital, Nairobi County.

1.5 Purpose of the Study

To generate data on the role of maternal nutrition knowledge, attitude and practices on nutritional status of children 6-59 months at Kenyatta National Hospital, Kenya

1.6 Objectives of the study

1.6.1 Main Objective

To determine the association between maternal nutrition knowledge, attitude, practices, socio-economic income and other social demographic factors that influence the nutritional status of children under-five years at Kenyatta National Hospital.

1.6.2 Specific Objectives

1. To determine socio-demographic characteristics and socio-economic income of mothers at Kenyatta National Hospital
2. To determine the maternal nutrition knowledge, attitude and practices of mothers at Kenyatta National Hospital
3. To determine dietary diversity score of children 6-59 months at Kenyatta National Hospital
4. To determine the nutritional status of children 6-59 months at Kenyatta National Hospital, Nairobi County

1.7 Null Hypotheses

The hypotheses to be tested by the study are:

1. There is no significant relationship between socio-demographic characteristics and children's nutritional status.

2. There is no significant relationship between maternal nutrition knowledge, attitude, practices, and nutritional status of children 6-59 months.

3. There is no significant relationship between dietary diversity score and children's nutritional status.

4. There is no significant association of socio-economic income, socio-demographic characteristics, maternal nutrition knowledge, attitude and practices on nutritional status of children 6-59 months at Kenyatta National Hospital, Nairobi County.

CHAPTER TWO: LITERATURE REVIEW

2.1 Maternal Nutrition Knowledge

Research shows there is a solid linkage between maternal nutrition knowledge and child care. Women who are well educated experience limited challenges when it comes to the health status of their children. They are well advance with types of illnesses that their children may experience hence capable of containing the situation. Maternal nutrition knowledge has been related with nutrition status among children in different settings including Jamaica (Handa, 1999); Bolivia(Frost, Forste and Haas, 2005); and Kenya (Kabubo-Mariara, Ndenge and Mwabu, 2009). However there is limited information on the strategy that link women's education and the health of the child which has not yet been understood well (Abuya *et al.*, 2011). According to Glewwe (1999) there are three links that affects child's health. They include; the very basic education of the mother is likely to transfer the knowledge about child health to future mothers. Secondly women have been able to recognize different types of illnesses that can affect or affect their children through the skills and literacy that they have acquired in education system; hence they are able to seek treatment for their children. Thirdly the more the women spend time in education the more they are well acquainted with knowledge of malnutrition that can affect their children (Abuya *et al.*, 2011). Different investigations have discovered a solid connection between maternal nutrition knowledge, social financial status and children nutrition status. This is on the grounds that informed women will probably get steadier, higher paying employments; to get married to men with advanced education and higher pay; and to live in better neighborhoods, which have an impact on child nutrition health and survival (Frost, Forste and Haas, 2005). Studies have additionally discovered a relationship between maternal nutrition education and maternal depression, while maternal depression has been related with poor health status of the

child, including poor nutrition status (Lorant *et al.*, 2003). Against this background, this investigation concentrates on Kenyatta National Hospital in Nairobi, Kenya, a nation that still registers a generally high child death rate in Africa (Kitui, Lewis and Davey, 2013). Advance towards the previous 2015 MDGs targets was slower than expected, the motivation behind why there is requirement for additionally research into ways in which maternal knowledge have an impact on the health status of children. The motivation behind this research is to better comprehend components that impact poor health and nutrition results at Kenyatta National Hospital facility in Nairobi Region, Kenya. I try to answer the inquiry: Does mother's nutrition knowledge influence children nutrition status with regards to poverty in urban?

2.2 Socio-Economic Status

The most ordinarily inquired about connections between mothers' knowledge and children's wellbeing is financial status. The relationship with young children mortality and health to a great extent has been clarified by the connection between education accomplishment and an expanded capacity to purchase merchandise and services connected with health status (Li and Defo, 1997). Education has a reasonable association with wage. Women with more education will probably get the best, steadier occupation that pays in cash as opposed to any other so that they would more be able to reliably increase household financial income (Barrett *et al.*, 1996). Besides, learned women will probably wed spouses with more prominent educational knowledge accomplishment and higher paying employments (Cleland, 2014).

The impact of financial status on health status is additionally genuinely and clear. More increased amounts of salary are corresponded with better housing conditions; in this manner, family has lavatory in their houses, piped water, and electricity for the most part have improved the hygiene and sanitation within the family with such enhancements (Barrett *et al.*, 1996).

Moreover, more cash can be allocated for quality food, garments, medicine, also human health provisions benefits that can specifically influencing the health of the children (Casapía *et al.*, 2007). The research proof, along these lines, shows that financial status impacts children's health status (Ahmad, Lopez and Inoue, 2000). Comparative research have discovered that fathers occupation is emphatically connected with neonatal, newborn child, child mortality, and farming employments with most astounding childhood mortality prevalence and expert/salaried laborers the least (Boerma, Sommerfelt and Bicego, 1992). Reduced prevalence of child mortality additionally is related with clean water, modern toilets, tile floors, and radio proprietorship (Ahmad, Lopez and Inoue, 2000). In summary, financial components have reliably clarified half or a greater amount of influence of maternal knowledge on child health conditions in earlier research (Alva and Inequality, 1998). We hence anticipate that financial status will be imperative pathway connecting maternal knowledge and child nutrition status.

2.3 Knowledge

The objective of formal education is impacting knowledge. Education ensures caregiver can find out the causation, aversion, acknowledgment, and cure of disease, and dietary needed to influence their health response and nutrition status (Caldwell, 1979; Li and Defo, 1997). Moreover, educated women have exposure and good comprehension of health information and suggestions through media communications or different channels (Cleland, 2014).

The connection between experience and children health infers that cognitive comprehension of health process straightforwardly influences practices concentrated on enhanced health. On the off chance that this is valid, acquired health information" should direct to more data assurance against contamination through enhanced cleanliness, lessened vulnerability to sickness by better nutrition, and enhanced recuperation from malady disease through more convincing household

and outer social health services" (Li and Defo, 1997). Investigations connecting formal learning, health information and child wellbeing status are compelled and the experimental connection between education and health situation is uncertain. Some investigation has discovered that increased knowledge is related with particular sorts of health knowledge, including the risks of unboiled water, significance of washing hands after toilet utilization, correct utilizing oral rehydration treatment of diarrhea, and a comprehension of viruses as a reason for infection (JT, AE and SO, 1991). In the past investigation findings of these elements was not generally predictive of health status. A few research have observed health knowledge as an intervening element between maternal knowledge and child wellbeing (The *et al.*, 2016); though others have discovered almost no relationship in education and knowledge health (Cleland, 2014)

2.4 Attitudes

Notwithstanding essential knowledge health, education likewise can impact attitude on health status creating a move far from customary faith and applications, prompting a receptivity to good ideas and applications, successive acknowledgment of logical clarifications of sickness and advanced medication (Barrett *et al.*, 1996; Li and Defo, 1997; Cleland, 2014). In this manner, if this precisely depicts the association between knowledge and attitudes of health, educated mothers are additionally accepting and embracing of current pharmaceutical, more inclined to utilize prevention health care provisions, and willing and able to go with their infants to a health center for medication, and cannot compromise the health situation of their children (Boerma, Sommerfelt and Bicego, 1992). Research discoveries in nutrition bolster attitude as connection between knowledge and child wellbeing status, inclusive of nutrition dietary status (Dominguez-Salas *et al.*, 2014). One investigation found that idealistic and ambitious mothers were effective in keeping up great nutrition dietary children status regardless of the environment. Interestingly,

children whose mothers have fatalistic outlook will probably experience the ill effects of lack of healthy nutrition (Cleland, Ginneken and Jo, 1988) reason that formal training and modernization are key segments creating the attitudinal move from capitulation to the inevitable to the feeling of control. Past disclosures, subsequently, recommend that a change in dispositions is another pathway through which maternal knowledge impacts child wellbeing status.

As a pointer of this disposition move, past research has found that informed ladies will probably look for modern health services (Barrett *et al.*, 1996; Alva and Inequality, 1998; Addai, 2000). Since the information do exclude attitudinal measures, we utilize measures of the use of advanced health system benefits as an intermediary attitude towards health care. Furthermore, ethnicity is likewise inspected as an element of attitude on health care. Researches in Guatemala showed less of indigenous population inclined to have confidence in current medical use, rather trusting sicknesses happened due to hot or cold irregular characteristics or bad spirits (Dardano et al., 1990). Related beliefs have likewise been realized among the indigenous population in Bolivia (Rodriguez et al., 1991). (Goldman et al., 1991), in a Guatemalan investigation of parental care and child vaccinations, concluded present day health services use varies enormously by ethnic and Spanish dialect capability, and in addition through financial status and availability. Hence we incorporate ethnic as a direct element of attitudes on health provision.

2.5 Women's Autonomy

Women education can likewise impact child wellbeing by expanding basic leadership of mothers inside the household. Mothers by and large are essential guardians in the household, dedicating time to protect and give care to the infant than fathers. Women, along these lines, are typically the first to perceive a child is unwell. Be that as it may, in numerous conventional societies uneducated women regularly don't act until the point that other customary authorities figures that

the child is unwell (Allin and Stabile, 2012). Expanded maternal knowledge influences customary balance of authority in family connections, giving knowledgeable mothers more command concerning the health of their children. Educated mothers feel that they are responsible and in charge of their children and will probably draw the attention regarding the disease, take an action to take their ailing children to a health center, as opposed to conceding choices to customary authority structures (Caldwell, 1979; JC and P, 1993).

The empirical validity validating autonomy as an element connecting maternal knowledge to child wellbeing is unexhausted by few researches exploring the subject. A research presumed that expansion in mother's monitor over household income is related to enhanced nutrition status of female newborn children (Allin and Stabile, 2012). An investigation showing that the survival of a mother's children is directly connected with her autonomy level is by (S, 1995). (Mason, 1986) connected education with maternal basic leadership autonomy and increased child survival. The more education knowledge a mother gets, the more probable she is to be the primary decision maker concerning her children's wellbeing. Consequently, past findings recommend that female autonomy is another pathway through which maternal education influence child health (Mason, 1986).

2.6 Reproductive Variable

Reproduction factors give another pathway between training and child wellbeing and past investigations have tried to connect maternal knowledge and regenerative practices to infant survival (Mason, 1986). With increased level of education, women will probably see reproduction as being within their immediate control. Additionally, choices with respect to the planning of births are perceptive, and regenerative conduct is checked to avert undesired

pregnancies. Past researches discovered a connection between cutting edge instruction and lower fertility, multiplication at low ages, and longer birth spacing (Cleland, 2014). These conceptive components are by and large associated with expanded infant survival. Large amounts of infant mortality are connected with both teenage bearing among adolescents and ladies beyond 35 years old (Casapía *et al.*, 2007). Barely, studies have researched about the impact of maternal age on child wellbeing status.

A similar report utilizing DHS information did not locate a steady example of malnutrition and maternal age (Boerma, Sommerfelt and Bicego, 1992); regardless, a present information giving an account of a Bolivian population discovered the stunting likelihood declines with maternal age (Frost, Forste and Haas, 2005). Birth spacing of under 2 years are connected with expanded child death rates (Curtis and Steelef, 1996). Children spaced at least two years intervals have a greater possibility of being all around cared for, being breastfed longer, and of being tall and heavy. Moreover, stunting is more typical in infants with earlier birth intervals of under 2 years than infants following longer birth spacing (Boerma, Sommerfelt and Bicego, 1992; Frost, Forste and Haas, 2005). Concerning first and high parity births are at more genuine risk of mortality than low births parity (Pebley, Goldman and Rodriguez, 1991). Moreover, initial research discoveries show that stunting increase as birth spacing builds (Forste and Haas, 2005).

The general help for regenerative components as a pathway connecting maternal training and child wellbeing is blended. (Cleland, 2014) contended that the impact of maternal training on infant mortality has little to do with moving conceptive conduct, though others contended for regenerative between maternal knowledge and infant survival (Mason, 1986). Based essentially in light of model suggested by (Mason, 1986) and (The *et al*., 2016) we can theorize and test

different pathways connecting mother training and child wellbeing. In particular, we demonstrate the effects of financial status, education, current attitudes on medical services, authority, and conceptive conduct as pathways connecting mothers' knowledge to infant nutrition. The linkage utilizes national information from Bolivia that was done keeping in mind the end goal to analyze these linkages within poverty settings. Furthermore, measures residence and area to control for health services accessibility.

2.7 Child Health

'The early childhood years give an imperative window of chance to build a solid establishment for future advancement' (Marriott *et al.*, 2012). Researches in neuroscience affirm that 'the first 5 years endure forever', and that the best mental health happens when children are watched over within a supporting relationship (The *et al.*, 2016). Further, the start of life is particularly imperative for some parts of good health and prosperity in later adulthood where early exposures and experiences effect on the formative direction, including health, cutting across life course (Black *et al.*, 2013). Most of past research on child health centers on maternal education as precursor to enhance child health. Support for this theory has originated from vast cross-national surveys led under the rubric of the World Fertility Surveys and the Demographic Health Surveys (Boerma, Sommerfelt and Bicego, 1992).

Virtually all studies in light of these two extensive informational indexes have indicated solid relationships between maternal knowledge and infant health survival. Given the nearby connection between education and other great financial status, scientists vary in their inclination to move past this correlation to contend that maternal education causes low child mortality. Despite the fact that a greater part of researchers working around this area unequivocally express that maternal education has a solid autonomous impact on child health survival. (JC and P, 1993;

Cleland, 2014), a minority are less certain about the causal idea of this relationship and advocate caution (Cleland, Ginneken and Jo, 1988). Health and nutrition education might be more powerful if focused toward mothers with young children.

2.8 Child Growth

Proper nutrition is vital for a newborn child's development and advancement. For 4–6 months the greater part of a baby's nutrition needs can be fulfilled through breastfeeding or milk formula, however as a child develops it builds up a requirement for a more diverse diet. Child development is globally perceived as a vital general public health indicator for observing nutrition status and health in population. Children who experience the ill effects of growth retardation because of terrible eating disorders or potentially repetitive infections have a tendency to have more regular episodes of serious diarrhea and are more vulnerable to a few irresistible illnesses, for example, malaria, meningitis, and pneumonia (Kibona *et al.*, 2016). Various investigations have shown the relationship between maximizing seriousness of anthropometric shortages and mortality, and significant commitment to child mortality of all degrees of malnutrition is presently broadly acknowledged (Pelletier and Frongillo, 1993). There is solid confirmation that impaired child development is related to delayed cognitive improvement, performing bad at school, and decreased intellectual limit (Onis and Blössner, 2003).

A baby is physiologically ready to begin feeding when temperature, respiration, and heart rate are within normal limits. If respiration is unlabored, if active bowel sounds can be noted as normal and if there is no abnormal distension, then the baby will normally be ready to feed (Perry *et al.*, 1999). Carbohydrates are very important in the diet of a young infant as newborns have only small hepatic glycogen stores and have a limited ability to carry out both

gluconeogenesis and ketogenesis. Carbohydrates should make up at least 40–45% of the baby's total calorific intake. Human milk is rich in the carbohydrate lactose. Milk formulas need carbohydrates added to supplement the lactose in cow's milk (Perry *et al.*, 1999). Fat should make up around 15% of an infant's calorific intake. Fat in human milk is easy for infants to digest but cow's milk fat, which is difficult to digest, is removed and replaced with a more digestible fat such as corn oil. In its first 6 months an infant requires around 2.2 g/kg of protein per day. The protein content in human milk is ideal for a baby's requirements. It contains a greater ratio of lactalbumin to casein than cow's milk, which is easier to digest. Some milk formulas have their protein content altered to be more like that of human milk during nutritional requirements of the infant (Parliament *et al.*, 2006). The initial milk produced, called colostrum, and contains antibodies that help protect the baby from infection. Breast milk is also perfect for the baby's growth and development, containing a perfect balance of nutrients for its first 4 months.

The benefits of breast milk to a baby's health include a reduced incidence of gastrointestinal disorders (Marriott *et al.*, 2012), respiratory illnesses (Ahmad, Lopez and Inoue, 2000), diarrhea and childhood cancers. Benefits of breast feeding for the mother have also been identified. Suckling immediately after birth helps the womb to contract (Gupta *et al.*, 2012). Breast-feeding also helps the mother return to her pre-birth weight more quickly and is associated with lower incidence of obesity later in life (Hawkes, Haddad and Udomkesmalee, 2015). Women who breast-feed have a lower risk of ovarian, uterine, and premenopausal breast cancer (Wu *et al.*, 2004), and are less likely to develop osteoporosis.

2.9 Anthropometric Measurement

The globally prescribed approach to evaluate malnutrition at population level is to take anthropometric measurement. In view of combination of these measurements anthropometric indices are designed. These indices are basic for the analysis of body measurements for example, weight alone has no importance only if it is identified with a person's age or height (Blössner, Onis and Organization, 2005). In children the three most regularly utilized anthropometric indices are weight for height, height for age, and weight for age. These indices can be communicated as far as z-scores, percentiles, or rate of median, which enable correlation of a child or group of children with a reference population.

For a long time the WHO Department of Nutrition has been utilizing anthropometric information to observe trends in child malnutrition. A major trouble has been the non-consistency of survey investigations and presentation of their outcomes. Albeit many nutrition surveys have been done since the 1970s, a considerable many of the surveys have utilized distinct meanings (that is distinctive anthropometric indices, reporting frameworks, cutoff points, and reference values) subsequently comparing between results difficult. This absence of practical comparison of data prompted the start of WHO's systematic gathering and standardization of data on the dietary status of the global under 5 population.

The WHO Global Database on Child Development and Malnutrition (consequently alluded to as the 'database') was started in 1986 to compile, standardize, and disseminate effects of malnutrition surveyed over the world. The particular objectives of the database are to: describe nutrition status; empower global comparison of nutrition information; recognize population in need; assess nutrition and health interventions; analyze mainstream trends in child growth; and raise political awareness of healthful issues. A distinctive component of the database is to

methodically analyze raw informational collected in a standard form to create comparable outcomes. This study depicts technique used in database and gives cases how the compiled data is utilized for advancing the healthy development and improvement of infant.

2.10 Malnutrition

Malnutrition is an overall general public health issue that has an impact on the development and advancement of children less than five years old. Additionally it is associated with a high morbidity and mortality in this age group. Furthermore, it reduces child immunity and this makes children susceptible to a number of infections such as pneumonia, tuberculosis and diarrhea which increases the mortality rate of children (Marriott *et al.*, 2012).

Malnutrition is a when the body does not have enough required supplements, known as under nutrition, or has excess of the required nutrients referred to as under nutrition (MoPHS, 2009). Under nutrition a form of malnutrition occurs as a result of deficiencies of micronutrients in the body, which happens in the form of impaired immunity and major illness like anemia, and growth failure measured by stunting and wasting (MoPHS, 2009). Child malnutrition can be defined as a pathological state because of lacking adequate nutrition, including under nutrition (protein energy undernutrition) because of deficient intake of energy and different supplements; over nutrition because of consumption of energy and different nutrients; deficiency illnesses because of inadequate intake of at least one particular supplement, for example, vitamins or minerals. (Ge, K.Y. furthermore, Chang, S.Y., 2001)

Stunting is a growth failure among children that occurs slowly as a result of inadequate nutrition and repeated infection, resulting in a height for age that is not exactly - 2 z scores of median value of WHO 2000 reference. Low height for age is characterized as shortness, and it might reflect different variation; while stunting is failure to reach linear growth potential or increasing

decrease of height with respect to age. It comes about because of extended times of insufficient nutrient intake, poor dietary quality, increased morbidity, or combination of all these elements (Gibson, 2005). Stunting may likewise be because of intrauterine growth retardation followed by normal postnatal development (KNBS, 2008)

Africa is leading in the prevalence levels of stunting, estimated 48.1 percent, and the lowest improvement rates (UNCN, 2002). In Kenya, 35 percent of the children under five years are stunted, while the proportionate that is extremely stunted is at 14 percent (KNBS, 2010). Stunting in Kenya among children less than five years was higher in boys compared to girls 37 and 33 percent respectively (KDHS, 2008/9) Stunting simply reflects inability to get enough nutrition consistently influenced by recurrent chronic diseases. Children whose height for age Z-score is below - 2 SD are viewed as short for their age and are chronically malnourished. Children who are below- 3 SD are considered seriously stunted (KNBS, 2010). Stunting is constantly measured using the height for age index which indicates linear growth deficit and cumulative development deficit in children (WHO, 2009)

The common causes of stunting include: poor maternal nutrition, poor sanitation, genetic inheritance, infections in childhood and long term poor child nutrition (Onis and Blössner, 2003). Weight for age is a composite list of stature for age and weight for height. It considers both acute and chronic malnutrition. Children whose weight for age is below - 2 SD are identified as underweight. Children whose weight for age is below - 3 SD are considered seriously underlying (KNBS, 2010)

2.11 Theoretical and Conceptual Framework

The conceptual model hypothesizes that nutritional status among children may vary by maternal nutrition knowledge, attitudes, practices and socio-economic status of mothers. At the same time, nutritional status may be associated with child characteristics such as age, gender, among others; parental and household characteristics, and the diversity of the food they consume at home.

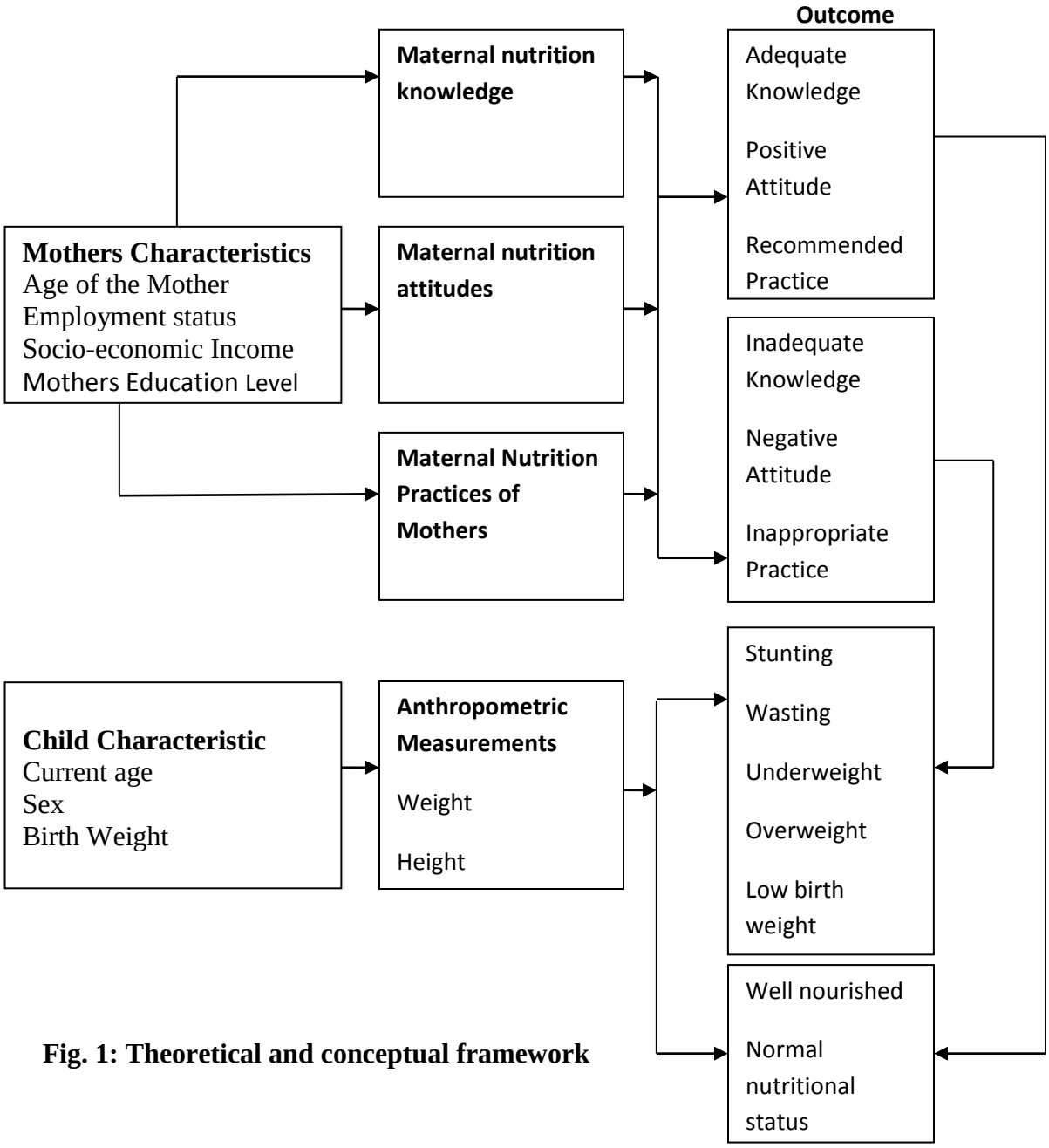

Fig. 1: Theoretical and conceptual framework

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Study Design

The study design was cross sectional and comparative. It was both quantitative and qualitative in nature based in Pediatric department at Kenyatta National Hospital, Nairobi County.

3.2 Study Area and Study Site Description

The research was conducted at Pediatric Department of Kenyatta National Hospital (KNH) in Nairobi County, Kenya. The county covers a region of 680 M^2. The hospital was established to satisfy the part of being a National Referral and Teaching Hospital, and in addition to give medical research environment. Built up in 1901 with a bed limit of 40, KNH became a State Company in 1987 with a Management Board and is at the apex of the referral framework in the Kenyan Health Sector.

3.2.1 Kenyatta National Hospital

KNH is the largest referral health facility in the County with 50 wards, 20 out-patient clinics, 24 theaters and a total bed capacity of 1,800. The normal bed occupy rate goes to 300% and at any given day the Health facility host in its wards in the vicinity is 2500 and 3000 patients. The health facility on average has over 80, 000 in-patients annually. It is located in Upper Hill Community area which is about 5km from central Business District in Nairobi, Kenya. The hospital is a National Referral and Teaching Hospital, and provides a medical research environment (KNH, 2014).

3.3 Study Population

The Study population comprised of mothers-child dyad 6-59 months admitted due to nutritional health problems in Pediatric department of Kenyatta National Hospital. The mothers were the

respondents in the interview because they assisted in giving other background information significant to the research. The sampling frame consisted of mother-child where the child was between 6-59 months. Mother-child dyad was selected by systematic random sampling consecutively until the sample size was achieved. The study population also included the health personnel who participated in the key informant interviews.

3.4 Sample Size Determination

The sample size was calculated using Fischer et al's (1991) formula for this study

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

n= Estimated sample size

z= z value for the chosen confidence interval (usually 0.95 α=0.05=1.96)

p= Prevalence estimate. The overall prevalence estimate of children expected to be underweight is 11% according to KDHS report 2013/14 (KNBS, 2014)

q= 1-p. The estimated proportion of normal children- those who are not malnourished.

$d^{2=}$ Degree of desired precision for the estimate (usually 0.05)

Hence $n= (1.96^{2*}0.10*0.90)/0.05^2) = 139$.

When a 5% attrition rate was added: 5/100*139 = 7+139=146.

Therefore the total sample size was 146

3.5 Sampling Procedure

Purposive sampling was used to select Kenyatta National Hospital as the study setting, because it is the largest public and referral hospital and is more representative. Exhaustive simple random sampling was used to pick 10 Wards out of 10 Wards. Systematic random sampling was used to enroll mother-child pair into the study until the sample size was achieved.

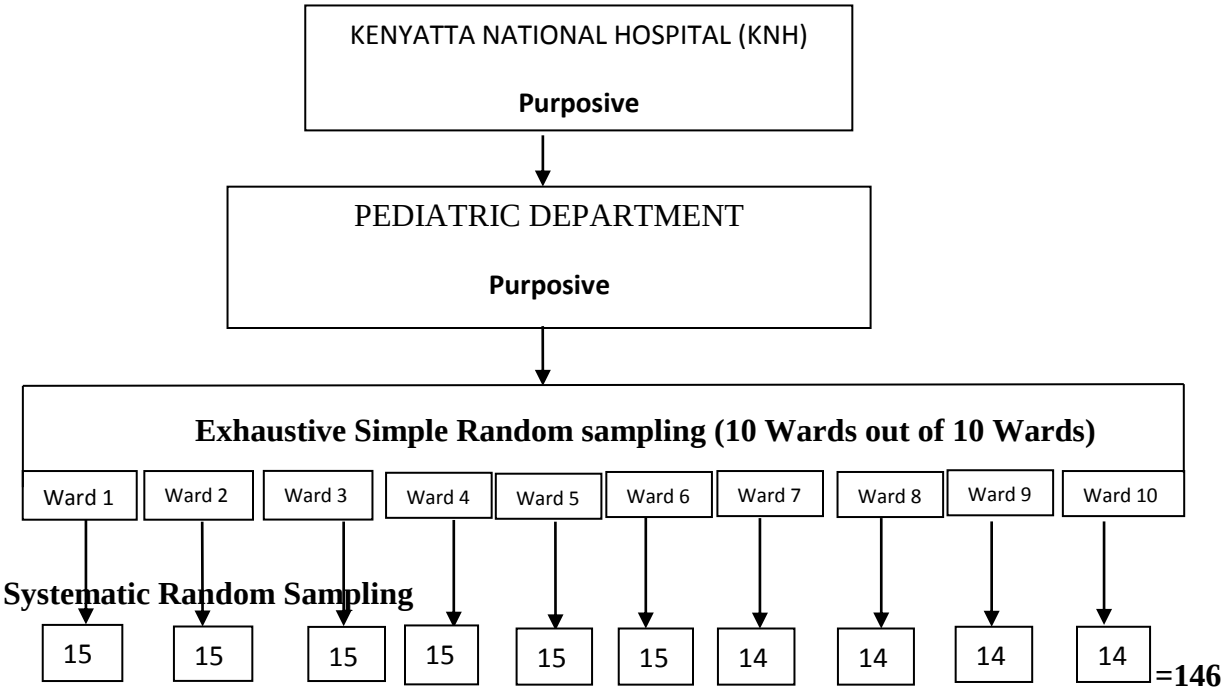

Fig. 2: Sampling Procedure

3.6 Inclusion Criteria

Mother infant pair admitted at Pediatric department, Kenyatta National Hospital for nutritional health checkup, growth monitoring and immunization irrespective of the regions they reside in. Only children above six months and below five years whose mothers voluntarily accepted to participate in the study were included. This was by signing the consent form after being explained what the study entailed and giving consent for their infants to be assessed.

3.7 Exclusion Criteria

A severely sick child was not allowed to participate as well as child below six months and above five years old whose parents did not give consent. Infants accompanied by other members of the family other than their mothers could not participate since most of the questions were directed towards biological mothers.

3.8 Data Collection

3.8.1 Tools and Equipment for Data Collection

1) A structured pre-tested questionnaire was administered by trained research assistants. The questionnaire collected four types of information as follows:

a) Socio-demographic and socio financial data of the mother for example; name, age, sex, marital status, education level and others.

b) Mothers' nutrition knowledge, attitude and practices on infant information inclusive of breastfeeding practices, feeding practices, complementary feeding practices, and anthropometric measurements.

c) A food frequency questionnaire for every child.

2) Food Frequency Questionnaire

The qualitative tool without portion size information was used to assess how often foods from given food groups are given to children two weeks preceding the study. According to FAO (2008), FFQs has always been widely used to calculate food diversity scores, the larger the score the diversified food intake. The different food items included in food frequency questionnaire were aggregated into 10 groups proposed by Nantel and Kennedy (2006) as shown below:

Foods offered at home can affect nutritional status among children under-five years. A measure of dietary diversity score was used to assess the foods given to children at home by mothers.

Table 1: Food Frequency Table for children 6-59 months

	Food Groups	Food Items
1	Cereals, roots and tubers	Cassava, Yams, Rice, Potatoes, Ugali, Chapati, Breakfast Cereals, Bread
2	Vitamin A rich fruits and vegetables	Mangoes, Carrots, Pawpaw, Watermelon, Pumpkin, Cabbage, Broccoli
3	Other Fruits	Orange, Lemon, Pineapple, Guava, Apple Banana
4	Other Vegetables	Sukuma wiki, Traditional Vegetables, Spinach
5	Legumes, Pulses and nuts	Beans, Lentils, Green grams, Groundnuts
6	Oils and Fats	Cooking vegetable oils, Blue band, Ghee
7	Meat, Poultry and Fish	Chickens, Pork, Mutton, Omena, Beef, Fish
8	Dairy	Milk, Yoghurt, Mala
9	Eggs	All types of eggs
10	Condiments/Others	Spices, Sweets, Sugars

3.8.2 Recruitment and Training Research Assistants

Four research assistants were recruited, working within Kenyatta National Hospital as Nutrition Interns from the University of Nairobi. The research assistants were able to speak fluent English and Kiswahili with basic knowledge in taking anthropometric measures of children above six months and below five years. They were prepared for two days to outfit them with learning on the most proficient method to direct and fill questionnaires as well as taking of anthropometric measurements.

3.8.3 Pre-test of Questionnaires

Pretest was done at Pipeline Health Center, targeting at least 15 mother-infant pairs and the information collected was used to modify questions so as to give the desired results.

3.8.4 Data Collection Procedures and Methods

The interviewer approached the mother infant pair using the exhaustive sampling procedure. The interviewer then created a rapport before explaining to the respondent what the research entails. He/she explained the nature of the study, the purpose, its benefits, rights as volunteers and risks/discomforts expected then requested her to voluntarily accept to participate in the study. The interviewer also assured the respondent of the confidentiality of the information given so as to encourage participation. If she was able to read then, a consent form was given to the mother to read and sign if she agrees to take part in conjunction with their infants voluntarily. If not able to read the interviewer explained the contents on the consent form to the respondent in detailed. Data was then collected from the mother child pair one at a time to enhance accuracy.

A structured questionnaire was administered and filled with data on name of the child, date of birth, age, sex, breastfeeding practice which specifies duration. Those on complementary feeding, time of introduction of food other than breast milk, number of feeds administered to the child was recorded. A food frequency questionnaire was used to assess the adequacy of the diet fed to children.

3.8.4.1 Anthropometric measurements

The anthropometric measurements are universally accepted to be the most valuable device for evaluating the nutrition status, and dangers of poor health and survival in children and infants.

a) Age and Sex Determination: Age was calculated in months from the birth date based on clinic cards and birth certificates. The sex of the infant was observed physically during examination. Mother's age was obtained by asking the mothers to state their age to the interviewer and this was to be confirmed from the clinic booklet for the latest indicated age.

b) Birth weight- To determine the birth weight the mother was requested to produce the clinic cards or booklet because in any health center facility when they come for weight monitoring and immunization at the clinic, they do carry them for recording the measurements done on that particular day.

c) Height Measurement- A length board was used to measure recumbent length of the index child by making the infant lie flat on the length board facing upwards. One research assistant ensured the infant lay properly and with the assistance of the mother press the feet of the child to ensure they are straight.

d) Weight Measurement- Weight was measured to the closest 0.1kg while utilizing a Salter scale and a weighing scale. The children were weighed twice in minimum clothing, probably a vest and without shoes. Two measurements were taken to obtain the mean value for analysis.

3.8.5 Socio-demographic Characteristics

This section comprised of three questions that sought to establish the socio-demographic characteristics of the nurses. These included sex, age, and marital status (Appendix 1).

3.8.6 Practices

Questions on practices aimed at assessing the mothers actions related to maternal nutrition care in the course of taking care of their children. The questions presented the mothers with practical situations on child care practices. The questions were accompanied by multiple-choice responses

with provision for the respondents to give their appropriate response where the statements provided did not include their opinion. Most practice questions were accompanied by three statements namely; 1) Yes - which implied that they always carried out that practice; 2) No – meant that they did not do it at all; and 3) Sometimes – implied that they carried out the practice but not consistently. Each practice action that the nurses responded to as "No" was accompanied by an open-ended question for an explanation of the reason why they would not or did not carry out that practice (Appendix 2).

3.8.7 Knowledge

This section comprised of 30 questions aimed at assessing the mothers' understanding on aspects of childcare nutrition practices. The questions assessed the mothers' knowledge on maternal nutritional practices child dietary requirements and after delivery. The respondents selected what in their opinion, was the correct response to each of the 30 knowledge questions from a provision of multiple-choice statements (Appendix 2).

3.8.8 Attitude

The statements expressing attitude assessed the mothers' perceptions on maternal nutrition and their role and responsibility in delivering nutritional care to their children. Attitude was assessed on a 5-point Likert scale (1=Strongly agree; 2=Agree; 3=Disagree; 4=Strongly disagree) to determine the degree of the mothers' agreement or disagreement to 9questions pertaining to maternal nutrition management. The statements assessed the mothers' perceptions towards their responsibility in taking care of their children. Respondents rated their level of agreement or disagreement to the statements by selecting the response that best expressed their feelings and thoughts about the issue in question. This section was concluded with an open-ended question on

the mothers' perception on their role in the nutritional management and care of their children (Appendix 2).

3.9 Data Quality Assurance

In achieving quality of data, the principle investigator ensured adjustment of scales which was done once a day to guarantee exactness of the estimations of the measurements. All the anthropometric equipment was calibrated too before use. The principal investigator also ensured supervision of the investigators associates amid information collection. Research colleagues got appropriate training from the principal investigator in order to minimize mistakes in recordings. To keep away from parallax amid reading of measurements a normal of two ensuing readings on a similar newborn child were taken amid weight measurement. The completed questionnaire was cross-checked and examined after measurements by the principal investigator to guarantee fulfillment of information consistency of answers and the validity of the measurement recorded.

3.10 Data Management and Analysis

The information gathered for the research was analyzed using the Predictive Analytical Software (PASW) in the past known as Statistical Package for Social Science (SPSS) (version 20). The Emergency Nutrition Evaluation (ENA) for SMART programming (2012 version) was utilized for the anthropometric information analysis. The WHO 2006 development reference values was utilized as the standard for calculating weight for age z-score (WAZ), height for age z-score (HAZ), and weight for height z-score (WHZ). Before carrying out the anthropometric calculation for WAZ, HAZ, and WHZ, the data was cleaned to eliminate the outliers as characterized by Emergency Nutrition Assessment (ENA) programming (2012 version).

Descriptive and multivariate analyses were used to distinguish key indicators related with nutritional status of children. For chi-square test and t-test analyses were utilized to conclude on

the significance of distinction between proportions, while Analysis of Variance (ANOVA) was utilized to test group difference of quantitative variables. Such as maternal nutrition knowledge, attitude, practices, child birth weight, age, current weight and mother's socio-demographic characteristics and socio-economic income at a significance level of 0.05. Logistic regression was also performed to ascertain the determinants of child nutritional outcome.

The default classification framework is defined by WHO for its efficiency and effectiveness to depict nutrition status including the extreme ends of distribution and furthermore permit the determination of summary statistics means and SDs of z-scores. To determine at Z-scores we utilized the correct age in days for the WHO standards and months for the WHO reference 2007 (WHO, 2009).

Table 2: Weight and Height and BMI for Age Classification

Indicators	**Cut off Points (Z scores)**
Weight for age	
Normal	-2 to +2
Underweight	<-2
Height for Age	
Normal	+1 to +2
Stunted	>-3
BMI/Weight for Age	
Thin	<-2
Normal	-2 to 1
Overweight	>+1 to +2
Obese	>+2

3.11 Ethical Consideration

The permission to do the research was obtained from the Board of Post-graduate Studies at University of Nairobi and Kenyatta National Hospital by presenting the research proposal to the KNH/UON-Ethics and Research Board of Committee (Appendix 6). To limit the uneasiness and inconveniencies the research team clarified the objectives, purposes, and conceivable advantages of research study in a non-threatening manner and socially important manner. The participant was given a chance to ask questions and refuse participation if desired or take an interest in participation by signing a consent form. Safety of the child was guaranteed by giving satisfactory procedures to guarantee no mishap happens amid taking measurements. Confidentiality and protection was kept up and the care givers were guaranteed of this. Physical acts and psychological comments to hurt the respondent were avoided.

CHAPTER FOUR: RESULTS

This chapter is a presentation of results from the study. The data collected allow the analysis of Pediatric health department at Kenyatta National Hospital on nutrition knowledge, attitudes and practices of mothers on the nutritional status of their children. The results are both quantitative and qualitative. Descriptive results are presented in graphs and charts, and mainly give the information on the socio-demographic characteristics. The study sample comprised 146 mother-child dyads.

4.1 Socio-economic and socio-demographic characteristics

Table 3 indicates that over 58% of the respondents have no source of income, whereas 86.3% have monthly proportion income less than KES 10,000. Only 8% of the respondents are regularly employed, while 21% are casual laborers. Majority (75.3%) had land which was attributed as household property belonging to the husband particularly. Only 11% owned apartments, while 13.7% owned a car. Majority (58%) were hosted by their parents and relatives for free, while 37% paid rent and8.2% owned a home.

Table 3: Socio-economic characteristics of mothers at Kenyatta National Hospital

Characteristics	N=146 N	% Respondents
Occupation Characteristics		
Regularly employed	11	8
Farmer	2	1
Business Self-Employed	30	21
Casual labor	16	11
Teacher	2	1
Housewife	34	23
Student	3	2
Unemployed	48	33
Monthly Proportion of Income		
<KES 10000	126	86.3
KES 1000-KES 24000	20	14.7
>KES 240000	0	0
Property Ownership		
Car	20	13.7
Land	110	75.3
Apartments	16	11
Where they live		
Self-Owned	12	8.2
Hosted by parent or relative for free	80	54.8
Pay rent	54	37

Figure 3 shows marital status of mothers; where by majority (73%) of mothers are monogamously married, while 13% have never been married. About 4% of the mothers were divorced while 3% were either separated or widowed.

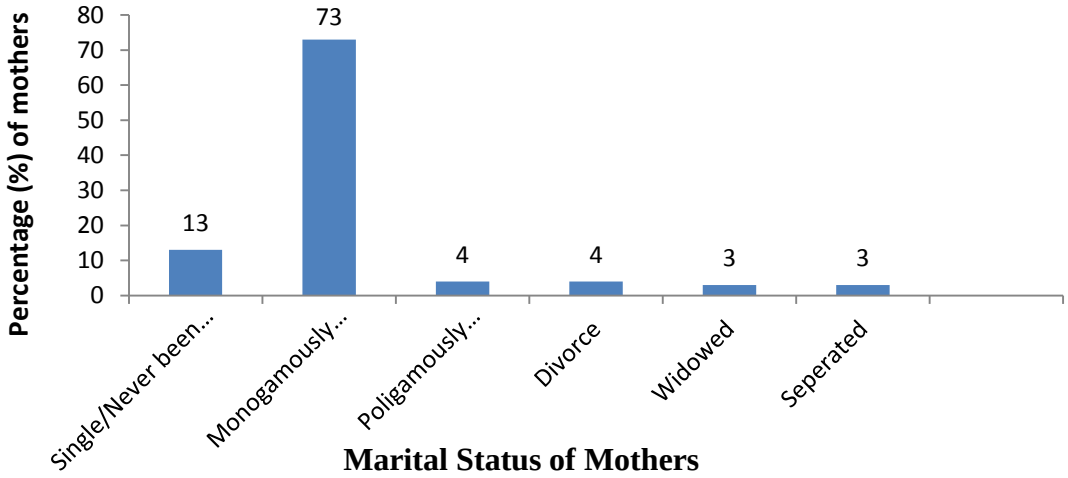

Fig 3: Maternal marital Status

Figure 4 shows that 37.1%of mothers reached Secondary education level, followed by 31.2% attaining lower primary school level, while only 2.7% and 9.3% of mothers managed to reach University and polytechnic levels, respectively. Those who never went to school were 8.5%.

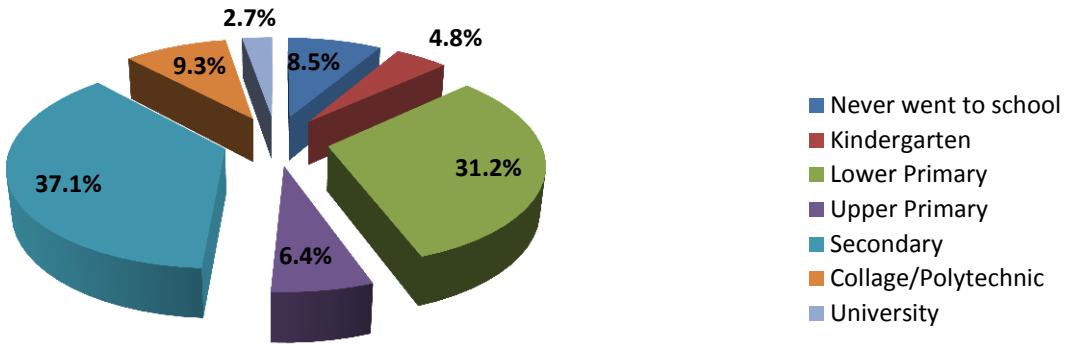

Fig.4: Mothers Educational Level

From Figure 5, it is evident that majority (55%) of mothers have more than three children compared to those (45%) who have less than four children. Likewise 31% of mothers had only two children each.

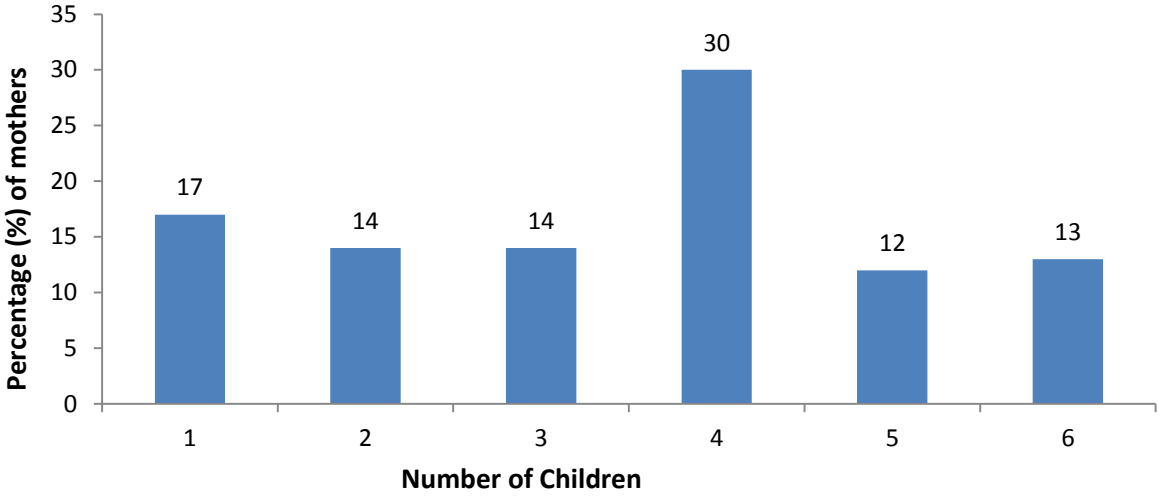

Fig. 5: Number of Children

4.2 Maternal Nutrition Knowledge

Table 4 presents the responses to questions knowledge on maternal nutrition. The mean knowledge score for the mothers was 60.87%. The minimum score was 19.5% while the highest score was 88.4%. Most (68.5%) of the participants had good knowledge with only 31.5% of them having inadequate knowledge. The results showed that the respondents had low knowledge levels in the following areas: folic acid supplements for pregnant mothers (30.8%), recommended waiting periods between pregnancies (19.5%).

The respondents demonstrated high knowledge levels in the following areas: The first food a newborn baby should receive as only breast milk (85.6%), breast milk protection of the baby should receive as only breast milk (85.6%), breast milk protection of the baby from diarrhoea and chronic diseases in adulthood (78.8%), risk of having a low-birth weight baby (71.2%)

4.2 Maternal Nutrition Knowledge

Table 4 presents the responses to questions knowledge on maternal nutrition. The mean knowledge score for the mothers was 60.87%. The minimum score was 19.5% while the highest score was 88.4%. Most (68.5%) of the participants had good knowledge with only 31.5% of them having inadequate knowledge. The results showed that the respondents had low knowledge levels in the following areas: folic acid supplements for pregnant mothers (30.8%), recommended waiting periods between pregnancies (19.5%).

Table 4: Responses to the Maternal Nutrition Knowledge Questions

Maternal Nutrition Knowledge (N=146)	Correct n (%)	Incorrect n (%)
1. The first food a newborn baby should receive is only breast milk?	**125 (85.6)**	**21 (14.4)**
2. It is recommended that a mother feeds nothing more than breastmilk from birth to six months?	**129 (88.4)**	**17 (12.6)**
3. Breastmilk provides all the nutrients and liquids a baby needs in its first six months	**98 (67.12)**	**48 (32.9)**
4. Breastmilk Protects the baby from diarrhoea and other infections and chronic diseases in adulthood	**115 (78.8)**	**31 (22.2)**
5. At six months a babies should start eating foods in addition to breastmilk?	**89 (61)**	**57 (39)**
6. Folic acid supplements/tablet prevents birth abnormalities of the nervous system of the unborn baby	**45 (30.8)**	**101 (69.2)**
7. When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby?	**104 (71.2)**	**42 (29.8)**
8. Health risks for pregnant women who lack iron in the diet risk of dying during or after pregnancy	**78 (53.4)**	**68 (46.6)**
9. It is recommended that a woman waits at least two or three years between pregnancies, before coming pregnant once again.	**27 (19.5)**	**119 (81.5)**
10. When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby, meaning that the baby is small or has a low birth weight?	**68 (46.6)**	**78 (53.4)**
11. To prevent undernutrition among Infants (0–6 months) it is recommended to breastfeed exclusively/give only breastmilk?	**73 (50)**	**73 (50)**
12. A doctor or nurse can help the mother to find out if the baby is growing well?	**118 (80.8)**	**28 (19.2)**
13. Ways to encourage young children to eat is giving them attention during meals,talk to them,and make meal times happy by clapping hands?	**86 (58.9)**	**60 (41.1)**
14. A baby younger than six months should be breastfed or fed with breastmilk on demand or whenever the baby wants	**91 (62.3)**	**55 (37.7)**
15. Exclusive breastfeeding mean that the infant gets only breastmilk and no other or foods?	**87 (59.6)**	**59 (40.4)**

4.3 Attitude towards maternal nutrition care

From the respondents, 80.8% had a negative attitude towards nutrition while 19.2% had a positive attitude. Table 5 shows the positive and negative responses to the attitude statements on maternal nutrition care. Nearly all the respondents (80.8%) had a negative attitude towards maternal nutrition care. The areas with the highest disagreement among the respondents were: breastfeeding a baby exclusively for six months (72.6%); breastfeeding a baby on demand when the baby want (89%), it is serious for a bay to a have low birth weight (68.5%). Also 90% of the respondents disagreed that they are likely to have a low birth weight baby.

Table 5: Attitude towards Maternal Nutrition Care

Attitude Statement	**N=146**	
	Agree n (%)	**Disagree n (%)**
Do you think it is good to breastfeed your baby exclusively for six months?	**40 (27.4)**	**106 (72.6)**
Is it difficult for you to breastfeed your baby exclusively for six months?	**48 (32.9)**	**98 (67.1)**
Do you think it is good to breastfeed your baby on demand that is when the baby wants to feed?	**16 (11)**	**130 (89)**
Is it difficult for you to breastfeed your child on demand?	**46 (31.5)**	**100 (68.5)**
Do you think you are likely to have a low-birth-weight baby?	**56 (38.4)**	**90 (61.6)**
Do you think it is serious for your baby to have a low-birth-weight?	**46 (31.5)**	**100 (68.5)**

4.4 Maternal Practices

Nutritional practices of the respondents were assessed using nutrition practices assessment questionnaire. From the respondents 68.5% had appropriate nutrition practices while 31.5% had inappropriate practices. It was observed that most (61%) of respondents do not eat healthy or diversified diet to have enough breastmilk to feed their babies. A reason cited that they lacked economic purchasing power to have enough and diversified food in their households

Majority (76.7%) of the respondents indicated that Infant formula by spoon, cup or bottle can be fed to the baby when you they are not around. Over (53.4%) indicated that they seek professional help from health-care services: doctors, nurses, midwives when experiencing difficulties breastfeeding, while (26.1%) did it sometimes. Those who did not (20.05%) cited lack of finance. Likewise (58.4%) disagreed that a mother should continue breastfeeding 24 months and more because they'll get old fast.

Table 6: Maternal Practices towards Nutrition Care

Maternal Nutrition Care Practice	Frequency N=146	Percent (%)
When you are not at home or cannot feed the baby yourself a house-help can help you feed the baby?		
Yes	100	68.5
Sometimes	26	17.8
No	20	13.7
Infant formula by spoon, cup or bottle can be fed to the baby when you are not there?		
Yes	112	76.7
No	18	12.3
Sometimes	16	11
Do you eat healthy or diversified diet to have enough breastmilk to feed your baby?		
Yes	37	25.3
No	89	61
Sometimes	20	13.7
When at work do you express breastmilk by hand, storing it and asking someone to give it to the baby		
Yes	56	38.4
No	50	34.2
Sometimes	40	27.4
Do you seek professional help from health-care services: doctors, nurses, midwives when experiencing difficulties breastfeeding?		
Yes	78	53.4
No	38	26.1
Sometimes	30	20.5
It is recommended that a mother continues breastfeeding 24 months and more?		
Yes	40	27.4
No	80	54.8
Sometimes	26	17.8

4.5 Individual Dietary Diversity Score of children aged 6 - 59 months old

The individual dietary diversity scores were calculated based on 7 food groups (WHO, 2007). The mean individual dietary diversity score was 4.6. Children consuming between 1 and 5 food groups were the majority (79.5%) while 38.4% consumed 3 food groups out of the possible 7 food groups included in the analysis. Children consuming ≤ 3 food groups were considered to have low IDDS while those consuming 4 or 5 and ≥6 were considered to have medium and high IDDS, respectively. Based on this classification, only 20.5% of the children had high IDDS. Most of the children (41.1%) had medium IDDS while 38.4% of the children had low IDDS as shown in Table 7.

Table 7: Individual Dietary Diversity Score of children aged 6 - 59 months old

		Percent
DDS Category	**Frequency**	**N=146**
Low DDS (≤ 3)	56	38.4
Medium DDS (4-5)	60	41.1
High DDS (≥ 6)	30	20.5

4.6 Nutrition Status of Children 6-59 Months

Table 8 shows the nutrition status of study children by gender. The study shows that stunting at 15.8 % was the main nutrition problem. The nutrition status between boys and girls for all the three indicators were almost similar.

Table 8: Nutrition status of children by gender

	Gender		
Nutrition status	**Boys**	**Girls**	
Indicators	**N=73**	**N= 73**	**(Total)=146**
	%	**%**	
Overweight	9.6	9.6	
Stunting	19.2	19.9	
Underweight	15.8	15.8	

4.7 Association between socio-demographic characteristics and nutrition status in children

Chi-square analysis was performed on the association between socio-demographic characteristics with nutritional indices of the children 6-59 months (Table 9). A significant association was found to exist between underweight and stunting among the children. Significant association ($\chi 2=4.486$, 4df, $p=0.000$) give these parameters in each case was observed between children's age and nutritional status based on underweight. Educational status and number of children were significantly associated with stunting ($\chi 2=2.562$, 4df, $p=0.049$), ($\chi 2=1.645$, 4df, $p=0.002$) respectively). However, there was no significant association ($p>0.05$) between socio-demographic characteristics and overweight in children. There was no significant association between the three indicators of nutritional status (underweight, stunting and overweight) and mother's age, occupation status and child birth weight.

Table 9: Association between socio-demographic characteristics and nutrition status in children

Socio-demographic characteristics	Underweight (p-value)	Stunting (p-value)	Overweight (p-value)
Mothers' age	0.840	0.855	0.265
No. of Children	0.213	**0.002***	0.724
Education level	0.466	**0.049***	0.500
Occupation status	0.077	0.173	0.275
Child age	**0.000***	0.823	0.823
Child birth weight	0.782	0.387	0.224

Chi square-test
*Significant results are highlighted in bold

4.8 Association between maternal nutrition knowledge, attitude and practices and nutrition status in children

Chi-square analysis was performed on the association between maternal nutrition knowledge, attitude and practices on nutritional status of children (underweight, stunting and overweight), with nutritional indices of the children 6-59 months (Table 10). A significant association was found to exist between nutrition underweight and nutrition attitude ($\chi 2=4.628$, 1df, $p=0.031$) among children with an exception of stunting and overweight ($p<0.05$). However, there was no significant association ($p>0.05$) between nutrition knowledge and practices on nutritional status of children as shown in table 10.

Table 10: Association between maternal nutrition knowledge and underweight in children

Socio-demographic characteristics	Underweight (p-value)	Stunting (p-value)	Overweight (p-value)
Nutrition Knowledge	0.979, $\chi 2$=0.041, 1df	0.208, $\chi 2$=3.144 2df	0.544, $\chi 2$=1.021, 1df
Nutrition Attitude	**0.031, $\chi 2$=4.628, 1df**	0.518, $\chi 2$=0.417 1df	0.868, $\chi 2$=0.868, 1df
Nutrition Practices	0.585, $\chi 2$=0.298, 1df	0.111, $\chi 2$=2.539 1df,	0.140, $\chi 2$=2.173, 1df

Chi square-test
*Significant results are highlighted in bold

4.9 Association between dietary diversity score and nutritional status in children

Table 11 below presents results pertaining to dietary diversity score and nutritional status of children who are underweight, stunted and overweight. There was no significance association of dietary diversity score of children and nutritional status of the mothers (7.71±1.917) (P=0.121).There was no significance association in the dietary diversity score of children (7.30±1.119). Likewise there was no significance association in the dietary diversity score of children (7.42±0.940).

Table 11: Association of dietary diversity scores and nutritional status of children 6-59 months

Nutritional Status	DDS not met (<5 food groups) n= 56 %	DDS met (>5 food groups) n=90 %	Total 146	Chi-square test p-value
Underweight	16	30		0.121
Normal	14	86		
Stunted	27	30		0.155
Normal	29	60		
Overweight	12	16		0.448
Normal	28	90		

DDS=Dietary Diversity Score

4.10 Regression analysis of factors associated with nutritional status in children

Multiple linear regression analysis was performed to examine the significant association of variable factors such as socio-economic income, socio-demographic characteristics, nutrition knowledge, attitude, practices and dietary diversity score with nutritional status of children 6-59 months at Kenyatta National Hospital. The following factors found to be significantly associated with any of the three nutritional outcomes at different levels in the preceding analyses or those identified in existing literature as being associated with nutritional outcomes in young children were included in the multivariable analysis; Socio-demographic characteristics, dietary diversity score, nutrition knowledge, nutrition attitude and nutrition practices.

4.11 Regression analysis of factors determining underweight in children

Table 12 provides factors that determine weight for age among children 6-59 months. Based on regression analysis, the factors that determined weight for age in the study after controlling for other variables included child age, number of children, and nutrition attitude.

Table 12: Regression of factors determining underweight in children

Variables	β	β SE	Wald Statistic	p-value	Adjusted Odds Ratio	Odds Ratio 95% CI
Constant	0.777	0.178				
Child birth weight	0.151	0.427	0.126	0.723	1.163	0.504 – 2.685
Child age	**0.080**	**0.024**	**10.766**	**0.001**	**2.083**	**1.033 – 1.136**
Mothers' occupation status	-0.107	0.152	0.492	0.483	0.899	0.891 – 1.094
No. of children	**-0.318**	**0.154**	**4.257**	**0.039**	**0.727**	**0.537 – 0.984**
Mothers' age	-0.017	0.050	0.117	0.732	0.983	0.891 – 1.084
Mothers' education level	0.219	0.221	0.986	0.321	1.245	0.808 – 1.919
Socio-economic income	0.394	0.771	0.261	0.609	1.483	0.327 – 6.720
Dietary diversity score	0.316	0.165	3.653	0.056	1.371	0.992 – 1.896
Nutrition Knowledge	0.041	0.495	0.007	0.934	1.042	0.395 – 2.749
Nutrition Attitude	**1.167**	**0.702**	**2.762**	**0.045**	**3.213**	**0.811 – 12.725**
Nutrition Practice	-0.581	0.662	0.768	0.381	0.560	0.153 – 2.050

4.12 Regression analysis of factors determining stunting in children

Child age, dietary diversity score and mothers' nutritional practices determined height for age among children below five years in the study. Child age (p= 0.007), dietary diversity score (p= 0.031) and mothers' nutritional practices (p= 0.024) were determinant of stunting in children after controlling for other variables included in the model.

Table 13: Regression analysis of factors determining stunting in children

Variables	β	β SE	Wald Statistic	p-value	Adjusted Odds Ratio	Odds Ratio 95% CI
Constant	0.446	0.170				
Child birth weight	0.112	0.380	0.087	0.767	1.119	1.031 – 1.894
Child age	**-0.049**	**0.018**	**7.292**	**0.007**	**0.952**	**0.919 - 0.987**
Mothers' age	0.005	0.045	0.012	0.915	1.005	0.919 – 1.098
Mothers' occupation	0.077	0.132	0.342	0.559	1.081	0.834 – 1.401
No. of children	-0.085	0.212	0.002	0.967	0.991	0.654 – 1.503
Mothers' education level	0.145	0.200	0.544	0.461	1.159	0.783 – 1.716
Socio-economic income	0.298	0.628	0.225	0.635	1.347	0.393 – 4.612
Dietary diversity score	**0.335**	**0.155**	**4.665**	**0.031**	**1.398**	**1.031 – 1.894**
Nutrition Knowledge	-0.964	651	2.193	0.139	0.389	0.106 – 1.366
Nutrition Attitude	0.744	0.582	1.635	0.201	2.104	0.673 – 6.584
Nutrition Practices	**1.076**	**0.477**	**5.081**	**0.024**	**2.932**	**1.151 – 7.473**

4.13 Regression analysis of factors determining overweight in children

Analyses of the correlates of nutritional outcome among children below five years were done. Child age and mothers nutritional practices were determinant of weight for age, meaning there was a statistical significant association with weight for height in the analyses of child's age (p =0.000) and mothers' nutrition practices (p = 0.006) were determinant of overweight in children after controlling for other variables in the regression model. None of the factors remaining could predict statistical significance of overweight.

Table 14: Regression analysis of factors determining overweight in children

Variables	β	β SE	Wald Statistic	p-value	Adjusted Odds Ratio	Odds Ratio 95% CI
Constant	0.446	0.170				
Child birth weight	-0.473	0.608	0.606	0.436	0.623	0.189 – 2.051
Child age	**-118**	**0.027**	**18.551**	**0.000**	**0.889**	**0.842 - .938**
Mothers' occupation	-0.097	0.190	0.258	0.611	0.908	0.625 – 1.318
Mothers' age	0.088	0.071	1.542	0.241	1.092	0.950 – 1.255
No. of Children	0.156	0.297	0.278	0.598	1.169	0.653 – 2.092
Mothers' education level	0.152	0.354	0.184	0.668	1.0164	0.581 – 2.331
Socio-economic income	-0.522	0.852	0.375	0.540	0.593	0.112 – 3.150
Dietary diversity score	-0.013	0.240	0.003	0.958	0.987	0.617 – 1.581
Nutrition knowledge	0.719	0.731	0.967	0.325	2.052	0.490 – 8.593
Nutrition attitude	-0.522	0.852	0.375	0.540	0.593	0.112 – 3.150
Nutrition practices	**-2.073**	**0.754**	**7.560**	**0.006**	**0.126**	**0.029 – 0.551**

CHAPTER FIVE: DISCUSSIONS

5.1 Demographic and socio-economic characteristics

Higher levels of low education in women could explain the poor nutritional status of the under-fives. This is in agreement with Boor et al. (2018) that mothers with low level of education could lack the knowledge to improve the total welfare or income of the household which in turn has an effect in the nutritional outcome of the under five children.

5.2 Nutritional status of children aged 6-59 months

The nutritional status of children below 5 years of age is an outcome of immediate, underlying and basic causes of malnutrition (UNICEF, 1990). The three anthropometric indices, height-for-age, weight-for-age and weight-for-height were used. Height-for-age is the measure of linear growth. A child who was below minus two standard deviations (SD) from the reference mean for height-for-age was considered short for his/her age or stunted, a condition reflecting the cumulative effect of chronic malnutrition (Kabubo-Mariara et al.,2009). Weight-for-age is a composite index of weight-for-height and height-for-age. A child can be underweight for his or her age because she or he is stunted, wasted, or both. Weight-for-age is an overall indicator of a population's nutritional health (Kujinga et al., 2018) Weight-for-height describes current nutritional status. A child who is below minus two standard deviations from the reference mean for weight-for-height is considered too thin for his/her height or wasted, a condition reflecting acute or recent nutritional deficit (Abuya et al., 2011). The higher prevalence of wasting in children may be attributed to inappropriate introduction of complementary food and the inadequate feeding as evidenced by feeding frequency of at least 4 food groups in a day instead of the recommended five food groups or more (WHO, 2003).

Stunting is a form of chronic malnutrition that results due to the failure to receive adequate nutrition over a long period of time and can also be affected by chronic or persistent illness. The discrepancy might be due to small sample size compared to that of national data. More so, KDHS sample was also inclusive of children less than six months. This finding agrees with that of a study conducted in western Kenya which revealed high level of stunting among children below five years (Kwena & Baliddawa, 2012). The highest prevalence of stunting observed in children aged 6-59 months as compared to other age categories could be associated with late introduction to complementary feeding as well as poor complementary diet which are mostly cereal based and lack in diversity (Gewa & Leslie, 2015).

5.3 Maternal nutrition attitude and nutrition status of children

A great majority of the respondents had good nutrition knowledge. This can be attributed to the fact that the lowest educated respondent had completed secondary education while few were college/university graduates. It was however noted that knowledge of the respondents was not significantly associated with nutrition status as an indicator. It would appear that most of the respondents with good knowledge on nutrition used the knowledge to feed their children appropriately.

5.4 Maternal nutrition attitude and nutrition status of children

Attitude in the context of nutrition can be defined as the expression of favour or disfavour towards appropriate nutrition practice formed from past and present experiences. (Addai, 2000) In this study, attitude was a factor of; perceived benefits of good nutrition, perceived severity of poor nutrition, self-confidence of the participants and perceived barriers of adoption of good nutrition practices for their children. Most of the respondents had a negative attitude towards nutrition. This was heavily influenced by a high number of neutral responses particularly in

questions related to the importance of limiting nutrient intake (proteins and carbohydrates). This may have been caused by an internal thought process influenced by the knowledge that limiting nutrient intake to specific proportions is healthy versus the belief that to body build one is required to eat large unrestricted amounts of protein and carbohydrate.

There was a significant association between the attitude assessment score of the mothers and their children's nutritional status. This implied that nutrition attitude had an influence on dietary practice and by extension nutrition status.

5.5 Maternal nutrition practices and nutrition status of children

Inappropriate feeding practices are the major causes of malnutrition in young children.

Breastfed children who are 6-23 months old should receive animal-source foods and vitamin A-rich fruits and vegetables on daily basis (Kibona et al., 2016). The delay in introduction to complementary foods is as a result of lack of soft foods as the caregivers wait for children to develop teeth so that they can eat family foods. The lower dietary diversity among the study children could be due to the limited variety of foods.

5.6 Dietary diversity and nutrition status of children

In the developing world, lack of dietary diversity is a critical issue where diets consist mainly of starchy staples, with less access to nutrient-rich sources of food such as animal proteins, fruits and vegetables (Addai, 2000). This is particularly true as evidenced by this study where majority of the children (41.9%) consume high dietary diversified (>4 food groups) diet comprising mainly of cereals and legumes and medium consumption of animal protein. While the intake of energy is important in diet, other nutrients such as vitamins, proteins and minerals are also necessary for healthy living. Nutritional wellbeing is determined by the proportion of essential

nutrient in the diet. Micronutrient deficiencies are common even in areas where macronutrient intake is adequate and stable. Hence food diversity in the diet is an important factor in nutrition security (Cleland, Ginneken and Jo, 1988).

Variety of food in the diet also influences food utilization in the body. Due to inter-nutrient interaction, absorption of some food may be enhanced by others for instances fruits and vegetables enhance absorption of some micronutrients in cereals and legumes. The monotony of the diet which is evident in this study may limit the kind of nutrient interactions required for food utilization by the body resulting to inadequate nutrient balance, hence negatively affects nutritional status. Dietary diversity is known to vary across seasons depending on seasonal availability of food.

5.7 Factors determining under-weight in children

Based on regression analysis, the factors determining weight for age among children and mothers in the study included child age, number of children, dietary diversity score and nutrition attitude. The children who were being taken to clinic for check-up passed two years were likely to be under-weight than their counterparts who were taken to clinic for checkup at younger age of below two years. Results showed that dietary diversity score was a determinant with increased likelihood of children recording lower weight for age, after controlling for other variables included in the model. The significant association of dietary diversity score and underweight showed that underweight children were more likely to have low dietary diversity score. A study among children (6-59 months) in Bangladesh reported dietary diversity and underweight, thus indicating that underweight was a predictor of low dietary diversity score (Rah et al., 2010). Nutrition attitude was a determinant with the increased likelihood of children recording lower weight for age, after controlling for other variables include in the model.

Underweight or weight-for-age measure reflects both long term chronic malnutrition and recent food insecurity or illness. It can thus reflect prenatal under nutrition, infection and possibly inadequate childcare practices. A well-diversified diet is a sure way to achieve the important micronutrients of the body. In this study the diets reflects poor diversity with low consumption of the micronutrient rich animal source foods and fruits and vegetables and high consumption of the energy-dense staples**.**

5.8 Factors determining stunting in children

Results showed age of child, dietary diversity score and nutrition practices were determinant of stunting in children in the logistic regression model. The high stunting levels could have been due to micronutrient deficiency, which is evidenced by high consumption levels of carbohydrate based staples and the low consumption of vitamin and mineral rich fruits and vegetables. Additionally, the inadequate childcare practices (Early introduction of complementary foods, inadequate breastfeeding practices and exposure to unsanitary conditions), combined with the interaction of infection can lead to child malnutrition. Recurrent infectious diseases reduce appetite, increase metabolic requirements, and increase nutrient loss (Hawkes et al., 2015).

It is therefore possible that more of the children have not been able to meet their requirements for energy over the years leading to growth faltering. The children's food consumption and dietary patterns reflect monotonous diet that is high in carbohydrates and low in nutrient rich foods such as fruits and vegetables. The high malnutrition levels are associated with poor hygiene practices, inadequate breastfeeding practices and inadequate complementary feeding practices.

5.9 Factors determining overweight in children

None of the factors remaining could predict statistical significance of overweight with exception of age of child and nutrition practices. This clearly indicates that children who are fed with more carbohydrates foods are likely to gain more wait. Mothers are the ones who make independent decisions for their babies on food choices, the results shows that poor dietary practices has an impact on overweight and obesity and associated health risks. Appropriate dietary practices awareness is lacking among mothers with children below five years, this calls for further probe to ascertain the reason behind the poor dietary practices despite given the appropriate knowledge in child feeding practices.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION

6.1 Conclusion

Based on the findings of this study it can be concluded that; child age and mothers' education level influences underweight and stunting in children respectively. Likewise, mothers' nutrition attitude influences underweight in children. Numbers of children, dietary diversity scores and nutrition attitude are determinants of underweight in children. Also, age of child, dietary diversity score and nutrition practices determine stunting in children and age of child and nutrition practices determine overweight in children.

6.2 Recommendations

Nutritional education and seminars should be conducted in hospitals and even communities, particularly for women who are the primary caregivers should be encouraged to regularly check on the nutritional status of their children by visiting health facility for routine growth monitoring.

The government through Ministry of Health has a duty to improve the socio-economic income of households by creating more employments for women, this will help mothers to be able to provide for their families hence improve the nutritional status of their children. Also mothers should be advised to practice birth control to minimize the number of children they are be able to take care of financially.

Intensive nutrition counseling should be enhanced at Kenyatta National Hospital in Pediatric department to mothers who come for nutritional services. A follow up also needs to be done by the nutritionist and health staffs to reinforce mothers' nutrition practice on what they have been taught about nutrition.

Since mothers are the ones who make independent decisions for their babies on food choices, this study recommends creating nutrition information awareness on the effect of poor dietary practices and negative attitude on overweight and associated health risks. This should aim at improving nutrition positive attitude and appropriate dietary practices.

Similar studies should be carried out in other health facilities in the country to establish the situation and generate more data that can be used to inform policy and development of standard of maternal nutrition KAP on children nutrition status in Kenya.

REFERENCES

Abuya, B. A., Onsomu, E. O., Kimani, J. K. and Moore, D. (2011) 'Influence of maternal education on child immunization and stunting in Kenya', *Maternal and Child Health Journal*, 15(8), pp. 1389–1399.

Addai, I. (2000) 'Determinants of Use of Maternal – Child Health Services in Rural', *Journal of Biosocial Science*, 32(1), pp. 1–15.

Ahmad, O. B., Lopez, A. D. and Inoue, M. (2000) 'The decline in child mortality : a reappraisal', *Asian Journal of Medical Sciences*, pp. 1-4.

Allin, S. and Stabile, M. (2012) 'Socioeconomic status and child health: what is the role of health care, health conditions, injuries and maternal health?', *Health Economics, Policy and Law*, 7 pp. 227–242.

Alva, S. and Inequality, S. (1998) 'Maternal Education and Child Health: Is There a Strong Causal Relationship ?', *Maternal and Child Health Journal*, 35(1), pp. 71–81.

Barrett, H., Browne, A., Barrett, H. And Browne, A. (1996) 'Health , Hygiene and Maternal Education : Evidence From The Gambia', *Journal of Biosocial Science*, pp. 43(96).

Boor, F.K. and Ogada, I.A., Kimiywe J. (2018) 'Knowledge and Practices on Early Breastfeeding among Mothers Delivering at a Teaching and Referral Hospital in Uasin-Gishu County, Kenya.' *Journal of Pediatric Women's Healthcare*, pp. 2-7.

Black, R. E., Alderman, H., Bhutta, Z. A., Gillespie, S., Haddad, L., Horton, S., Lartey, A., Mannar, V., Ruel, M., Victora, C. G., Walker, S. P. and Webb, P. (2013) 'Maternal and child nutrition: Building momentum for impact', *The Lancet*, 382(9890), pp. 372–375.

Blössner, M., Onis, M. De and Organization, W. H. (2005) 'Malnutrition: quantifying the health impact at national and local levels', *Environmental Burden Disease Series Journal*, 12(12), pp. 43.

Boerma, J. T., Sommerfelt, A. E. and Bicego, G. T. (1992) 'Child anthropometry in cross-sectional surveys in developing countries: an assessment of the survivor bias.', *American journal of epidemiology*, 135(4), pp. 438–449.

Burleigh, E., Dardano, C. and Cruz, J. R. (1990) 'Medical Anthropology : Cross- Cultural Studies in Health and Illness Colors , humors and evil eye : Indigenous classification and treatment of childhood diarrhea in highland Guatemala', *Lancet Journal*, pp. 37–41.

Caldwell, J. C. (1979) 'Education as a Factor in Mortality Decline An Examination of Nigerian Data', *Population Studies*, 33(3), pp. 395.

Casapía, M., Joseph, S. a, Núñez, C., Rahme, E. and Gyorkos, T. W. (2007) 'Parasite and maternal risk factors for malnutrition in preschool-age children in Belen, Peru using the new WHO Child Growth Standards.', *The British journal of nutrition*, 98(2007), pp. 1259–1266.

Cleland, J. (2014) 'Maternal Education and Child Survival in Developing Countries for pathways of influence',*Journal of Health, Population and Nutrition*, pp 1-2

Cleland, J. C., Ginneken, K. V. A. N. and Jo, S. I. (1988) 'maternal education and child survival in developing countries : the search for pathways of Influence of parental education on the mortality of an analysis of survey data from Ibadan , Nigeria', *The Lancet Journa*l 27(12), pp. 1357–1368.

Curtis, S. L. and Steelef, F. (1996) 'variations in familial neonatal mortality risks in four countries', *Social Science and Medicine Journal* pp. 141–159.

Dominguez-Salas, et al (2014) 'Maternal nutrition at conception modulates DNA methylation of human metastable epialleles.', *Nature communications*, 5, p. 3746.

Frost, M. B., Forste, R. and Haas, D. W. (2005) 'Maternal education and child nutritional status in Bolivia: Finding the links', *Social Science and Medicine Journal*, 60(2), pp. 395–407.

Gibson, R. S. (1990) Principles of nutritional assessment. *Oxford University Press*.

Gupta, J. K., Sinha, A., Lumsden, M. . and Hickey, M. (2012) 'Uterine artery embolization for symptomatic uterine fibroids', *Cochrane Database of Systematic Reviews Journal*, (3), pp. 6–7.

Handa, S. (1999) 'Maternal Education and Child Height', *Economic Development and Cultural Change Journal*, 47(2), pp. 421–439.

Hawkes, C., Haddad, L. and Udomkesmalee, E. (2015) 'The Global Nutrition Report 2015: what we need to do to advance progress in addressing malnutrition in all its forms', *Public Health Nutrition Journal*, 18(17), pp. 3067–3069.

JC, C. and P, C. (1993) 'Roles of women families and communities in preventing illness and providing health services in developing countries.' *Washington D.C. National Academy Press 1993.*, pp. 252–71.

JT, B., AE, S. and SO, R. (1991) 'Childhood morbidity and treatment patterns.' *Columbia Maryland Institute for Resource Development / Macro International 1991 Aug*.

Kabubo-Mariara, J., Ndenge, G. K. and Mwabu, D. K. (2009) 'Determinants of children's nutritional status in Kenya: Evidence from Demographic and Health Surveys', *Journal of African Economies*, 18(3), pp. 363–387.

Kibona, N., Doland, C., Watson, F. E., Alnwick, D. and Tomkins, A. (2016) 'An evaluation of a project to improve child nutrition in Tanzania', *Social Science and Medicine Journal*, pp. 367-400.

Kitui, J., Lewis, S. and Davey, G. (2013) 'Factors influencing place of delivery for women in Kenya: an analysis of the Kenya demographic and health survey, 2008/2009', *BMC Pregnancy and Childbirth*, 13(1), pp. 40.

Kujinga, P., Borgonjen-van den Berg, K.J., Superchi, C., ten Hove, H.J., Onyango, E.O., Andang'o, P., Galetti, V., Zimmerman, M.B., Moretti, D. and Brouwer, I.D., (2018). Combining food-based dietary recommendations using Optifood with zinc-fortified water potentially improves nutrient adequacy among 4-to 6-year-old children in Kisumu West district, Kenya. *Maternal & child nutrition Journal*, 14(2), p.e12515.

Li, B. and Defo. (1997) 'Effects of socioeconomic disadvantage and women's status on women's health in Cameroon'. *Social Science & Medicine*, 44(7), pp. 4-9.

Lorant, V., Deliège, D., Eaton, W., Robert, A., Philippot, P. and Ansseau, M. (2003) 'Socioeconomic inequalities in depression: A meta-analysis', *American Journal of Epidemiology*, 157(2), pp. 98–112.

Marriott, B. P., White, A., Hadden, L., Davies, J. C. and Wallingford, J. C. (2012) 'World Health Organization (WHO) infant and young child feeding indicators: associations with growth measures in 14 low-income countries', *Maternal & Child Nutrition. Blackwell Publishing Ltd*, 8(3), pp. 354–370.

Martin, H. C., et al., (2015) 'Multicohort analysis of the maternal age effect on recombination.', *Nature communications. Nature Publishing Group*, 6, p. 7846.

Mason, K. O. (1986) 'The Status of Women : Conceptual and Methodological Issues in Demographic Studies', 1(2), pp. 284–300.

Ministry of Health Kenya (2013) 'The Kenya National Patients' Rights Charter', pp. 1–14.

Onis, M. De and Blössner, M. (2003) 'The World Health Organization Global Database on Child Growth and Malnutrition : methodology and applications', pp. 518–526.

European Commission. (2006). 'Directive 2006/52/EC of the European Parliament and of the Council of 5 July 2006 amending Directive 95/2/EC on food additive other than colours and sweeteners for use in foodstuffs'. *Official Journal of the European Union, pp.10-22.*

Pebley, A. R., Goldman, N. and Rodriguez, G. (1991) 'prenatal and delivery care and childhood immunization in guatemala, *Social Science and Medicine Journal* pp. 231–247.

Pelletier, D. L. and Frongillo, E. A. (1993) 'Epidemiologic Evidence for a Potentiating Effect of

Malnutrition on Child Mortality', *Social Science and Medicine Journal* 83(8).

Perry, S. E., Hockenberry, M. J., Lowdermilk, D. L. and Wilson, D. (2017) Maternal child nursing care. *Social Science and Medicine Journalpp. 3-4.*

*P*rogress for Children: A Report Card on Nutrition *(2017) - UNICEF*.

S, K. (1995) 'Autonomy and Egyptian women: findings from the 1988 Egypt Demographic and Health Survey.' *Calverton Maryland Macro International Demographic and Health Surveys [DHS]*.

The, S., Resources, H., Winter, N. and Glewwe, P. (2016) 'Board of Regents of the University of Wisconsin System Why Does Mother Schooling Raise Child Health in Developing Countries ? 34(1), pp. 124–159.

Ugwa, E. (2016) 'Nutritional practices and taboos among pregnant women attending antenatal care at general hospital in Kano, Northwest Nigeria', *Annals of Medical and Health Sciences Research*, 6(2).

UN General Assembly (1989) 'Convention on the rights of a child', *United Nations, Treaty Series*, 1577(November), pp. 1–15.

United Nations (2015) 'Priority Nutrition Indicators for the Post-2015 Sustainable Development Goals', *United Nations System-Standing Committee on Nutrition*.

Wainaina, C.W., Wanjohi, M., Wekesah, F., Woolhead, G. and Kimani-Murage, E., 2018. Exploring the Experiences of Middle Income Mothers in Practicing Exclusive Breastfeeding in Nairobi, Kenya. *Maternal and child health journal*, pp.1-9.

World Health Organization. and UNICEF. (2003) Global strategy for infant and young child feeding.

WHO. (2007). The Millennium Development Goals Report 2007. *NEW YORK: United Nations.*

Wu, G., Bazer, F. W., Cudd, T. a, Meininger, C. J. and Spencer, T. E. (2004) 'Recent Advances in Nutritional Sciences Maternal Nutrition and Fetal', *Amino Acids Journals*, (13), pp. 2169–2172.

KNBS, (2010). The Kenya Population and Housing Census Report 2009: Kenya National Bureau

United Nations System Standing Committee on Nutrition (2015) Priority Nutrition Indicators for the Post-2015 Sustainable Development Goals.

APPENDIX 1: TRAINING CURRICULUM

DAY	TIME	SUBJECT	LEARNING METHOD	LEARMING AIDS
1	**9:00-10:30 am**	**Introduction and Overview of the Study** ➢ General objectives ➢ Specific objectives	➢ Lecture	➢ Flip charts ➢ Marker pens ➢ Note books ➢ Pens/Pencils
	10:30-11:00 am	**Tea Break**		
	11:00-1:00 pm	**Data collection techniques** ➢ Questionnaire fillings (translating to Kiswahili)	➢ Lecture ➢ Role Play ➢ Demonstration ➢ Brainstorming	➢ Sample questionnaire
	1:00-2:00 pm	**Lunch Break**		
	2:00-4:00 pm	**Data collection Techniques (cont')** ➢ Anthropometry – Taking Height – Taking Weight – Recording Measurements	➢ Demonstration ➢ Role Play	➢ Seca Scales ➢ Height Board ➢ Flip Charts ➢ Marker Pens ➢ Data Form
	4:00-5:00 pm	➢ **Ethics and Conduct** – Professional Conduct in the Field – Confidentiality – Working Hours – Allowances – Q & A	➢ Lecture ➢ Discussion	➢ Flip charts ➢ Marker Pens
2	9:00-9:30 am	**Recap of the Previous Day**	Discussion	➢ Flip charts ➢ Marker pens
	9:30-1:30 pm	**Pre-test questionnaire**		➢ Questionnaire
	2:30-3:30 pm	**Lunch Break**		
	3:30-5:00 pm	➢ Revision of the questionnaire based on the results of the pretest ➢ Conclusion &closing	➢ Discussion	➢ Filled Questionnaire

APPENDIX 2: STUDY QUESTIONNAIRE

Interviewer Code_____ Questionnaire No._____

SECTION A

Date…….

Key Informant Guidelines at Kenyatta National Hospital

1. Have you ever received any training as a Nutritionist? l=Yes 2=No
2. If yes, what part of nutrition training? .....

   1=Clinical Nutritionist

   2=Public Health Nutritionist (Macro-level)

   3=Community Nutritionist

   4=Food Science Nutritionist
3. Do you have any knowledge on infant and young child feeding practices?

   l=Yes 2=No
4. If yes, how did you learn about infant feeding practices?

   1=Collage 2=University

   3=Seminars

   4=Workshops
5. What do infant feeding practices entail?

   1=Breast feeding

   2=Formula feeding

   3=Solid food intake

   4=Complementary foods and liquids
6. What were the traditional infant feeding practices?

   1= 0-3months.....

   2= 3-6 months.....

   3= 6-12 months.....
7. What are the current infant feeding practices?

   1= 0-3months.....

   2= 3-6months.....

   3= 6-12months.....
8. Do you give the mothers advice on infant feeding practices?

l=Yes 2 = No

9. What nutrition education messages are included in the Infant and Young Child Feeding practices?
10. Do you think mothers follow your nutrition advice at the Wards and Clinics?

    1 =yes

    2-No Give reasons for any answer given above.....
11. Improved nutritional status of infants associate with the program has been successful?

    1=Yes 2=No 3=Don't know
12. If No, give reasons you can attribute to the failure of the program in achieving improved nutritional status among infants?
13. How many mothers do you attend to per month? .....
14. How frequent are the lessons per individual mother?
15. Which communication skills do you use to pass messages?
16. Which language is generally used?
17. Do mothers understand the language used?
18. What are your recommendations to improve infant feeding practices among mothers?

    .....

    ……

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THIS STUDY.

Interviewer Code: _____ Questionnaire No. _____

SECTION B: MOTHERS DEMOGRAPHIC CHARACTERISTICS

No	Name	Age (Yrs)	Marital Status	No. of Children	Education Level	Occupational Status	Religion
1							

Marital Status

1= single/never been married 2=monogamously married 3=polygamous married
4= divorced 5= widowed 6= separated

Education Level

1= Never went to school 2=Kindergarten 3= Lower Primary
4= Upper Primary 5= Secondary 6= College/ Polytechnic
7=University

Occupational status

1 "regularly employed 2= farmer 3=business/Self-Employed
4= casual laborer 5= unemployed 6= house-wife
7= student 8=Teacher

Religion

1= Christian 2= Islam 3= Pagan
4=Traditional Believer 5=others (specify)

SECTION C: KNOWLEDGE

Breastfeeding Knowledge

1. Do you know how to feed your child?

   1= Yes 2 = No 3=Other

2. Most of teaching on child feeding practices is got at the hospital/MCH?

   1=Yes 2=No 3=Other

3. The first food a newborn baby should receive is only breast milk?

   1=Yes 2=No 3=Don't know

4. Do you know exclusive breastfeeding?

   1=Yes 2=No 3= Don't know

5. Exclusive breastfeeding mean that the infant gets only breastmilk and no other or foods?

   1=Yes 2=No 3=Don't know

6. It is recommended that a mother feeds nothing more than breastmilk from birth to six months?

   1= Yes 2= No 3= Don't know

7. Breastmilk provides all the nutrients and liquids a baby needs in its first six months

   1= Yes 2=No 3=Don't know

8. How often should a baby younger than six months be breastfed or fed with breastmilk?

   1=On demand, whenever the baby wants 2=Other 3=Don't know

9. Breastmilk Protects the baby from diarrhoea and other infections and chronic diseases in adulthood
   1=Yes 2=No 3=Don't know

Complementary Feeding

10. At what age should babies start eating foods in addition to breastmilk?

    1=At six months 2=Other 3=Don't know

11. Is it important to give foods in addition to breastmilk to babies from the age of six months?
    1=Yes 2=No 3=Don't know
12. If, Yes why is important to give food in addition to breastmilk?

    1= Breastmilk alone is not sufficient

    2=baby needs more food in addition to breastmilk

    2=Other 3=Don't know

13. Pulses and nuts: flours of groundnut and other legumes (peas, beans, lentils, etc.), sunflower seed, peanuts, soybeans can be added to porridge to make it nutritious?

    1=Yes 2=No 3=Don't know

14. Ways to encourage young children to eat is giving them attention during meals, talk to them, make meal times happy by clapping hands
    1= Yes 2=No 3=Don't know

Iron-Deficiency Anaemia

15. Have you heard about iron-deficiency anaemia
    1=Yes 2=No 3=Don't know/no answer
16. If Yes: Can you tell me how you can recognize someone who has anaemia?
    1=Less energy/weakness 2=Paleness/pallor 3=Spoon nails/bent nails 6=Don't know
17. What are the health risks for infants and young children of a lack of iron in the diet?
    1=Delay of mental and physical development 2=Other 3=Don't know

Seeking Child Growth Monitoring

18. How can you (caregiver) find out if the baby is growing well or not?

    1=Stunted 2=Not eating well 3=Sick 4=Dont' know

19. Who can help the mother to find out if the baby is growing well? Where can she go?

    1=Go to the health centre/ask a doctor or nurse 2=Other 3=Don't know

20. If the baby is not gaining weight, what does that mean?

    1=The baby is not eating well/the baby does not want to eat

    2=The baby may be sick often 3=Other 4=Don't know

21. To prevent undernutrition among Infants (0–6 months) it is recommended to breastfeed exclusively/give only breastmilk?

    1=Yes 2=No 3=Don't know

Folic acid supplements/tablets during pregnancy

22. Health benefit for taking folic acid supplements/tablets? Is to prevent birth defects/abnormalities of the nervous system of the unborn baby (brain, spine and skull)

    1=Yes 2=Other 3=Don't know

23. When a pregnant woman is undernourished, she is at risk of having a low-birth-weight baby, meaning that the baby is small or has a low birth weight?

    1=Yes 2=No 3=Don't know

Deficiency of Iron-Anaemia during Pregnancy

24. What are the health risks for pregnant women who lack iron in the diet?

    1=Risk of dying during or after pregnancy 2=Don't know 3=Other

25. Anaemia is caused by lack of iron in the diet/eat too little, not much

    1=Yes 2=No 3=Don't know

26. Anaemia can be prevented by eating iron-rich foods or having a diet rich in iron?

    1= Yes 2=No 3=No

27. When taken during meals, certain foods help the body absorb and use iron. What are those foods?

1=Vitamin-C-rich foods, such as fresh citrus fruits (orange, lemons, etc.)

2=Other 3=Don't know

28. Some beverages decrease iron absorption when taken with meals. Which ones?

1=Coffee 2=Other 3=Don't know

Family Planning/Birth Spacing

29. It is recommended that a woman waits at least two or three years between pregnancies, before coming pregnant once again.

1=Yes 2=No 3.Dont Know

30. If Yes, Please can you tell me why this is recommended?

1=To rebuild/fill up their body stores of nutrients (fat, iron and others)

2=Other 3=Don't know

SECTION C: PRACTICES

31. When you are not at home or cannot feed the baby yourself a house-help can help you feed the baby?

1=Yes 2= Sometimes 3=No

32. Infant formula by spoon, cup or bottle can be fed to the baby when you are not there?

1=Yes 2= Sometimes 3=No

33. Many times, mothers complain about not having enough breastmilk to feed their babies. Please tell me how a mother can keep up her milk supply.

1=Having a healthy or diversified diet 2=Other 3=Don't know

34. Many mothers need to work and are separated from their baby. In this situation, how could a mother continue feeding her baby exclusively with breastmilk?

1=Expressing breastmilk by hand, storing it and asking someone to give it to the baby

2=Other 3=Don't know

35. If a mother has difficulties feeding breastmilk she should seek professional help from health-care services: doctors, nurses, midwives or other health professionals

1=Yes 2=No 3=Other

36. Until what age is it recommended that a mother continues breastfeeding?

1=Six months or less 2=6–11 months 3=12–23 months

4=24 months and more (correct response) 5=Other 6=Don't know

During Pregnancy

37. A pregnant mother should eat more iron-rich foods to provide good nutrition to her baby to help him/her grow?

    1=Yes 2= Sometimes 3=No

38. A lactating woman should eat more frequently (eat more times each day) to be healthy and produce more breastmilk?

    1=Yes 2= Sometimes 3=No

39. Most women would benefit from Iron Folic acid supplements during pregnancy?

    1=Yes 2= Sometimes 3=No

SECTION D: ATTITUDE

40. Do you think it is good to breastfeed your baby exclusively for six months?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

41. If not good, can you tell me the reasons?
42. Is it difficult for you to breastfeed your baby exclusively for six months?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

43. If Difficult: Can you tell me the reasons why it is difficult?
44. Do you think it is good to breastfeed your baby on demand that is when the baby wants to feed?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

45. If not good: Can you tell me the reasons why it is not good?
46. Is it difficult for you to breastfeed your child on demand?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

47. If Difficult: Can you tell me the reasons why it is difficult?
48. Do you think you are likely to have a low-birth-weight baby?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

49. If Not likely: Can you tell me the reason why it is not likely?

50. Do you think it is serious for your baby to have a low-birth-weight?

    1= Agree 2=Strongly Agree 3= Disagree 4=Strongly Disagree

51. If Not Serious: Can you tell me the reason why it is not serious?

SECTION E: SOCIO-ECONOMIC STATUS

52. How much do you make per month in your household?

53. Please describe the home where you live
    1= Self- Owned 2= Hosted by parent or relative for free
    3= Pay rent 4= Others specify _____
54. Do you have a care in your household?
    1=Yes 2=No 3=Don't Know
55. Do you own a land in your household?
    1=Yes 2=No 3=Don't know
56. Do you own apartments for your income in your household?
    1=Yes 2= No 3=Don't Know

SECTION F: FOOD FREQUENCY TOOL FOR CHILDREN 6-59 MONTHS

Food Group: Examples	RECORD: 1=Yes, 2=No, 3=don't know
Cereals: Millet/Sorghum/Maize porridge,	
Cereal products: Spaghetti, pasta, anjera, rice, bread, mahmri, mandazi, ugali (sima) or other foods made from grain like: Sorghum, Millet, Wheat	
Vitamin A rich vegetables and tubers: Pumpkins, carrots, orange or yellow fleshy sweet potatoes	
White tubers and roots: Sweet Potato (white), white Yams, Cassava, Irish Potato or any other foods made from roots	
Dark green leafy vegetables including wild green vegetables like:cassavaleaves,amaranthus, mchicha, pumpkin leaves, spinach, kales, sweet potato leaves	
Other vegetables: Cabbage, Eggplants, Tomatoes, Onions, Green Pepper, Mushroom, Okra, celery	
Vitamin A rich fruits:Ripe mangoes, papayas + other locally available vitamin A rich fruit	
Other fruits: Bananas, Oranges, Lemons, Tangerines, Pineapples, coconut	
Organ meat (iron rich: Liver, Kidney, heart, gizzardor other organ meats	
Fresh meats and offals: Meat, poultry, offal (e.g chicken/poultry, camel/goat meat, beef)	
Eggs: Chicken,Ducks,Guineafowls,Turkey,Pigeon, or other eggs from any birds	
Fish: Fresh or dried fish or shell fish (Tilapi, octopus, crab)	
Pulses/Legume, nuts (e.g beans, lentils, green grams, Cowpeas)	
Milk and milk products (e.g. goat/camel/fermented milk, milk powder)	
Oils/fats (e.g. cooking fat or oil, butter, ghee,margarine)	
Sweets,Sugar,honey,sweetened soda or **sugary foods** such as chocolates,candles	
Condiments and Spices: Chillies, Pepper, Ginger, Spices, Herbs, Salt	
Beverages: Kahawa, black tea	

SECTION G: INDEX CHILD CHARACTERISTICS

Name of child…….. Date of Birth……Age…….
Sex……. Child ID……. ……. Birth Weight…….
Child delivered at? l=Hospital 2= Home
Relationship to child……

Anthropometric Measurements

Weight (nearest 0.1 kg)			**Height** (nearest 0.1 cm)			**MUAC** **(nearest 0.1cm)**		
1	2	Average	1	2	Average	1	2	Average

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THIS STUDY

APPENDIX 3: INFORMED CONSENT INFORMATION SHEET

Study Topic: **INFLUENCE OF MATERNAL NUTRITION KNOWLEDGE, ATTITUDE, PRACTICES OF MOTHERS ON NUTRITIONAL STSTUS OF CHILDREN 6-59 MONTHS AT KENYATTA NATIONAL HOSPITAL, KENYA**

You are being invited to take part in a research study to contribute towards better understanding of maternal nutrition knowledge, attitude, practice and nutritional status of children under-five years at Kenyatta National Hospital. The purpose of the study is to generate data on the role of maternal nutrition knowledge, attitude and practice to the nutritional status of children under-five years at Kenyatta National Hospital.

In this study, you will be expected to provide truthful information regarding your household to the enumerator assigned to you. Once you consent to participate in the study, the enumerator will ask you questions and the responses you give will be captured in this questionnaire. With your cooperation, the interview will last for approximately 40 minutes after which the enumerators.

The data collected shall only be seen by members affiliated with the study, and will not be linked to any identifying information such as name, address or other personal details that you will supply. The data collected shall be averaged over many participants and therefore your individual data shall not be identifiable.

This study poses no known risk(s) to you or your family. You may decide to stop participating in the study at any time however we encourage you to remain in the study. You have the right to demand that any data provided until that point be withdrawn/destroyed.

If you have any questions with regards to this information sheet, you should ask the enumerator before the study begins.

PRINCIPAL INVESTIGATOR: KEVIN OMONDI OBONYO

PHYSICAL ADDRESS: University of Nairobi, College of Agriculture and Veterinary Sciences, Faculty of Agriculture, Department of Foods, Nutrition, Dietetics and Technology POSTAL ADDRESS: P.O BOX 29053-00625 KANGEMI. PHONE CONTACT: +254723800809; EMAIL: omondikevin87@yahoo.com

INFLUENCE OF MATERNAL NUTRITION KNOWLEDGE, ATTITUDE, PRACTICES OF MOTHERS ON NUTRITIONAL STSTUS OF CHILDREN 6-59 MONTHS AT KENYATTA NATIONAL HOSPITAL, KENYA

Kindly tick where appropriate:

1. I Confirm that I have read (or been read to) and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had the questions answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my legal rights being affected. ☐

3. I understand that relevant sections of information and data collected during the study may be looked at by other members of this research team. I give permission for these individuals to have access to these records. ☐
4. I agree to take part in the study without any demands and of my own free will. ☐

Name of respondent: …….

Date: ……...

Signature: …… OR

Thumb Print

☐

APPENDIX 4: STUDY FINDINGS DISSEMINATION PLAN

1. A copy of this dissertation will be availed at the University of Nairobi's library for reference by other scholars interested in the results findings and any other information.
2. The Research and Programs department at KNH will get a copy for future reference by other scholars and health staff.
3. I will hold a briefing session for all ward and unit in-charges in the Reproductive Health department, to share the study findings and deliberate on appropriate approaches to address the gaps in maternal nutrition care practices of nurses identified during the study.
4. I will publish the study findings in a peer reviewed journal to disseminate the findings with the other scholars.
5. The abstract of these study findings will also be disseminated to the local, regional and international conferences, workshops or symposiums to share the information with other scholars and professionals.

APPENDIX 5: SIMILARITY INDEX REPORT

Turnitin Originality Report

INFLUENCE OF MATERNAL NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICES OF MOTHERS ON NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS AT KENYATTA NATIONAL HOSPITAL, KENYA

By Kevin Obonyo

From FOOD SAFETY (human nutrition)

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APPENDIX 6: LETTERS OF ETHICAL CLEARANCE AND STUDY APPROVALS