

**DIETARY PRACTICES, NUTRITION AND HEALTH STATUS OF INFANTS BORN TO  
ADOLESCENT MOTHERS IN TRANSMARA WEST, NAROK COUNTY, KENYA**

**BRIGID CHEBET KOTUT**

**A Thesis Submitted to the Institute of Postgraduate Studies of Kabarak University in Partial  
Fulfilment of the Requirements for the Award of Master of Science in Human Nutrition and  
Dietetics**

**KABARAK UNIVERSITY**

**December, 2020**

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Name of Student: **Brigid Chebet Kotut**

Admission Number: **GMND/M/2285/09/16**

## RECOMMENDATION

The thesis entitled “**Dietary practices, Health and Nutrition Status of Infants Born to Adolescent Mothers in Transmara West, Narok County, Kenya**” and written by **Brigid Chebet Kotut** is presented to the Institute of Postgraduate studies and research of Kabarak University. We have reviewed her thesis and recommend it to be accepted in partial fulfilment of the requirement for award of the degree of Master of Science in Human Nutrition and Dietetics.

Signed: \_\_\_\_\_


Date: \_\_\_\_\_

**Dr. Wesley Bor (PhD)**

Department of Human Nutrition & Dietetic

Kabarak University

Nakuru, Kenya

Signed:  \_\_\_\_\_

Date: \_\_\_\_\_

**Dr. Jane Situma (PhD)**

Department of Nutritional Sciences

Masinde Muliro University of Science and Technology

Kakamega, Kenya

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## **DEDICATION**

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## ABSTRACT

Globally, adolescent motherhood remains a challenge because they are unprepared for childcare hence putting their infants at risk of malnutrition. In order to prevent the occurrence of common illnesses, infants should be fed according to WHO recommendations. Research on dietary practices and the health of infants belonging to young mothers is scarce in Kenya. The purpose of this study was to determine dietary practices, health and nutrition status of infants born to adolescent mothers in Transmara West, Narok County. Five health facilities were purposively selected in Transmara West Sub County, Narok County by use of analytical cross-sectional study design. A sample size of 246 infants and 246 adolescent mothers were recruited from the health facilities. Quantitative data was analysed using SPSS for windows version 24.0 and ENA for SMART survey 2011. The relationship between nutritional status and other variables was established by use of chi-square test at a significance level of less than 0.05. Most of the mothers were between 16 to 17 years with the youngest mother being 14 years old. Breastfeeding practices was as follows; early initiation within one hour was (62.2%, exclusive breastfeeding was (50.0%) and continued breastfeeding at 12 months was (5.5%). The infants who had been introduced to solid and semi-solid foods were 88.6%. A few of the breastfed infants achieved the minimum meal frequency: 6-8 months (2.6%) and 9-12 months (0.4%) unlike the non-breastfed infants (90.9%). The most commonly consumed food groups being vitamin A rich fruits and vegetables, dairy products and grains. Slightly less than half (40.3%) of the infants received their recommended minimum meal frequency while 47.6% of those aged 6-12 months achieved the minimum dietary diversity while most achieved the minimum acceptable diet (61.9%). Malnutrition levels were 17.1 per cent 22.0% and 22.0 per cent for wasting, stunting and underweight respectively. Meal frequency, exclusive breastfeeding and infant illness two weeks before the study were significant ( $p < 0.05$ ) factors associated with malnutrition. Educational level of the mother did not influence the nutritional status of their infants. The study alluded to the existence of malnutrition among infants of adolescent mothers and hence the study recommends that policies should be in place that governs the care and health of young mothers and their infants. Similar research should be replicated especially to compare the nutrition status of infants of adult mothers with that of young mothers in the same study area.

**Keywords;** *Adolescent mother, infant, feeding practices, nutritional status, breastfeeding*

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## **ABBREVIATIONS AND ACRONYMS**

|                |  |
|----------------|--|
| <b>ANC</b>     | Antenatal Clinic   |
| <b>DF</b>      | Degree of freedom  |
| <b>ENA</b>     | Emergency Nutrition Assessment                             |
| <b>FAO</b>     | Food Agricultural Organization                             |
| <b>HAZ</b>     | Height for Age z-score                                     |
| <b>IFSS</b>    | Infant Feeding Surveillance System                         |
| <b>KDHS</b>    | Kenya Demographic Health Survey                            |
| <b>MCH</b>     | Maternal and Child Health                                  |
| <b>MIYCN</b>   | Maternal Infant and Young Child Feeding                    |
| <b>NACOSTI</b> | National Commission for Science, Technology and Innovation |
| <b>SD</b>      | Standard Deviation   |
| <b>SMART</b>   | Standardized Monitoring and Assessment of Relief           |
| <b>SPSS</b>    | Statistical Package for Social Sciences                    |
| <b>UNFPA</b>   | United Nations Populations Fund                            |
| <b>UNICEF</b>  | United Nations International Children's Fund and Education |
| <b>WAZ</b>     | Weight for Age z-score                                     |
| <b>WHO</b>     | World Health Organization                                  |
| <b>WLZ</b>     | Weight for Length z-score                                  |

## OPERATIONAL DEFINITION OF TERMS

**Adolescent mother:** In this study, adolescent mother referred to women aged below 18 years at the time of childbirth.

**Exclusive breastfeeding:** This referred to giving the infant breast milk alone for the age of six months and below without the introduction of other foods, drink or water but only allows the infant to receive ORS, syrups and drops.

**Feeding practices:** This referred to breastfeeding practices and timely initiation of complementary feeding of infants aged between 6-11 months, frequency of feeding (meal frequency), different variety of food consumption (dietary diversity) and attainment of acceptable diet

**Health:** In this study, health referred to the incidence or presence of a disease or of all diseases among the infants two weeks to data collection.

**Infant:** This referred to children below one year of age

**Malnutrition:** This referred to under-nutrition and over-nutrition that refers to an insufficient, excessive or imbalanced consumption of nutrients resulting in weakened bodily functions affecting adequate maintenance of processes such as growth, disease resistance and subsequent recovery, this study focused on under nutrition

**Nutritional status:** This referred to the physiological condition of the body as revealed by anthropometric measurements and referenced against the child's anthropometric measurements of weigh -for-length, length-for-age and ultimately weight-for-age.

**Stunting:** This referred to the height for age of the infant in relation to the specific age and sex of the infant (H/A).

**Underweight:** This referred to the weight for age in relation to the specific age and sex of the infant (W/A).

**Wasting:** This phrase referred to the weight for height of the infant (W/H).

**Z-Scores:** This referred to the index used to show how much a value deviated from the median value which in this study were weight for length, weight for age and height for age were the focus



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

The nutrition status of young infants relies on the interactions between foods consumed and their health status (WHO, 2018). On the other hand, there has been an increase in adolescent motherhood among those below 15 years thus risking their lives and that of their infants due to complications of child birth and pregnancy (WHO, 2018). Infants born to adolescents who are considered young mothers are likely to have low birth weight, which can have an effect on their health and development. Globally, approximately 22 per cent of infants below the age of five years were stunted, 5.6 per cent overweight and 7.5 per cent wasted globally while in Africa the prevalence of the three forms of malnutrition is stunting 5.6 per cent overweight 21 per cent and wasting is at 9 per cent (WHO, 2018).

Early conceptions and childbearing have been associated with stress and negative mental health which impacts negatively in the development of their children (Kumar, et al., 2018). Most of the adolescent mothers may not be formally employed and are from low socio-economic status which may affect the health outcomes of their infants (Godbout, et al., 2016). They also deal with individual, social and personal changes which make it hard for them to properly take care of their infants (Chen, et al., 2014).

In a study in Bangladesh, new-borns of adolescent mothers were found to have poorer nutritional status as compared to those of their adult counterparts, including lower stunting, wasting and higher underweight prevalence (Nguyen, et al., 2017). Studies have shown that some of the factors that have contributed to malnutrition among infants of young mothers include; low socioeconomic status, inadequate maternal and prenatal nutrition, low education status and early weaning (Da Costa, et al., 2018; Nguyen, et al., 2017).

In order to achieve optimal growth and health, infants should be only be introduced to breast milk without introduction of other foods for a period of six months which will promote optimal protection from morbidity and mortality (Beguy, et al., 2014). In a study at Durham region (Durham, 2015), only 21 per cent of the adolescent mothers continued to introduce their infants

to only breast milk without other foods due to difficulties in latching and low milk supply. In the same study, the adolescent mother seems to introduce solids and liquids more frequently than adult mothers do. In a study by (Godbout, et al., 2016), it documented that poor infant feeding among the adolescent mothers was associated with schooling, low socioeconomic status and poor knowledge of the mother. They are at risk of restricted growth especially those between the ages of 0-11 months (Yu, et al., 2016).

Teenage pregnancies continue to increase dramatically in developing Countries. Currently in Kenya, the prevalence is at 18 per cent with the highest being Narok County at 40 per cent and a low of 6 per cent in Muranga County. Other Counties with higher prevalence of adolescent motherhood is as follows: 28 per cent Tana River, 29 per cent West Pokot, 33 per cent Homabay and 21.8 per cent Kilifi. In addition, 18 per cent of young women aged 15-19 years have begun childbearing, 15 per cent have already had a live birth and an additional 3 per cent are pregnant with their first child(“Kenya 2014 Demographic and Health Survey,” n.d.). According to the survey young women with no education (33%) are much more likely to have given birth as compared to those with secondary or higher education (12%).This makes it difficult for them to take care of their infants because of economic challenges (Population Reference Bureau, 2015). In urban residents of Kenya, adolescent mothers with primary education had their first child early than those with secondary education (Mumah, 2014).

The Kenya national data by KNBS and ICF MACRO (2015), reported that; 26 per cent of children below the age of five years in Kenya are stunted, 4 per cent wasted and 11 per cent underweight based on WHO 2006 reference growth standards. In Narok County, global acute malnutrition prevalence remained poor as compared to that of June 2013 (Narok County SMART Survey Report - February 2018, n.d.). The levels of malnutrition were as follows; underweight and stunting levels were at 18.9 per cent and 27.2 per cent respectively. Stunting levels was classified as medium that is 1 in 4 children in the county are stunted (“Narok County SMART Survey Report - February 2018,” n.d.). The current research study determined the dietary practices, health and nutrition status of infants born to adolescent mothers in Transmara West Sub County.

## **1.2 Statement of the Problem**

Despite adequate nutrition being a basic human right, new-borns of adolescent mothers have been found to have poorer nutritional status in comparison to adult mothers (Nguyen et al., 2017). Most adolescent mothers have unique challenges such as no access to any source of income, being immature and lack of family support which in turn affect their health outcomes and that of their children (Godbout, et al., 2016). Early marriage and childbirth continue to increase in low and middle income countries.

There is a rise in adolescent motherhood in Kenya with those with lower education and living in rural areas (26%) having their child below the age of 18 years putting their children at risk of under nutrition (KNBS, & ICF MACRO, 2015). In Transmara West County, there were high pregnancies that led to a high number of teenage girls dropping out of school which was so far the highest in the County (“NATIONAL ADOLESCENTS AND YOUTH COUNTY,” 2017). Further, a research by Okeyo (2019) in Transmara East established that there is low coverage on the information concerning infant feeding, supplementation and mother’s dietary practices, which can create risks of under nutrition to these young mothers.

Adolescent mothers have increased responsibilities like the return to school, household chores and the general workload at home thus leaving their children to the hands of their parents or grandparents. Under nutrition among their infant’s increases the risk of morbidity and other serious health problems early in life. In addition, evidence has shown that young mothers struggle with different barriers such as the lack of autonomy in decision making and child care, the knowledge on proper infant feeding, embarrassment that is associated with public breastfeeding and the lack of support from the health care team (Jama, et al., 2018). It has also been suggested that this is because of the stigma and perceived lack of support from the family, community and health care team.

Despite the rise in early motherhood, data on dietary practices, health and nutritional needs of their infants is limited. If no intervention is provided to these young mothers, the outcome may be associated with intergenerational malnutrition and poverty (Wanjohi, et al., 2017). These young mothers are vulnerable, immature and not mentally prepared for childcare. They have been found to be depressed and to have low self-esteem because of child marriage (Marangu, et al., 2017). In addition, the return to school of the teenage mother leaves their infants vulnerable

to under nutrition as the caretakers lack the proper motherly care and support. Narok County has high level of teenage pregnancies with poor malnutrition levels (“Narok County SMART Survey Report - February 2018,” n.d.).

Limited studies in developing countries have focused on the health of teenage mothers especially on dietary practices, which is rarely reported by the mothers hence to address this gap, this study aimed at determining the dietary practices, health and nutritional status among the infants of adolescent mothers in Transmara West Sub County.

### **1.3 Purpose of the Study**

The purpose of this research study was to assess the dietary practices, health and nutrition status of infants born to adolescent mothers in Transmara West Sub County, Kenya.

### **1.4 Objectives of the Study**

The study objectives were as follows;

1. To assess the demographic and socio-economic characteristics of the infant born to adolescent mothers in Transmara West Narok County Kenya
2. To determine the dietary practices of infants born to adolescent mothers in Transmara West Narok County Kenya
3. To establish the morbidity status of infants born to adolescent mothers in Transmara West Narok County Kenya
4. To assess the nutrition status of infants born to adolescent mothers in Transmara West Narok County Kenya
5. To establish the association between dietary practices, health and nutrition status of infants belonging to adolescent mothers.

### **1.5 Research Questions**

1. What are the demographic and socio-economic characteristics of adolescent mother and their infant in Transmara West Narok County Kenya?
2. What are the dietary practices among infants born to adolescent mothers in Transmara West Narok County Kenya?

3. What is the health status of infants born to adolescent mothers in Transmara West Narok County Kenya in Transmara West Narok County Kenya?
4. What is the nutrition status of infants born to adolescent mothers in Transmara West Narok County Kenya?

### **1.6 Justification for the Study**

The rise in early marriages in developing countries has contributed to early motherhood affecting negatively on the health of young mothers and their infants. Their children are at risk of malnutrition particularly in communities where teenage motherhood is very rampant because of cultural influences. Programs that emphasize on the needs of this young mother will help in educating them on proper childcare practices and infant feeding. Information on infant feeding practices among the infants of young mothers will contribute to Sustainable Development Goal three that aims at promoting good health and well-being. Furthermore, the study will build evidence and provide information on the nutrition and well-being of the infants of young mothers.

There is scanty information concerning the needs of young mothers, their infants especially on their nutritional status and the associated factors since most studies have determined the infant feeding among children of adult mothers yet under nutrition, and poor infant feeding is still high.

The findings from this study may help to come up with policies that will look up to the needs of the children of adolescent mothers. The information will also be used in identifying areas of concern especially the factors associated with infant nutritional status among the adolescent mothers will reduce mortality and frequent hospitalisation of children through designing programs targeting the adolescent mothers. The findings will be significant in improving the overall nutrition status of the infants of young mothers.

### **1.7 Scope of the Study**

The focus of this study was on the dietary practices, health and nutrition status of infants born to adolescent mothers. Although there are other causes of malnutrition, the study focused on adolescent mother health care practices for the infant and the dietary practices for the infant.

The study was undertaken in health facilities that were selected purposively in Transmara West Sub County.

### **1.8 Assumptions of the Study**

The research study assumed that the teenage mothers would cooperate and follow the standard admission, treatment and discharge criteria. It was also assumed that there would be enough finances to undertake the study.

### **1.9 Limitations of the Study**

1. Cause effect relationship may not have been established because the study was a cross-sectional design carried out among infants below the age of 11 months.
2. The study was conducted within the facility and therefore a number of teenagers who may have delivered at home could have been missed at the enrolment.
3. The data was collected through the questionnaire, which relied on recall, hence subject to respondent bias. To mitigate this, the questions were broken down into sections during administration for easier understanding as if on initiation of breastfeeding it was specifically grouped into hours to enable recall that is more accurate.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 General Overview of Literature**

The first year in a child's life is critical because it requires proper care in order to enhance proper growth and development. Inadequate nutrition during the care process could slow development and productivity especially physical and cognitive functions (UNICEF, 2013). The various factors that could contribute to malnutrition include; poor maternal care practices, breastfeeding, complementary feeding status coupled with morbidity status (Kimani-murage, et al., 2015). According to Dewey (2013), the introduction of solid foods during the 12-month interval of 6 to 12 months is reported to be important. In the early life, under-nutrition is directly because of poor feeding practices (breastfeeding and complementary feeding) coupled with high morbidity (Kimani-Murage, et al., 2011).

This chapter focused on information concerning the demographic status of adolescent motherhood, infant dietary practices, health status and infant nutritional status in order to identify the gaps.

#### **2.2 Adolescent Mother Demographic and Socio-Economic Status in Relation to Infant Nutritional Status**

It is estimated by WHO (2018), that 2.5 million girls aged 16 years of age have given birth in low resource countries by the age of 18 years. In the same study by World Health organisation, early marriages are common among adolescent girls aged 15 to 19 years contributing to 90 per cent of the adolescent births. Adolescent pregnancy accounts for 28 per cent among women aged between 20 to 24 years who give birth before the age of 18 years in Sub-Saharan Africa (Edilberto, n.d.). The increase in child marriages is more common in areas with low socioeconomic status leading to an increase in adolescent births (Campbell, et al., 2013).

Further, early marriages, unemployment and violence among adolescent mothers led to depletion of nutrients contributing to a low birth weight for the infant and inadequate breast milk (Raj, et al., 2010). Additionally, studies have shown that infant nutritional status is related with maternal education (Aparicio, et al., 2018; Fadare, et al., 2019; Islam, et al., 2016). Categorically, post-natal environments in developing countries, young mothers who are not

experienced and not able to make independent decisions, poor health seeking behaviours contribute to poorer nutritional status and stunting among their children (Wu, et al., 2016).

The lack of support by their families and community has negatively affected the growth and development of their children has contributed to high mental stress among the mothers (Huang, et al., 2014). Past studies have shown that these young mothers lack autonomy in decision making and most of them are from low socioeconomic status contributing to malnutrition which impacts negatively on the health and development of their children (Da Costa, et al., 2018; Nguyen, et al., 2017).

In Kenya, 66 per cent of school dropout was associated with unintended teenage pregnancies with 59 per cent of this pregnancies occurring among girls aged 15-19 years (Walgwe, et al., 2016). Further, a study by (Concerns, 2017) in Kajiado suggests that young mothers are not equipped to take care of their children and thus poor health outcomes of their children. Limited studies have looked at the health status and the nutrition status of these infants despite the rise in adolescent young motherhood.

### **2.3 Infant Feeding Practices among Infants 0-12 Months**

Infant feeding practices for the first year should be multidimensional as documented by UNICEF (2013) whereby infants should be fed with breast milk in the first one hour of birth and be fed breast milk alone for six months after which safe solid foods will be introduced at the age of six months. UNICEF (2013) that this could contribute to lower mortality among five year olds by one fifth documents it. Inappropriate feeding has contributed to 55 per cent of diarrhoea and respiratory infections among infants (WHO, 2018).

Results of studies on infant feeding among adolescent mothers have shown that inappropriate feeding practices poses a lot of challenges because the mother is not mature enough to make the right decision for herself and both for her infant (Smith, et al., 2012; Jama, et al., 2018 and Tucker, et al., 2012). According to Hong (2017), it was documented that the children of adult mothers had better nutrition status than those of adolescent mothers.



### **2.3.1 Breastfeeding Practices**

The WHO and UNICEF recommend that breast milk should be fed to the infants for a period of six months without the introduction of any other solid foods or water. After the age of six months, breastfeeding should continue for a period of two years as other foods are gradually introduced to the infant (UNICEF, 2013). Breast milk alone without the introduction of other solids or liquids has been recommended because it provides all the nutrients, immune factors, antioxidants (WHO/UNICEF, 2018). The indicators for breastfeeding include early initiation within one hour and exclusive breastfeeding for infants less than six months and continued to one year (UNICEF, 2013).

### **2.3.2 The Status and Benefits of Exclusive Breastfeeding**

Breast milk is important for children below the age of six months as it provides the simplest, healthiest, complete and sufficient for infants below six months of age. The introduction of breast milk alone promotes better growth and development than alternative feeding methods in infants. Additionally it has been associated with lower risks of diseases such as obesity, diabetes, and childhood leukaemia later in life (Mika, 2011). Furthermore, breastfeeding positively increases brain development in the first year of life for children. It also leads to a higher acceptance of new variety of complementary foods later in life. Food diversity also increases the spectrum of nutrients to ensure that they are healthy and achieve optimal growth (Mika, 2011).

The WHO and UNICEF have recommended that in order to promote the closeness between the mother and the infant, breast milk should be fed to the infant within one hour of birth (WHO/UNICEF, 2018). The breastfeeding duration of young mothers has been found to be short since most of them lack the proper breastfeeding knowledge and are confused about motherhood (Smith, et al., 2012). Additionally, it is stated that the challenges faced by this young mothers has been related to their schooling and low socioeconomic backgrounds (Godbout, et al., 2016). A study carried out by Jama (2016) found out that diarrheal disease among children is caused by the introduction of other foods besides breast milk at an early age thus contributing to malnutrition among their children. Adolescent mother's choice of breastfeeding has been reported to be related to attitudes, knowledge on breastfeeding, the perceived benefits, the problems associated with nipple pain and the experience of breastfeeding (Tucker, et al., 2011). Difficulties in latching and low milk supply were associated with early

introduction of liquids than solids among adolescent mothers in the Durham region (Report, 2015).

In a study by Godbout (2016), parents of the adolescent mothers have been found to influence their infant feeding choices leading to low levels breastfeeding and early introduction of bottle-feeding. In a separate study, nipple pain, fatigue and soreness were found to be a contributing factor to low levels of breastfeeding (Camarotti, et al., 2011).

### **2.3.3 Early Initiation of Breast Milk**

Globally, new evidence suggests that 45 per cent of infants are safeguarded from mortality by early initiation to breast milk (WHO, 2018). Additionally, breast milk has been associated with increased child survival that benefits the child up to six months. It is estimated that more infants in Southern and Eastern African countries were practicing early initiation thus decreased child mortality (WHO, 2018). A study finding in Hoima Uganda revealed that 60 per cent of teenage mothers initiated their children to breast milk within the first hour of birth (Kabwijamu, et al., 2016). On the other hand, 85 per cent of the adolescents initiated breastfeeding as compared to adult mothers at 92 per cent (Durham region, 2015).

There is a rise in adolescent motherhood in Kenya; there is a need to be able to provide an educative environment for these young mothers in order to reduce infant morbidity and mortality.

Unlike other studies parents of adolescents have been found to contribute to long term exclusive breastfeeding of the adolescent mother (Nesbitt, et al., 2012). The mothers in the same study expressed the fact that their own nutritional status affected how they fed their infants. They also lacked knowledge on the duration of breastfeeding and were unable to know when their baby was full. However, grandmothers of the adolescent mothers have also been found to contribute to low levels of breastfeeding (Da Costa, et al., 2018).

The decision by the adolescent mothers to stop breastfeeding was influenced by inadequate knowledge, inadequate support from the health care team and early painful experience that they were unprepared for (Smith, et al., 2012). In Kenya, approximately 61 per cent of infants age group of between 0 to 6 months are exclusively breastfed as compared to 13 per cent in 2003

(KDHS, 2014). There is a dearth of data on adolescent mother breastfeeding practices in Kenya, and very little information is available.

### **2.3.4 Complementary Feeding**

The introduction of solid foods has been recommended to infants aged six months and above in order to enhance optimal growth of the child's body and brains (WHO, 2018). After the age of six months, the infant should be introduced to a variety of semi-solid foods in order to prevent wasting and stunting. Globally, only 1 in every 6 children under the age of five has received a minimum acceptable diet. Children in developing countries are more vulnerable due to inadequate resources thus higher risks of stunting. These countries have been found to be prone to micronutrient deficiencies due to inadequate diets putting close to 250 million children at risk of stunting (WHO, 2018).

This study by World Health Organization (2018) found out that late introduction of foods to this children denies their bodies nutrients leaving them at risk of malnutrition. Therefore the World Health Organization has recommended that infants in the ages between 6 to 8 months be introduced to two meals in a day and those in the ages of 9 to 23 months be given at least three meals in a day. On the other hand, the children who are not on breast milk should be fed a minimum of four times in day once they turn six months of age.

During this critical period, it was found that in developing countries half of the children aged 6-23 months are not fed the required number of times in a day (WHO, 2018). A minimum of four serving from the following food groups is recommended among the children between 6 to 12 months ; grains, roots and tubers; legumes and nuts; dairy products; meats and fish; eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables. The most crucial age group is 6-11 months where the diet should be diversified to prevent micronutrient deficiencies, which could in turn lead to stunting (WHO, 2018).

Appropriate feeding is measured at the population level and involves a composite indicator, which is the minimum acceptable diet for children aged 6 to 23 months. Children should also be able to consume foods that have been prepared in safe environments, which include safe washing of hands before meal preparation in order to prevent infection, and more than four foods from each food groups (WHO, 2018).

Early introduction of other foods among children among teenage mothers has been associated with the lack of sufficient information on infant feeding and inadequate social and financial support. Additionally these mothers have been found to introduce sugary foods at a young age with low consumption of fruits and vegetables after the age of six months of age because of inadequate maternal and prenatal nutrition (De Costa, et al., 2018).

#### **2.4 Nutritional Status of Infants Born to Adolescent Mothers**

Globally stunting has been found to be higher in South East Region and WHO African region with 22% of under-fives being too short for their age in 2017. Malnutrition has been associated with childhood morbidity and mortality future learning capabilities and non-communicable diseases. According to World Health Organization (2018), the prevalence was approximately 51 million in 2017 with wasting being 7.5 per cent and 5.6 per cent overweight.

In a study in Ghana among adolescent mothers, children under 5 years were found to have increased risk of stunting, wasting underweight in comparison to similar children of adult mothers (Wemakor, et al., 2018). Children of the adolescent have been found to have low weight at birth due to environmental factors such as poor socio-economic factors and the mother's level of education (Fanzo, et al., 2012).

According to (Raj, et al., 2010), low maternal age and poor socioeconomic status among young mothers contributed to high infant mortality and malnutrition among their children. Their children were found to be malnourished due to the competitive nutrients between them and their infant (Hong, et al., 2017). In a study by (Finlay, et al., 2017), it was found that young maternal age, short birth intervals contributed highly to poor nutritional status and infant mortality and morbidity especially to the first born infants.

In Kenya, it has been found that stunting is at 26 per cent and those children that are severely stunted to be 8 per cent (KNBS, & ICF MACRO, 2015). Children residing in the rural areas had higher levels of stunting at 29 per cent than those in the urban areas at 20 per cent. Additionally, the children of young mothers who are educated have been found to be less stunted.

The level of malnutrition in the County of Narok has been as follows; the level of stunting was found to be at 27.2 per cent and underweight was 18.9 per cent being highest among boys than

girls due to socio-cultural factors. The caregivers were found to have good nutritional status and were healthy. Severe stunting for caregivers was 0.4 per cent and moderate malnutrition was 5.6 per cent (County, 2013).

According to (Tankoi, et al., 2016), low socioeconomic status, being a house wife, number of children in household, inadequate access to water, sanitation and hygiene and poor infant feeding practices led to a high level of under nutrition in Transmara East Sub County. In the same study, the levels of under nutrition among children were 22 per cent 31 per cent and 8 per cent for underweight, stunting and wasting respectively. However, this information is for adult mothers only and their children, the study of the children of young mothers has been scanty despite the fact that the County has levels of teenage pregnancies. Therefore, there is need for further research on the nutritional status of their infants in the study area.

## **2.5 Infant Morbidity Status and Adolescent Mother Health Seeking Behaviour**

The children aged two years and below are prone to infections and hence the need to prevent this to enhance proper growth and development. According to WHO (2018), acute respiratory infections, diarrhoea and malaria were the leading causes of death in 2016 among children under five years of age. The high morbidity among children under the age of five years was mainly as result of under nutrition and severe morbidity such as pneumonia, diarrhoea, malaria, HIV and AIDS and measles (UNICEF, 2013). Acute wasting and stunting have been associated with common infectious diseases in early childhood such as measles, diarrhoea, pneumonia, meningitis, and malaria in children. In a community based survey in low-income countries, stunting increased each day with increase in diarrhoea among children aged 24 months (Black, et al., 2013).

### **2.5.1 Diarrheal Disease**

Globally, it is estimated by the World Health Organization that 50 per cent of all cases of under nutrition have been attributed to inadequate sanitation facilities that are safe thus contributing to diarrhoea that has killed approximately 525,000 children under the age of five years each year. The same survey by WHO, established that infants aged 6-11 months have the highest incidence because they are in the transition from breast milk to solid foods (WHO, 2018).

In the Kenya Demographic Health Survey (2014), diarrhoea accounted for 15 per cent of children under age five and affected 27 per cent of those children aged 6-11 months two weeks before the survey. Among those who seek treatment, (58%) of the children were taken to health facility while 11 per cent received no treatment (KDHS 2014). According to the Narok County Health report (2018), the children with diarrhoea were (12.6%) and the caregivers who sought treatment in the public clinic was (50.5%) and (43.6%) in the private clinic respectively.

### **2.5.2 Acute Respiratory Infections**

Globally, pneumonia causes 16 per cent of all deaths of children below the age of five years and in 2015 killing 920 136 children (WHO 2018). According to (KDHS, 2014), children under five with signs of acute respiratory infections (ARI) was 9 per cent in the two weeks before the survey. In Narok County Health report (2018), acute respiratory infections were at 34.6 per cent and those that sought treatment the public clinic (50.5%) or private clinic (43.6%).

### **2.5.3 Malaria**

Globally, approximately 216 million malaria cases was reported in 2016 in relation to 237 million cases in 2010, and 210 million cases in 2013 (WHO, 2018). According to the Kenya Demographic Health Survey (2014), fever was reported in approximately 26 per cent of children under age 5 in the two weeks before the survey. Fever was not common among those children aged under 6 months (17 percent) but was common among children age 6-23 months (30-31 percent). In Narok County, 22.6 per cent of the children in the sampled households had fever and had been sick two weeks before the survey.

### **2.5.4 Maternal Health Seeking Behaviour**

In a study by Marangu (2017), it was established that most adolescents do not regularly go to health centres for postnatal care due to the high cost associated with accessing the hospitals. Adolescent mothers need support after delivery from the healthcare providers and from their families. Healthcare workers have been found to influence the knowledge on the mothers on the proper infant feeding. In a qualitative descriptive research by (Nesbitt, et al., 2012), adolescent mothers expressed that health care providers enhanced their confidence in breastfeeding through the hands on support that they gave them. A study by Kimani-Murage (2017); found out that

women deliver at substandard health facilities where they do not receive counselling from health providers on infant feeding. In Hoima Uganda, adolescent mothers who stayed longer in the hospitals learnt how to take care of their new-borns (Kabwijamu, et al., 2016).

In a study by Jama (2018), teen mothers in Kwazulu Natal became aware of the importance of exclusive breastfeeding because of the counselling they received from the ANC. In the same study, teenage mothers who were residing with other family members, hence were unable to make decisions on their own, and were more depended on their parents for advice on infant feeding. Thus being forced to engage in activities that put themselves and their infants at risk (Kimani-murage, et al., 2015). There is a dearth of knowledge on the adolescent mothers infant care practices among those in the rural areas in Kenya.

## **2.6 Association between Dietary Practices, Nutrition Status and Health**

### **2.6.1 Association between Infant Morbidity and Nutritional Status**

According World Health Organization (2020), infants of young mothers are prone to infections and malnutrition. In a comparison study between adult mothers and adolescent mothers, the children of adolescent mothers were found to be undernourished as a result of inadequate foods, infections and improper child care practices (Wemakor, et al., 2018). Additionally, this young mothers are not in a position to guarantee sufficient dietary practices and have been found to have low levels of breastfeeding thus contributing to wasting and stunting (Fekadu, et al., 2015). Limited data is available on the association between morbidity of infants and nutrition status among infants of adolescent mothers.

### **2.6.2 Association between Infant Morbidity and Nutritional Status**

In a cross sectional study in Tanzania, reduced underweight was associated with dietary diversity among children aged between 6 to 12 months (Khamis, et al., 2019). In another study in Ghana, optimal feeding practices showed a positive correlation with nutrition status. According to (Sié, et al., 2018), reduced stunting but not wasting was associated with nutritional status. Another study by Olodu et al. 2019 in Nigeria found out that exclusive breastfeeding is associated with reduced wasting among infants of young mothers. There is limited evidence on

association between dietary practices and nutrition status of infants belonging to adolescent mothers.

## **2.7 Water, Sanitation and Hygiene among Adolescent Mothers**

According to World Health Organization (2018), an estimated 870,000 deaths in 2016 have been linked to the lack of access to safe drinking water, safe sanitation and lack of hygiene. According to UNICEF (2013), in order to have healthy environments and reduce the prevalence of infectious diseases, it is vital to improve water, sanitation and hygiene as well as housing. These is not limited to immunization, improving sanitation by creating environments free of fecal matter, washing hands with soap, access to treated drinking water and use of insecticide-treated mosquito nets to treat malaria, and treatment of pneumonia with antibiotics (UNICEF 2013).

According to KDHS 2014, most households in Kenya (71%) get access to drinking water from clean and sources, while 27 percent use sources that are not improved. Approximately 66 per cent of rural Kenyans usually use latrines, most commonly a pit latrine without concrete or a pit that is open (48 percent) and 17 per cent use a sanitation facilities that is shared of which it is a pit latrine with a concrete (KDHS, 2014). In rural areas in Kenya, the knowledge on the adolescent mother's water, sanitation and hygienic practices is limited.

## **2.8 Summary of the Literature Review**

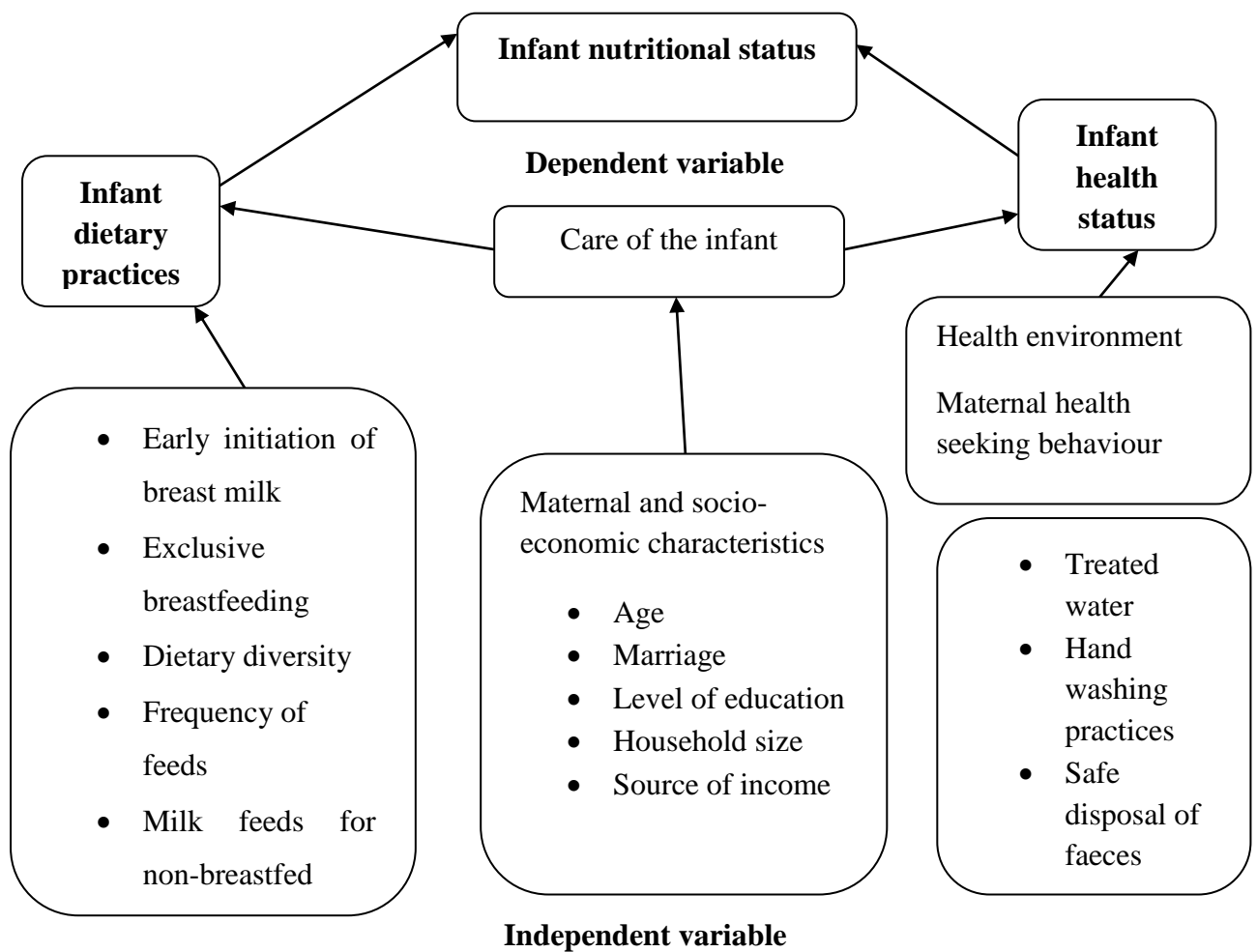
The increase in adolescent motherhood puts their children at risk of malnutrition, illnesses and death. The data is scanty regarding dietary practices, health and nutritional status and the factors associated with it is a hindrance in making decisions regarding policies and coming up with that govern the care of adolescent mothers. It is critical to improve the feeding practices and the nutritional status of lactating adolescent mothers and their children (WHO, 2018). This study added more information on the dietary practices, health and nutrition status of infants belonging to adolescent mothers.

## **2.9 Conceptual Framework**

The UNICEF 2013 conceptual framework has been used to indicate the interplay of factors affecting the nutritional status of the infant. The independent variables include; immediate



causes of under nutrition which is the dietary intake and infant health status. While inadequate care by the adolescent mothers, poor socioeconomic status, household food insecurity, and inaccessibility to health facilities are the underlying factors affecting the child’s nutritional status. Malnutrition related morbidity such as; Diarrhoea, Malaria, upper respiratory tract infections and measles are likely to recur among infants of adolescent mothers. Their feeding and care practices that falls short of a child’s needs is likely to deprive them of important nutrients and minerals, which would result in poor immunity that trigger illness in addition to appetite loss.



**Figure 1:** Conceptual framework adopted from UNICEF 2013 on dietary practices, health and nutrition status of infants of adolescent mothers.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

The focus in this section was on research design, the location of study, the population of study, sample size, sampling procedure, techniques that were used for data collection and data analysis.

#### **3.2 Research Design**

A descriptive cross-sectional study design was employed to assess the dietary practices, health and nutrition status of infants of adolescent mothers. This study design was used because it provides a snapshot of information about the situation at hand at a specific time and the characteristics of the status of study population. It also followed a systematic way of investigation with questions that have measurable variables with the aim of explaining, predicting or controlling (Ncklicek, 2012).

#### **3.3 Location of the Study**

Transmara West Sub County is divided into six administrative divisions or wards; Kilgoris, Keyian, Kirindon, Angata and Pirrar and located within Narok County. Transmara West Subcounty was selected because of the high numbers teenage pregnancies and also poor nutrition status of the infants (County health report, 2018). Narok County borders Nakuru County, Bomet County, Nyamira County and Kisii County and covers an area of 17,944 Km per square meters. According to the Kenya demographic statistics from the census, the total number of persons in Narok County was 850,920 with a population density of 47 people per Km per square meters. The age distribution among the population was as follows: 0-14 years 53 per cent 15-64 years 42 per cent and 65+ years 2.0 per cent The total number of health facilities in Narok County is one hundred and four. In Narok County, the following are the levels of health facilities available; three level four, one level three, sixteen level two and 84 level one.

### 3.4 Population of the Study

The respondents of this study consisted of adolescent mother infant pair. The infants that were recruited into the study consisted of infants aged between 0-12 months at the time of the study and were born of adolescent mothers. The age of the adolescent mother was below 18 years of age.

### 3.5 Sampling Procedure and Sample Size

#### 3.5.1 Sample Size Determination

The Fisher's et al. 1998 equation  $n = (z^2 \times pq)/d^2$  was used to determine the sample size where the total population is greater than 10,000.

**n** = desired sample size

**z**= standard normal deviate at the required confidence level in this case 1.96

**P**= proportion of the target population estimated to have characteristic being measured

Proportion of adolescent mothers either pregnant or lactating is 20% (KDHS, 2014) hence 0.20

**q** = (1-p) =25% or 0.25

**d**= level of accuracy of the statistic being measured (95%) = (0.05)

$n = (1.96^2 \times (0.2 \times 0.25))/0.05^2$

**n=246**

The sample size (n) that was selected was 246. The response rate was 100%.

#### 3.5.2 Sampling Procedure

The Narok County has four Sub-Counties that included Narok North, Narok South, Transmara East and Transmara West (County Government of Narok, 2013). Purposive sampling was used in selection of Transmara West Sub County as it is a rural sub-county with highest number of

teenage pregnancies (County Health Report, 2013). The health facilities in Transmara West Sub County were stratified per levels such that dispensaries was level two, while level three was health centers and finally level four was district hospital. The five health facilities namely Transmara Sub-County hospital, Lolgorian Sub-county hospital, St. Joseph missionary hospital, Nkararo health centre and Enosaen health centre were also purposively selected. Adolescent mothers were selected by systematic random sampling in the health facilities.

The table 1 below shows how the sample size proportionately allocated per levels as shown below using the formula:

$$(n/N)N_n$$

Where n = Population in the group

N = Total Population being studied

$N_n$  = Sample size

**Table 1:** Sample Size Distribution for the 5 Health Facilities

| No | Facilities              | Number of teenage mothers (2017-2018) | Sample size achieved |
|----|-------------------------|---------------------------------------|----------------------|
| 1  | Transmara Sub-county    | 250                                   | 60                   |
| 2  | Lolgorian Sub-county    | 100                                   | 27                   |
| 3  | St. Joseph Missionary   | 410                                   | 118                  |
| 4  | Nkararo health centre   | 100                                   | 27                   |
| 5  | Enosaen health centre   | 50                                    | 14                   |
|    | <b>Cumulative Total</b> | 910                                   | <b>246</b>           |

Source: MOH Transmara West Sub County (2018)

### 3.6 Study Subjects

#### 3.6.1 Inclusion Criteria

Adolescent mother infant pair who was medically stable with no known chronic disease and of sound mind and delivered in the health facility within the last 12 months were included in the

study. The adolescent mother and their caregivers should have been willing to assent and interested in participating in the study. They were residents of Transmara West Sub-county and gave assent and consent for participation in the study.

### **3.6.2 Exclusion Criteria**

Adolescent mother infant pair who delivered in the health facility within the last 12 months, willing to assent and caregiver willing to consent and having a pre-term baby or with known medical condition which could affect infant feeding practice were excluded.

### **3.7 Instrumentation**

#### **3.7.1 Researcher Administered Questionnaire**

The tool that was used by the researcher for data collection included a semi-structured questionnaire that was pretested and used to gather information on demographic and socio-economic characteristics, dietary practices, anthropometric measurements, care and support, and morbidity patterns from adolescent mothers attending well baby clinic/MCH and information was recorded by the researcher. The questionnaires were administered by the researcher assisted by research assistants who were trained by the researcher. The questionnaire was organized into the following five sections:

- i. Socio-demographic information of the adolescent mother and household
- ii. Infant feeding practices
- iii. Infant morbidity status and maternal care practices.
- iv. Anthropometric measurement of the infant (weight and length)

#### **3.6.2 Anthropometric Measurements**

Anthropometric measurements were measured by the researcher and two research assistants, trained in all aspects of collecting data. The researcher measured the weight and height of the infant. The child's card was used to get information on the child's age. The weight was taken using Seca 767 weighing scale. The child was weighed with fewer clothes.

### **3.6.2.1 Weight Measurements**

The following procedure was used:

The researcher took the baby and then requested the mother to remove the baby's heavy clothes. The scale was adjusted to zero. The baby was weighed with fewer clothes. The researcher gave the mother to the baby. The researcher took the reading to the nearest 0.5 Kg. The steps were repeated and a second reading was taken

### **3.6.2.2 Procedure for Taking Length/Height**

Standard Measuring board was used to take the length for the infant. The measuring board was placed on a flat stable ground. The infant was placed on the board assisted by the mother and was supported in the head and gradually lowered on the board. The researcher ensured that the child's head touches the fixed headboard with the hair compressed. The researcher ensured that the child was lying straight and is stretched on the board and the heels were firmly on the foot piece. The reading was recorded to the nearest 0.1 cm by the researcher. In order to take the second reading, the above steps were repeated.

### **3.6.3 Dietary practices assessment**

Data on the infant feeding practices was collected using a seven - food group dietary questionnaire. The mother was asked to name all the foods that the infant consumed in the past 24 hours. Therefore, the 7 food groups; starchy staples, legumes, seeds and nuts, dairy products, flesh foods, eggs, vitamin A rich fruits and vegetables and other fruits were used in the analysis of dietary diversity scores (WHO,2008). "Dietary practices score was awarded scores as follows: food groups below 3 showed low dietary inadequacy of the food groups taken while the food groups above 4 indicated adequate dietary diversity (WHO, 2008).

### **3.6.1 Pretesting of the Study**

The questionnaires were pretested in Narok County Referral hospital which was not inclusive in the study on 10% of the total sample. The area was selected for the pre-test because it is the main referral in that County with high attendance of teenage mothers. The researcher and the data collection team conducted the pre-test in order to assess the length, content, wording and

language of the tools. Any ambiguities like problems in wording, lack of clarity was noted and was corrected before the actual data collection process. Final adjustments were done after pre-testing the tool in order to increase reliability and validity.

### **3.6.2 Validity of the Instrument**

The researcher used peer review to enhance face and content validity. Data collection was also supervised very closely by the researcher. Questionnaires were reviewed daily to check for any inconsistencies.

### **3.6.3 Reliability of the Instrument**

In order to produce consistency in results, split half was used for external reliability whereas Cronbach alpha ( $\alpha$ ) was used for internal reliability to ensure consistency of results. Adolescent mothers were randomly sampled in the identified health facilities in Transmara West Sub County. The same questionnaire is the one that was used during data collection after a week.

### **3.7 Data Collection Procedure**

The researcher selected the different health facilities from strata. The mothers were recruited after they had received their usual MCH services. The age of the infant was verified using the child health cards. The type of data which was collected included but not limited to socio economic data, socio demographic data and health of the infant as well as anthropometric measurements.

### **3.8 Data Analysis**

#### **Objective 1: Analysis of Demographic and Socio-Economic Characteristics of the Mother-Infant Pair**

Descriptive analysis on demographic and socioeconomic information of the mother-infant pair was carried out using the latest version of SPSS software version 24. Simple frequencies were computed on sex and age of the mother, mother's educational level, the number of family members in the household and total income per month in the household. Pearson correlation

was used to establish the relationships between socio demographic and economic variables and the nutrition status of the infants.

### **Objective 2: Dietary Practices of Infants Born to Adolescent Mothers**

Dietary diversity data was entered into SPSS software version 24 and described using mean, maximum, minimum, standard deviation and percentages.

### **Objective 3: Health Status of Infants Born to Adolescent Mothers**

Analysis was carried out using the software (SPSS version 24) for child illnesses two weeks before the study. Simple frequencies were computed on the morbidity status of the infant, where they were treated and the duration of the illness. The relationships between child illness and the nutrition status of the infants were established using Pearson correlation.

### **Objective 4: Nutrition Status of Infants Born to Adolescent Mothers**

After the data was collected, the information on anthropometry was entered using ENA for SMART (2011). The World Health Organization (2006) reference data were used to compare with the nutritional indicators for children; weight-for-length, length-for-age and weight for age. Infants were considered wasted, stunted or underweight if they nutrition status was below-2 standard deviations ( $-2SD$ ) of the WHO median for WAZ, HAZ and WHZ respectively. After removing irrelevant parts of the data, further cross analysis of the study variables was carried out using Statistical Package for Social Sciences (SPSS) 24.0 thereafter the data was presented in charts and tables. Data on the nutrition status was described using mean, maximum, minimum, standard deviation and percentages.

### **Objective 5: Relationship between Demographic, Economic, Dietary Practices, Health and Nutrition Status of Infants Belonging to Adolescent Mothers**

The chi-square ( $\chi^2$ ) test was used to assess differentials existing associations between the dietary practices, morbidity status and the nutritional status of infants belonging to adolescent mothers. Cross tabulation was used to test whether there is a significant association between factors and infant nutritional status. Spearman rho correlation was conducted to test whether there is a significant relationship between demographic, economic, dietary practices, morbidity status and



the nutritional status of infants. After the analysis, a p-value of less than 0.05 was considered statistically significant. The results were presented using frequency distribution tables and indicated as frequencies or percentages in tables and figures.

### **3.9 Ethical Considerations**

The study was approved by the Kabarak University School of post-graduate while the ethical clearance was issued by the Kabarak University Institutional Ethical Review Committee (KU-IERC). The research permit was authorised from the National Commission for Science Technology and Innovation (NACOSTI). Further authorisation was given by the facility in charges and nutritionists in the sampled health facilities. Adolescent mothers and their guardians gave consent for participation of their infants and young teenage mothers into the study respectively. The health staff in charges allowed the use of the available Salter scales and length boards.

#### **3.9.1 Informed Consent and Assent**

A written informed consent from adolescent mothers and assent form from guardians was obtained that detail the purpose of the study, benefits of the study, risks involved and contacts of all relevant individuals to whom clarification of the study can be sort. The decision of the respondents to either be included or excluded in the study was respected. The respondents agreed to give consent by signing the forms in order for the researcher/ research assistants to collect data from them (APPENDIX I).

#### **3.9.2 Confidentiality**

The researcher assured the respondent on the confidentiality of the information obtained from them. To ensure anonymity and confidentiality, data pertaining to the name of the respondent and next of kin was not be recorded and special codes numbers will be assigned to each questionnaire to conceal identity of the respondent. All questionnaires were safely kept in lockable cupboards and data entered in a computer will be encrypted with passwords for maximum confidentiality of the information.

### **3.9.3 Autonomy**

Permission to collect data was sought from the adolescent mothers and their guardians and parents. The researcher assured that data pertaining to the name of the mothers, place of residence or next of kin will not be recorded for our study. During data collection, each mothers recorded meeting criteria was coded to maintain anonymity and the code used for data analysis. These actions ensured that mothers are protected from any harm as it was impossible to conduct them directly.

### **3.9.4 Beneficence**

The mothers were informed that the data obtained will be used for research purpose with the view of improving dietary practices and nutrition status through evidence-based information to practitioners. It will help immensely to advise the respondents on their diet. The respondents may not directly benefit from this study but the information obtained will be instrumental in informing decision makers on how best to plan and improve the dietary practices, health and nutrition status of mothers

### **3.9.5 Justice**

This study picked clients who met the criteria for selection and all data collected was analysed. During the study, all the respondents were treated equally regardless of the religion, age, their position social status in the community. The respondents were assured of safety during the data collection method was non-invasive.

## **CHAPTER FOUR**

### **DATA ANALYSIS AND PRESENTATION**

#### **4.1 Introduction**

The results in this chapter are presented in line with the objectives, which include descriptive findings on socio-demographic characteristics, socio-economic characteristics, dietary practices, morbidity status and infant nutritional status. These are then followed by inferential statistics on factors influencing infant nutritional status.

#### **4.2 General and Demographic Information**

##### **4.2.1 Demographic Characteristics of the Adolescent Mothers**

The respondents in this study comprised of a sample size of 246 infant-adolescent mother pair aged below one year and below 18 years respectively. As shown in Table 2, the youngest mother was 14 years old while most of them were between 16 to 17 years. The mean age of the adolescent mothers was  $16.78 \pm 1.020$ . The study revealed that half (52%) of the mothers were single while the rest were either married (37 %) or cohabiting (7%).

The young mothers had different levels of education ranging from no schooling to enrolment at tertiary education. About half of the mothers had primary level education (44.7%) and another half (44.7%) were still on going with their secondary education while (3.7%) had no formal schooling. Most of the mothers (41.5%) stated pregnancy as the reason for leaving school, lack of fees (39%), marriage (2.4%) and (3.3%) started working. The mean household size was  $2.16 \pm 2.11$  with a maximum of thirty-three and minimum of one. Most of the respondents (44.7%) lived with their parents while the rest (35.4%) with their spouse, with friends (3.7%), relatives (14.2%) and (2%) were staying alone.

**Table 2:** Demographic Characteristics of Adolescent Mothers

| Characteristic (n=246)                | Frequency | %    |
|---------------------------------------|-----------|------|
| <b>Maternal age in Years</b>          |           |      |
| 14                                    | 7.0       | 2.8  |
| 15                                    | 15        | 6.1  |
| 16                                    | 74        | 30.1 |
| 17                                    | 80        | 32.5 |
| 18                                    | 70        | 28.5 |
| <b>Marital status</b>                 |           |      |
| Married                               | 91        | 37   |
| Single                                | 128       | 52   |
| Separated                             | 7         | 2.8  |
| Cohabiting                            | 20        | 8.1  |
| <b>Highest academic qualification</b> |           |      |
| Primary                               | 110       | 44.7 |
| Currently in secondary                | 110       | 44.7 |
| Tertiary                              | 17        | 6.9  |
| No formal education                   | 9         | 3.7  |
| <b>Reason for leaving school</b>      |           |      |
| Started working                       | 8         | 3.3  |
| Lack of fees                          | 96        | 39   |
| Pregnancy                             | 102       | 41.5 |
| Relationship                          | 6         | 2.4  |
| <b>Household size</b>                 |           |      |
| 1-2                                   | 64        | 26   |
| 3-4                                   | 109       | 44.3 |
| 5 and above                           | 73        | 29.7 |
| <b>People you live with</b>           |           |      |
| Parents                               | 110       | 44.7 |
| Spouse                                | 87        | 35.4 |
| Friends                               | 9         | 3.7  |
| Relatives                             | 35        | 14.2 |
| Staying alone                         | 5         | 2    |

#### 4.2.2 Maternal Socio-Economic Characteristics

Investigation of the respondent source of income and occupation revealed that most (74.4%) of the adolescent mothers depended on their families for daily financial support to care for both the infant and the adolescent mother. Additionally, Table 3 further shows that about 17.8 per cent of

the mothers used their savings from casual jobs. Notably, 4.0 per cent depended on their spouse for support. The monthly combined household income was between Ksh. 3,000 to Ksh. 10,000, which accounted for 44.7 per cent. The other household members 28.5 per cent declared that their household monthly income was between Ksh. 10,000 to Ksh. 20,000. Worthwhile noting, the findings further found out that 24 per cent of the participants had their household monthly income below Ksh. 3,000.

**Table 3: Maternal Socio-Economic Characteristics**

| <b>Characteristic(n=246)</b>            | <b>Frequency</b> | <b>%</b> |
|---|------------------|----------|
| <b>Source of income</b>                 |                  |          |
| Casual jobs                             | 44               | 17.8     |
| Family                                  | 183              | 74.4     |
| Spouse                                  | 10               | 4.0      |
| Farming                                 | 9                | 3.6      |
| <b>Household monthly income in Ksh.</b> |                  |          |
| 500-3000                                | 60               | 24.4     |
| 3000-10000                              | 110              | 44.7     |
| 10000-20000                             | 70               | 28.5     |
| Above 30000                             | 6                | 2.4      |

#### **4.2.3 Demographic Characteristics of the Infants**

The child's health card was reviewed in order to obtain information about the infant. Information regarding infants was obtained from mothers and a review of the child's card. Over a half (56.9%) of the infants were girls while (43.1%) were boys. The mean age ( $\pm$  SD) of index of the infants was  $6.22 \pm 3.17$  months. The findings in this study indicated that most of the infants (48.8%) were in the age category of between 1 to 6 months. Children in the age category 6-8 months were (24%) while those 9-12 months were (27.2%) (Table 4).

**Table 4:** Characteristics of the study children

| <b>Characteristic (N=246)</b> | <b>Frequency</b> | <b>%</b> |
|-------------------------------|------------------|----------|
| <b>Gender of the infant</b>   |                  |          |
| Girls                         | 140              | 56.9     |
| Boys                          | 106              | 43.1     |
| <b>Age group of infants</b>   |                  |          |
| 0-6 months                    | 120              | 48.8     |
| 6-8 months                    | 59               | 24.0     |
| 9-12 months                   | 67               | 27.2     |

### **4.3 Feeding Practices for Infants 0-12 months**

Infants between the ages of 0-12 months formed the basis of breastfeeding practices (WHO/UNICEF, 2013).

#### **4.3.1 Breastfeeding Practices**

The indicators of breastfeeding practices that were used according to WHO 2008 were; early initiation to breast milk within one hour of birth, exclusive breastfeeding for infants below six months and continued breastfeeding at 12 months.

##### **4.3.1.1 Initiation of Breastfeeding**

According to the findings in this study, the number of infants that were initiation to breast milk within the first hour by the young mothers was (62.2%) while (37.8%) were initiated after one hour of birth (Table 5). The mothers who initiated after one hour (37.8%) reported no milk (9.8%) and cultural influence (1.6%) as the reasons for late initiation.

##### **4.3.1.2 Exclusive Breastfeeding to Children below Six Months**

The children below six months of age are recommended by the World Health Organization to be given only breast milk for the first six months of life to promote optimal growth, development and health (WHO, 2008). In this study, exclusive breastfeeding was half (50%) among the infants aged below six months. Other liquids that were given besides breast milk included; water (7.7%), sugar and water (7.3%) and salt and water (1.6%). Some of the reasons given for

early introduction of liquids included; the mother had no milk (9.8%), were advised by the health worker (2.0%) despite policies and guidelines against early introduction of other feeds.

#### 4.3.1.3 Continued breastfeeding at 12 months

Continued breastfeeding prevalence at 12 months among the infants was 5.5 per cent

**Table 5:** Breastfeeding practices

| <b>Breast feeding practices (N=246)</b>               | <b>Frequency</b> | <b>%</b> |
|---|------------------|----------|
| <b>Infant initiation to breast milk (0-12 months)</b> |                  |          |
| After one hour  | 93               | 37.8     |
| Within the first one hour                             | 153              | 62.2     |
| <b>Foods given in the first hour</b>                  |                  |          |
| Plain water   | 19               | 7.7      |
| Salt and water  | 4                | 1.6      |
| Sugar and water                                       | 18               | 7.3      |
| Cow's milk  | 1                | .4       |
| Nothing given   | 239              | 97.2     |
| <b>Reason for giving other fluids before 6 months</b> |                  |          |
| The baby was crying                                   | 7                | 2.8      |
| Had no milk   | 24               | 9.8      |
| Advised by the health worker                          | 5                | 2.0      |
| Cultural/religious reasons                            | 8                | 3.2      |
| Reason not given                                      | 202              | 82.2     |
| <b>Exclusive breastfeeding under six months</b>       |                  |          |
| Exclusively breast fed                                | 123              | 50.0     |
| Not exclusively breast fed                            | 123              | 50.0     |
| <b>Continued breastfeeding at 12 months</b>           | 13               | 5.5%     |

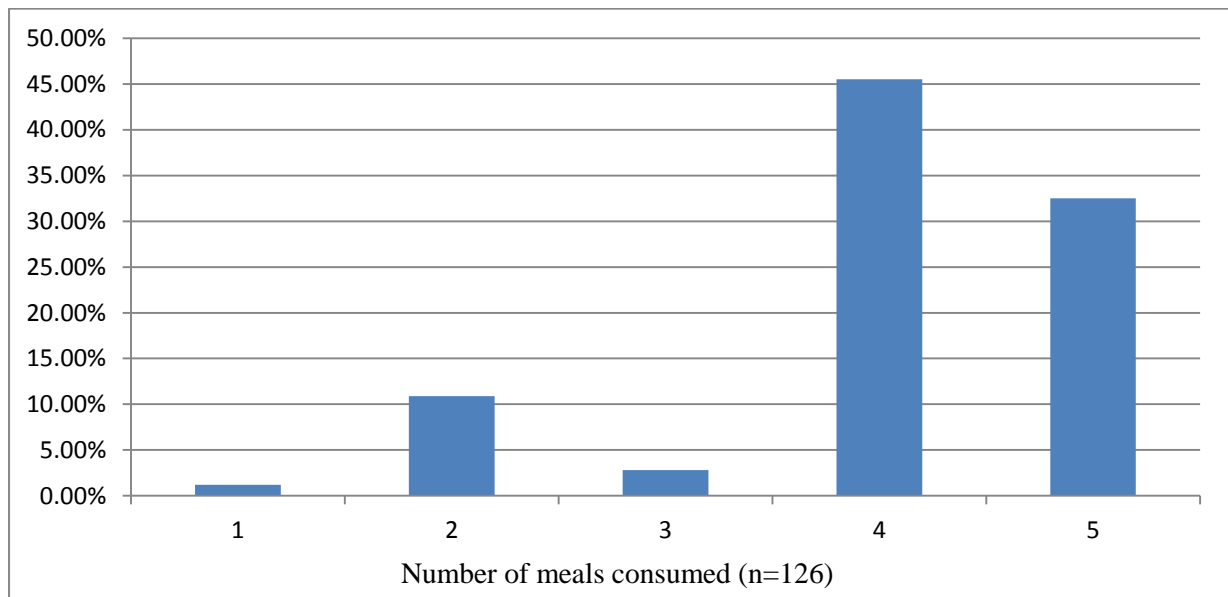
#### 4.3.2 Complementary Feeding Practices

##### 4.3.2.1 Timely introduction of complementary foods

The WHO and UNICEF recommend that safe, adequate and nutritious complementary foods should be introduced after the infant has been exclusively breastfed for a period of six months (WHO/UNICEF, 2013). In this study, the children aged between 6-8 months who received solid and semi-solid foods were 88.6 per cent (Table 6).

#### 4.3.2.2 Meal frequency

The figure below shows the frequently consumed meals by the children in the age group of 6-12 months (Figure 3)



**Figure 2:** Showing number of meals consumed by children 6-12 months

#### 4.3.2.3 Minimum Meal Frequency

According to the World Health Organization (2018), breastfeeding children between the ages of 6 to 12 months who consumed meals two times a day met the recommended minimum meal frequency and for those children aged 6 to 8 months consuming 3 times met the recommended levels and those 9 to 12 months and breastfeeding consumed 3 times a day. Additionally the non-breastfed children between 6 to 12 months old should be fed on minimum four times a day where snacks should be added between 1-2 nutritious snacks (UNICEF, 2013).

In this study, the children between the ages of 6-12 months that met the minimum meal frequency were 40.3 per cent while those children aged between 6-8 months that met the minimum of two or more solid foods were 2.6 per cent while those in the age group of 9-12 months that consumed three or more solid foods were 0.4 per cent. Additionally, the non-breastfed children aged between 6-12 months who consumed more than four meals in a day and one snack were 90.9 per cent (Table 6).



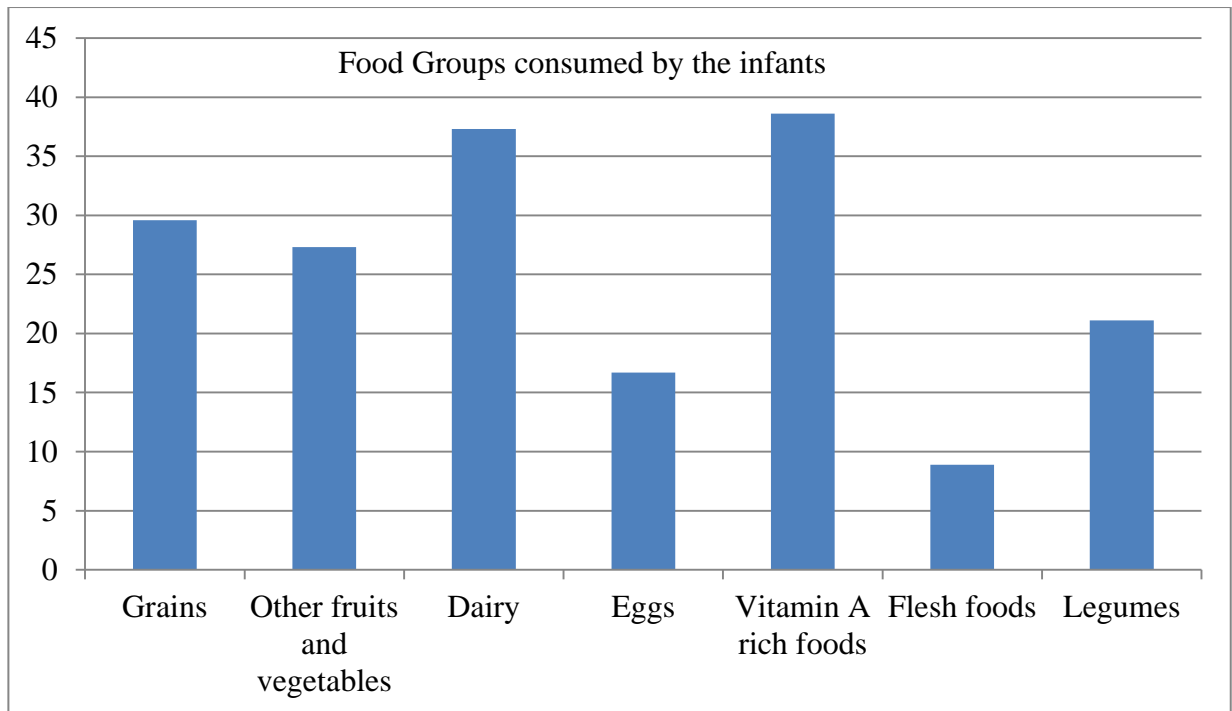
**Table 6:** Showing introduction of Complementary foods and Minimum Meal Frequency

| <b>Complementary feeding practices variable</b>                                       | <b>Total</b> |          |
|---|--------------|----------|
|   | <b>n</b>     | <b>%</b> |
| <b>Timely introduction of complementary foods</b>                                     |              |          |
| • No. of infants 6–8 months of age who receive solid, semi-solid or soft foods (n=58) | 47           | 88.6     |
| <b>Minimum meal frequency</b>   |              |          |
| • Breastfed children aged 6-8 months who received meals $\geq 2$ times (n=58)         | 6            | 2.6      |
| • Breastfed children aged 9-12 months who receive meals $\geq 3$ times (n=9)          | 1            | 0.4      |
| • Non-breastfed children aged 6-12 months who received meals $\geq 4$ times (n=10)    | 10           | 90.9     |
| Total no. of children (6-12 months) with minimum meal frequency (n=126)               | 106          | 40.3     |

#### 4.3.2.4 Dietary Diversity

The proportion of infants between the ages of 6 to 12 months that received foods from 4 or more food groups in the past 24 hours were found to have achieved the minimum dietary diversity. The food groups that were consumed by the infants were as follows ; grains, roots and tubers, legumes and nuts, dairy products, flesh foods, eggs, vitamin rich fruits and vegetables and other fruits and vegetables (WHO, 2008).

In this study, almost all (47.6%) of infants 6-12 months were reported to have consumed foods from  $\geq 4$  food groups (Table 7). The most consumed food groups that were frequently consumed and shown in figure 4 included Vitamin A rich fruits and vegetables (36.2%), followed by Dairy products (35.4%), Grains (30.1%), Other fruits and vegetables (26.4%), legumes and nuts (19.9%), eggs (15.9%) and flesh foods (8.9%) respectively. The most consumed liquids was porridge (45.5%) followed by cow's milk at 38.6%. Most of the infants consumed foods rich in vitamin A and while meat was consumed sparingly (8.9%).



**Figure 3:** Showing the food groups consumed by the infants in the past 24 hours

**Table 7:** Showing dietary diversity and minimum acceptable diet

| Complementary feeding practices   | (n=126) |      |
|---|---------|------|
|   | N       | %    |
| <b>Minimum dietary diversity (MDD)</b>  |         |      |
| • Children who received $\geq 4/7$ food groups  | 60      | 47.6 |
| • Children who receive an iron-rich food (flesh & organ meats)  | 22      | 8.9  |
| <b>Minimum acceptable diet (MAD)</b>  |         |      |
| • Total Children 6-12 months of age with minimum acceptable diet (MAD)                                  | 115     | 61.9 |
| • Breastfed children (6-12 months) who met minimum dietary diversity and minimum meal frequency         | 105     | 46.9 |
| • Non breastfed children (6-12 months) who met minimum dietary diversity, meal frequency and milk feeds | 10      | 15   |

#### 4.2.2.5 Minimum Acceptable Diet

The infants who were taken to have received the minimum acceptable diet included those children that were fed on the recommended minimum number of meals for their age and those that had a minimum dietary diversity (including milk with feeds for the non-breastfed) was 61.9 per cent

#### **4.2.2.6 Consumption of Nutrient-rich Value chain Commodities by Children 6-23 Months Vitamin A and Iron rich Foods and other Fortified Foods**

Consumption of Iron rich foods by children aged 6-12 months: consequently, 8.9 per cent infants consumed iron rich foods. There was no consumption of iron-fortified food specially designed for infants.

#### **4.4 Morbidity Patterns among the Infants**

Morbidity among infants has been found to affect the intake of food further affecting the absorption of nutrients in children. According to the study, it was found that (28.5%) of the infants were reported to be unwell in the immediate two weeks preceding the day of the study. The main illnesses reported by the mothers were malaria (8.5%) and common cold (8.1%), pneumonia (7.3%) and diarrhoea (4.6%) as shown in the Table 8. The adolescent mothers that were able to sought medical treatment in the hospital was (16.7%), clinic (7.3%), chemist (3.7%) and herbalist (0.8%). Most of them took their infants to the hospital (16.7%) as compared to 7.3 per cent who sought attention from the private hospitals.

**Table 8:** Morbidity Pattern among Infant 1-12 Months Old and Adolescent Mother Health Seeking Behaviour

| <b>Prevalence of morbidity among infants</b> | <b>Frequency</b> | <b>%</b> |
|--|------------------|----------|
| <b>Presence of Illness</b>                   |                  |          |
| Sick   | 70               | 28.5     |
| Not sick                                     | 176              | 71.5     |
| <b>Nature of Illness</b>                     |                  |          |
| Malaria                                      | 21               | 8.5      |
| Pneumonia                                    | 18               | 7.3      |
| Common cold                                  | 20               | 8.1      |
| Diarrhoea                                    | 11               | 4.6      |
| <b>Medical Treatment for the Child</b>       |                  |          |
| Clinic                                       | 18               | 7.3      |
| Herbalist                                    | 2                | .8       |
| Hospital                                     | 41               | 16.7     |
| Chemist                                      | 9                | 3.7      |
| <b>Duration of Illness</b>                   |                  |          |
| 2 days                                       | 11               | 4.5      |
| 3 days                                       | 6                | 2.4      |
| 7 days                                       | 24               | 9.8      |
| 14 days                                      | 20               | 8.1      |
| 21 days                                      | 5                | 2.0      |
| 30 days                                      | 2                | .8       |

#### **4.4.1 Maternal Health Seeking Behaviour**

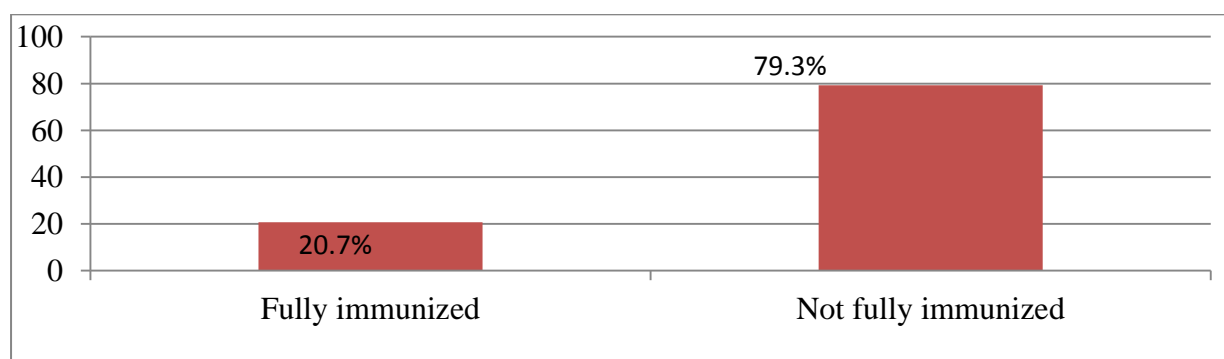
Most of the mothers (89.8%) attended the ANC and sought medical help for the sick infants in hospitals (16.7%). Slightly more than a third (78.9%) of them took their children for growth monitoring and those that did not were either engaged in farming activities (1.2%) or cited distance from the facilities (2.4%) as the reason.

**Table 9:** Health Behaviour among the Mother Seeking

| Variable  | Frequency | %    |
|---|-----------|------|
| <b>Attendance of ANC</b>  |           |      |
| Yes   | 221       | 89.8 |
| No  | 21        | 8.5  |
| <b>Medical treatment for the child</b>                              |           |      |
| Clinic  | 18        | 7.3  |
| Herbalist   | 2         | .8   |
| Hospital  | 41        | 16.7 |
| Chemist   | 9         | 3.7  |
| <b>Taking of your child for growth monitoring</b>                   |           |      |
| Yes   | 194       | 78.9 |
| No  | 52        | 21.1 |
| <b>Reason for not taking their child for growth monitoring</b>      |           |      |
| Distance from the facility  | 6         | 2.4  |
| Farming activities  | 3         | 1.2  |
| No means of transport   | 7         | 2.8  |
| The child was left under the caregiver and the mother was in school | 4         | 1.6  |
| Financially unstable  | 9         | 3.7  |

#### 4.5 Immunization Coverage

Immunization is crucial because it enables the body of the child to fight against diseases. In order to reduce infant illnesses and mortality it is crucial that the child be vaccinated against tuberculosis, diphtheria, whooping cough, tetanus, polio and measles. Data obtained from child health cards indicated that (20.7%) of the infants had completed the immunization schedule.



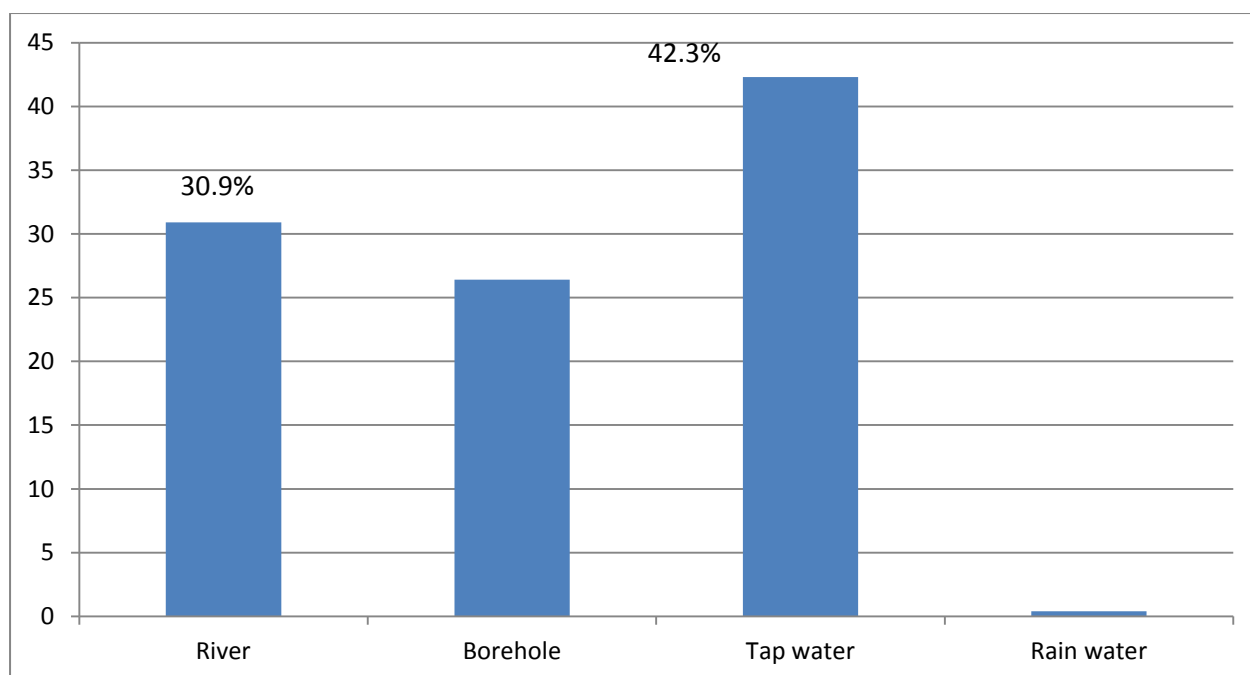
**Figure 4:** Infants 1-12 Months Fully Immunized

#### 4.6 Water Accessibility and Hygiene Practices among Adolescent Mothers

In this study, the main water source was tap water (42.3%) which was located within their compound (58.5%). Among these (78.4%) of the mothers reported that they were bathing their children once a day. More than half (65%) of the respondents treated their water by boiling the water before giving it to their children. Most of the mothers (69.5%) reported using their own pit latrines (Table 10).

**Table 10:** Water Accessibility and Hygiene Practices

| <b>Variable</b>  | <b>Frequency</b> | <b>%</b> |
|--|------------------|----------|
| <b>Water source</b>  |                  |          |
| River  | 76               | 30.9     |
| Borehole   | 65               | 26.4     |
| Tap water  | 104              | 42.3     |
| Rain water   | 1                | .4       |
| <b>Point from water source</b>                             |                  |          |
| within the compound  | 144              | 58.5     |
| 1km away   | 8                | 3.3      |
| 2km away   | 59               | 24.0     |
| 3km away   | 18               | 7.3      |
| 3-5km away   | 9                | 3.7      |
| 500m away  | 8                | 3.2      |
| <b>No of times the child is bathed</b>                     |                  |          |
| Once   | 193              | 78.4     |
| Two times  | 41               | 16.7     |
| Three times  | 10               | 1.6      |
| Four times   | 2                | .8       |
| <b>Water treatment</b>                                     |                  |          |
| Boiling  | 160              | 65.0     |
| Use water treatment  | 65               | 26.4     |
| Nothing is done to the water                               | 19               | 7.7      |
| The child is not given water to drink                      | 1                | .4       |
| <b>Type of sanitation facilities used in the household</b> |                  |          |
| Own pit latrine  | 207              | 84.1     |
| Neighbours' pit latrine                                    | 28               | 11.0     |
| Bush   | 11               | 4.4      |



**Figure 5:** Sources of Water

#### 4.6.1 Hand Washing Practices among the Adolescent Mother

In order to attain good health, proper hand washing should be an important behaviour that is incorporated in our daily activities. The findings (Table 11) showed that (69.5%) of mothers washed hands after using the toilet and before eating (15%).

**Table 11:** Hand Washing Practices among the Mother

| Variable                | Frequency | %    |
|-------------------------|-----------|------|
| After toilet            | 171       | 69.5 |
| Before eating           | 37        | 15.0 |
| Before cooking          | 4         | 1.6  |
| Before feeding the baby | 28        | 11.0 |

#### 4.7 Infant Nutritional Status

Infant nutritional status was measured using the indicators of weight-for-height, height-for-age and weight-for-age. Infants who were below -2SD were considered undernourished and those with less than -3 SD severely wasted. According to the findings in this study, wasting was 17.1 per cent stunting was 22.0 per cent and underweight was 22.0 per cent. Additionally, there was

no bilaterally pitting oedema cases were found among the assessed infants. As compared to girls, boys had a higher prevalence of malnutrition than girls.

#### 4.7.1 Acute Malnutrition

Acute malnutrition was presented as severe, moderate and total wasted. More boys (17.9%) had low weight for their length (wasting) than girls (9.3%) while wasting in the age group of 6-8 months was found to be highest (Table 12).

**Table 12:** Showing the Level of Wasting by Sex and Age of the Infants

|   | Gender of the infant |              | All<br>n=246 |
|---|----------------------|--------------|--------------|
|   | Girls (n=140)        | Boys (n=106) |              |
| Global malnutrition (< -2z-score )                  | 123 (87.9%)          | 81 (76.4%)   | 204 (82.9%)  |
| Moderate malnutrition (<-2 z-score and ≥-3 z-score) | 13 (9.3%)            | 19 (17.9%)   | 32 (13.0%)   |
| Severe malnutrition (< -3z-score)                   | 4 (2.9%)             | 6 (5.7%)     | 10 (4.1%)    |

| By age                           | Age group of infants |            |             | Total<br>wasting |
|----------------------------------|----------------------|------------|-------------|------------------|
|                                  | <6 months            | 6-8 months | 9-11 months |                  |
| Normal ≥ -2SD to <+2SD           | 98 (81.7%)           | 49 (83.1%) | 57 (85.1%)  | 204 (82.9%)      |
| Moderately wasted ≥-3SD to <-2SD | 13 (10.8%)           | 9 (15.3%)  | 10 (14.9%)  | 32 (13.0%)       |
| Severely wasting < -3SD          | 9 (7.5%)             | 1 (1.7%)   | 0 (0.0%)    | 10 (4.1%)        |

#### 4.7.2 Chronic Malnutrition

More boys (15.1%) were short for their age than girls (9.3%) while stunting was highest in the age group 1-6 months (17.5%) (Table 13).



**Table 13: Showing the Level of Stunting by Sex and Age of the Infants**

|  | <b>Gender of the infant</b> |                     | <b>All<br/>n=246</b> |
|--|-----------------------------|---------------------|----------------------|
|  | <b>Girls (n=140)</b>        | <b>Boys (n=106)</b> |                      |
| Stunting (< -2z-score )                                | 118 (84.3%)                 | 74 (69.8%)          | 192 (78.0%)          |
| Moderately stunted (<-2 z-score and $\geq$ -3 z-score) | 13 (9.3%)                   | 16 (15.1%)          | 29 (11.9%)           |
| Severely stunted (< -3z-score)                         | 9 (6.4%)                    | 16 (15.1%)          | 25 (10.2%)           |

| <b>By age</b>                           | <b>Age group of infants</b>   |                          |                           | <b>Total stunting</b> |
|---|-------------------------------|--------------------------|---------------------------|-----------------------|
|   | <b>Less than<br/>6 months</b> | <b>6 to 8<br/>months</b> | <b>9 to 11<br/>months</b> |                       |
| Normal $\geq$ -2SD to <+2SD             | 84 (70.0%)                    | 50 (84.7%)               | 58 (86.6%)                | 192 (78.0%)           |
| Moderately stunted $\geq$ -3SD to <-2SD | 21(17.5%)                     | 6 (10.2%)                | 2 (3.0%)                  | 29 (11.8%)            |
| Severely stunted < -3SD                 | 15 (12.5%)                    | 3(5.1%)                  | 7(10.4%)                  | 25(10.2%)             |

### 4.7.3 Underweight

About 22.0 per cent of all the children in the study had a low weight for their age with only 17.9 per cent originating from boys. In addition, the age group 9-12 months had the majority of severely undernourished children (7.5%) of the featured groups (Table 14).

**Table 14:** Showing the Level of Underweight by Sex and Age of the Infants

|  | Gender of the infant |              | All<br>n=246 |
|--|----------------------|--------------|--------------|
|  | Girls (n=140)        | Boys (n=106) |              |
| Underweight (< -2z-score )                                 | 107 (76.4%)          | 66 (62.3%)   | 173(70.3%)   |
| Moderately underweight (<-2 z-score and $\geq$ -3 z-score) | 23 (16.4%)           | 19 (17.9%)   | 42(17.1%)    |
| Severely underweight (< -3z-score)                         | 4 (2.9%)             | 8 (7.5%)     | 12(4.9%)     |

| By age   | Age group of infants |            |             | Total<br>underweight |
|--|----------------------|------------|-------------|----------------------|
|  | <6 months            | 6-8 months | 9-11 months |                      |
| Underweight (< -2z-score )                                 | 88 (73.3%)           | 40 (67.8%) | 45 (67.2%)  | 173 (70.3%)          |
| Moderately underweight (<-2 z-score and $\geq$ -3 z-score) | 11 (9.2%)            | 16 (27.1%) | 15 (22.4%)  | 42 (17.1%)           |
| Severely underweight (< -3z-score)                         | 5 (4.2%)             | 2 (3.4%)   | 5 (7.5%)    | 12 (4.9%)            |

#### 4.8 Nutritional Status and Associated Factors among the Infants

Pearson product moment correlation and chi-square was the statistical test utilized to assess the relationships between the study variables and nutrition status with a significance level of 0.05. The indicators of the infant's nutrition status were assessed as wasting, underweight and stunting. The variables that exhibited a significant relationship with any of the nutrition status indicators were highlighted.

##### 4.8.1 Dietary Practices and its Relationship with Nutritional Status

###### 4.8.1.1 Association between Meal Frequency and Nutritional Status

There was a positive relationship between meal frequency and the three indices of nutrition status (underweight, wasting and stunting) (p- value 0.00, 0.000 and 0.011 respectively) (Table 18)

**Table 15:** Relationship between Meal Frequency and Nutritional Status

| Variable           |                        | Food frequency |          |          | P-value*    |        |
|--------------------|------------------------|----------------|----------|----------|-------------|--------|
|                    |                        | Below 3        | 3-4      | Above 4  |             |        |
| <b>Underweight</b> | Moderately underweight | 12(28.60%)     | 0(0.00%) | 0(0.00%) | 30(71.40%)  | 0.001* |
|                    | Severely underweight   | 1(8.30%)       | 0(0.00%) | 0(0.00%) | 11(91.70%)  |        |
| <b>Stunting</b>    | Normal                 | 79(41.10%)     | 4(2.10%) | 0(0.00%) | 109(56.80%) | 0.001* |
|                    | Moderately stunted     | 24(82.80%)     | 2(6.90%) | 0(0.00%) | 3(10.30%)   |        |
|                    | Severely stunted       | 22(88.00%)     | 0(0.00%) | 1(4.00%) | 2(8.00%)    |        |
|                    | Normal                 | 93(45.60%)     | 5(2.50%) | 1(0.50%) | 105(51.50%) |        |
| <b>Wasting</b>     | Moderately wasted      | 22(68.80%)     | 1(3.10%) | 0(0.00%) | 9(28.10%)   | 0.011* |
|                    | Severely wasting       | 10(100.00%)    | 0(0.00%) | 0(0.00%) | 0(0.00%)    |        |
|                    |                        |                |          |          |             |        |

\*Pearson's chi-squared ( $\chi^2$ ) test at significant of  $P < 0.05$

#### 4.8.1.2 Association between Dietary Diversity and Nutritional Status

The nutritional status based on underweight, wasting and stunting showed no significant association with dietary diversity. Most infants were still breastfeeding but met the recommended levels of four or more food groups (Table 19)

**Table 16:** Relationship between Dietary Diversity and Nutritional Status

| Nutrition status       | Dietary diversity |            |          | P-value* |
|------------------------|-------------------|------------|----------|----------|
|                        | < 3               | 4-5        | >_6      |          |
| <b>Stunting</b>        |                   |            |          |          |
| Moderately stunted     | 1 (2.0%)          | 2 (3.3%)   | 0 (0.0%) | 0.915    |
| Severely stunted       | 2 (3.9%)          | 1 (1.7%)   | 0 (0.0%) |          |
| <b>Underweight</b>     |                   |            |          |          |
| Moderately underweight | 17 (33.3%)        | 13 (21.7%) | 0 (0.0%) | 0.443    |
| Severely underweight   | 5 (9.8%)          | 6 (10.0%)  | 0 (0.0%) |          |
| <b>Wasting</b>         |                   |            |          |          |
| Moderately wasted      | 3 (5.9%)          | 6 (10.0%)  | 0 (0.0%) | 0.607    |

#### 4.8.1.3 Association between Exclusive Breastfeeding and Nutritional Status

The nutritional status based on underweight, wasting and stunting showed no association with exclusive breastfeeding. Most infants (50%) were given breast milk alone without other substitutes for a period of six months (chi-square test;  $p = 0.000$ ) (Table 4.19)

**Table 17:** Association between Exclusive Breastfeeding and Nutritional Status

| Variable               | Exclusive breastfeeding |               | P-value* |
|------------------------|-------------------------|---------------|----------|
|                        | Exclusive               | Not exclusive |          |
| <b>Wasting</b>         |                         |               |          |
| Moderately wasted      | 22(17.9%)               | 10(8.1%)      | 0.001*   |
| Severely wasting       | 10(8.1%)                | 0(0.0%)       |          |
| <b>Underweight</b>     |                         |               |          |
| Moderately underweight | 12(9.8%)                | 30(24.4%)     | 0.001*   |
| Severely underweight   | 1(.8%)                  | 11(8.9%)      |          |
| <b>Stunting</b>        |                         |               |          |
| Moderately stunted     | 24(19.5%)               | 5(4.1%)       | 0.001*   |
| Severely stunted       | 22(17.9%)               | 3(2.4%)       |          |

#### 4.8.2 Relationships between Morbidity and Nutritional Status

Illness affects feeding practices thus causing the depletion of the nutrition status. The decreased intake of the food is because of the illness, which causes lack of appetite. A paired t-test showed that there were an association of child illness two weeks to the study and underweight ( $\chi^2=43.409$ ,  $P=0.001$ ,  $df=32$ ), stunting ( $\chi^2=34.515$ ,  $P=0.005$ ,  $df=16$ ) and wasting ( $\chi^2=27.012$ ,  $P=0.041$ ,  $df=16$ ).

**Table 18:** Relationship between Morbidity and Nutritional Status

| Variables          | $\chi^2$ /Likelihood |          |
|--------------------|----------------------|----------|
|                    | Ratio                | P value* |
| <b>Illness vs.</b> |                      |          |
| Underweight        | 43.409               | 0.001*   |
| Stunting           | 34.515               | 0.005*   |
| Wasting            | 27.012               | 0.041*   |

\*Pearson's chi-squared ( $\chi^2$ ) test at significant of  $P < 0.05$

### 4.8.3 Relationships between Demographic Information and Nutrition Status

Young maternal age, maternal education level and marital status play a very crucial in infant nutrition status according to (Islam, et al., 2016). There was no association between the mother's demographic information and the child's nutrition status. All the three forms of malnutrition did not show a significant relationship with education ( $P>0.05$ ) (Table 19)

**Table 19:** Relationships between Age of the Mother and Nutritional Status

| Variables                     | $\chi^2$ /Likelihood Ratio | P value |
|-------------------------------|----------------------------|---------|
| <b>Age of the mother vs.</b>  |                            |         |
| Underweight                   | 9.512                      | 0.301   |
| Stunting                      | 12.744                     | 0.121   |
| Wasting                       | 14.352                     | 0.572   |
| <b>Marital status vs.</b>     |                            |         |
| Underweight                   | 23.520                     | 0.12    |
| Stunting                      | 6.033                      | 0.420   |
| Wasting                       | 6.511                      | 0.368   |
| <b>Maternal education vs.</b> |                            |         |
| Underweight                   | 6.2                        | 0.625   |
| Stunting                      | 6.2                        | 0.625   |
| Wasting                       | 9.27                       | 0.32    |

### 4.8.4 Relationship between Adolescent Mother Socio-Economic Status and Nutrition Status

From the findings, the respondent's family income showed no significant relationship with underweight. ( $P<0.001$ ) (Table 22).

**Table 20:** Relationship between Family Incomes on Nutrition Status of the Infants

| Variables                | $\chi^2$ /Likelihood Ratio | P value |
|--------------------------|----------------------------|---------|
| <b>Family income vs.</b> |                            |         |
| Underweight              | 42.190                     | 0.003*  |
| Stunting                 | 4.097                      | 0.989   |
| Wasting                  | 6.042                      | 0.812   |

\*Pearson's chi-squared ( $\chi^2$ ) test at significant of  $P<0.05$

## **CHAPTER FIVE**

### **DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

The nutritional status of infants less than one year of age is affected by, breastfeeding practices, feeding practices, infections, hygiene and sanitation and social-demographic and economic factors. This study aimed at assessing the dietary, health and nutrition status of infants belonging to adolescent mothers in Transmara West, Narok County, Kenya. The information could also be useful for planning intervention programmes for infants of adolescent mothers.

#### **5.2 Adolescent Mother Demographic and Socio-Demographic Characteristics**

According to the study findings, most of the teenage mothers were in the age group of between 16 to 17 years. This is in line with other studies in Narok County (Moturi, 2016), Mathare slums (Munywoki, 2015) and in Uganda (Kabwijamu, et al., 2016) where majority of the young mothers were aged between 15 to 17 years. Another study by Olodu (2019) that focused on teenage mothers in Nigeria found that most of the mothers were older between 18-19 years. Further, the young mothers had varied levels of education ranging from no schooling to tertiary education. From the findings, the education level of the respondents was half for primary level and another half had secondary education. The study is similar to that of Munywoki (2015) and Olodu (2019) where most of the young mothers had primary level of education. This is also in line with Kenya Demographic Health Survey (2014) where young mothers with primary education were out of school because they had their first child at a young age. Early marriages and girls engaging in sexual activities at an early age without knowing the consequences could have caused this.

The study revealed that half of the young mothers were single whilst the rest were either married or cohabiting. The results concur with studies by Moturi (2015) and Kabwijamu (2016) in Mathare slums and Uganda respectively where half of the young mothers were single and the other half married. This could also be attributed to cultural influences and early marriages.

### **5.3 Infant Feeding Practices**

Child feeding practices for the first years of life should be multi-dimensional and be able to support the growing requirements of the infant.

#### **5.3.1 Breastfeeding Practices**

Breastfeeding is important for the physical closeness and emotional bonding between the mother and the infant and enables for the full growth and development of the child (WHO, 2018). The findings in this study showed that most of the infants were introduced to breast within one hour of birth. The mothers who initiated after one hour cited no milk and cultural influence as the reasons for late initiation. This study agreed with that of Kabwijamu (2016) in Uganda and Kenya Demographic Health Survey (2014) where initiation within the first hour was 71 per cent and 62 per cent respectively. These results differed with that of Olodu (2019) where a higher number of infants were initiated within the first hour at 87%. This was because most young mothers attended post natal care and were able to receive information of infant feeding.

#### **5.3.2 Exclusive Breastfeeding Under Six Months**

As compared to the national rates of exclusive breastfeeding rates of 61 per cent by Kenya Demographic Health Survey (2014), this study found out the rates were lower at 50 per cent. The results were higher than that of Olodu (2019) where only a few of the young mothers exclusively breastfed their infants at 31.9 per cent. However, an analysis of the distribution of breastfeeding by age groups of the infant showed a decrease in exclusive breastfeeding rates. It was highest for infants below six months and lowest for those aged 6 – 8 months. This could be because of the health talk by the health providers on the importance of exclusive breastfeeding.

#### **5.3.3 Complementary Feeding Practices**

##### **5.3.3.1 Minimum Dietary Diversity**

The achieved of minimum dietary diversity in this study was much higher than other studies carried out in Kenya by (Macharia, 2018) and (Korir, 2013). Most of the infants in the age group 6-12 months who consumed foods in more than four food groups. Additionally, the introduction of solid foods and semi-solid foods was adequate by the infants aged 6-8 months as

compared to WHO and UNICEF (2013) recommendations. The findings of this study are in agreement with the national data in Kenya (KDHS, 2014) where most of the infants frequently consumed foods rich in vitamin A, dairy products and grains. However, a study by da Costa (2018) differed with this finding whereby there was lower consumption of fruit and vegetables among the infants of young mothers instead the infants were offered mainly sweets, sugars, and salty foods. This mainly could be attributed to low educational levels and low socioeconomic backgrounds, in addition to inadequate maternal stores and prenatal nutrition food intake of the young mothers.

### **5.3.3.2 Minimum Meal Frequency**

The results of this study revealed that (40.3%) of breastfed infants in the age category of 6-12 months met the recommended levels of meal frequency. As compared to a study by Anin 2020 in Ghana, this study was a lower. On the other hand, infant that were still breastfeeding in the age group of 9-12 months old and met the recommended levels of three or four meal frequency was 0.4 per cent Of the non-breastfed for the age group 6-12 months that met were 90.9 per cent The minimum frequency of meals consumed was a bit higher than the national levels of 51 per cent (KNBS, & ICF MACRO, 2015). This could mainly be attributed to the differences in the age groups of the children.

### **5.3.3.3 Minimum Acceptable Diet**

The infants that met the minimum acceptable diet were the ones that met the recommended minimum number of meals for their age and minimum dietary diversity (including milk with feeds for the non-breastfed). This was higher than studies done by Korir (2014) and the national figures reported by KDHS 2014. As the sphere emphasises, children who meet their minimum acceptable diet are more likely to achieve adequately their nutrition needs (Sphere, 2011).

## **5.4 Morbidity Patterns among the Infants**

The most common illnesses among the infants were malaria and acute respiratory infections (ARI). Also prevalent was diarrheal diseases and common cold was also common which could be related with inappropriate sanitary habits. Additionally, hand-washing practices among these young mothers was not practiced before feeding of their children. This findings are similar to



that of national data (KDHS, 2014) and from Narok County (Health report, 2018) where majority of children under five had malaria, respiratory infections and diarrhoea. The high malaria incidence could be associated to lack of treated mosquito nets and their infants were left to caretakers. Morbidity in infants increases the risk of malnutrition due to increased nutrition demand, poor appetite leading to poor intake, mal absorption of nutrient as well as increased demand due to disease process (Lassi, et al., 2014).

### **5.5 Maternal Health Seeking Behaviour**

Most of the mothers attended the ANC and sought medical help for the sick infants in hospitals. Slightly more than a third of them took their children for growth monitoring and those that did not either were engaged in farming activities or cited distance from the facilities as the reason. This is with agreement with the County health report (2018) where almost all mothers sought medical treatment at the health facility. As a whole, the health seeking behaviour among the adolescent mothers was good which was shown by the good response to illnesses among the young mothers by taking their children to the health facilities.

### **5.6 Immunization Coverage**

Immunization is important because it enables the body of the child to fight against illnesses. Information obtained from child health cards indicated that most of the infants had not completed the immunization schedule. The immunization coverage for the children among adolescent mothers was appropriate. As compare to the national rate, this study had a higher coverage where almost all the children were fully immunized. This could be because of the available referral systems.

### **5.7 Water Accessibility and Hygiene Practices among Adolescent Mothers**

Adequate water, sanitation and hygiene are essential components in the reduction of diarrheal diseases and able to reduce the pathogen load (USAID, 2014). The finding of this study was that the main source of water was tap water, which was located within their compound. More than half of the respondents treated, they water by boiling before giving it to their children. Most of the mothers reported using their own pit latrines with 57.4 per cent reporting that they have access to a pit latrine, which was lower than the national rate of 66 per cent. (KDHS, 2014).The findings also agreed with a study by County Health report (2018) where most respondents

obtained their water from safe sources. This could be because this is a pastoralist community, which is always moving from one place to another in search of water and pasture for their livestock's, hence there is need for permanent structure for a toilet. Instead, they mostly use the bush. This poses a health risk due to contamination of drinking water sources especially during heavy downpour that causes flooding.

Proper hand washing practices is important behaviour that helps achieve good health. The study showed that the caregivers who reported to practice hand washing with soap before feeding the child and after cleaning the baby's bottom could be attributed to poor or lack of information on the five critical hand-washing moments as recommended by World Health Organization. Proper hand washing practices before meals and after visiting the toilet can, lower exposure to germs, which further reduces the chances of getting sick (WHO, 2018).

### **5.8 Nutritional Status of the Infants below 12 months**

The prevalence of wasting (17.1%), stunting (22.0%) and underweight (19.1%) were above that reported in the KDHS 2014 where wasting, stunting and underweight for children 6-59 months were 4.0 per cent 26.0 per cent and 11.0 per cent respectively. The findings of this study were also higher than that of Wemakor et al. (2018) in Ghana except for stunting which was lower. The findings were also similar to the County Health report (2018) where stunting was 27.2 per cent while severe stunting was 7.7 per cent and underweight 18.9 per cent while severe underweight was 2.6 per cent This could have been contributed by the fact that young mothers are not ready for child care and hence contributing to the high prevalence of malnutrition.

This was also similar to the Narok County Health report of 2018 where boys had a higher malnutrition level than girls. The under nutrition among the males children could be because of food preference, serving more food in favour of a girl child. This finding agreed with the findings of Nguyen (2017) showing that malnutrition is a public health issue that needs to be addressed among infants of young mothers. Further, teenage motherhood is also a contributing factor in the malnutrition of their children as they are not ready to shoulder the responsibilities of childcare.

## **5.9 Factors Associated with Infant Nutritional Status**

### **5.9.1 Relationship between Dietary Practices and Nutritional Status**

The association between meal frequency, breastfeeding and nutrition status was established. Most infants met this recommendation and thus had a good nutritional status. The three indices in this study showed a significant relationship with dietary diversity. In a study finding by (Olodu, et al., 2019) in Nigeria, breastfeeding had an association with lower stunting and underweight among the children.

Also this study agreed with the finding of (Olodu, et al., 2019) where breastfeeding for six months without the introduction of other foods resulted in lower wasting among the infants and concluded that infants who did not receive appropriate feeding had higher odds for wasting, stunting and underweight.

### **5.9.2 Relationships between Morbidity and Nutritional Status**

Illness affects feeding practices thus causing the depletion of the nutrition status. The decreased intake of the food is because of the illness, which causes lack of appetite showed that there were an association of child illness two weeks to the study and underweight.

During the past 14 days of study, illness was associated with the three indices of malnutrition. This finding therefore supports evidence that illness affects nutrition status of an individual as observed by Fekadu et al. (2015) where he found out that high diet quality was found to be less associated with illness. Additionally, Morton et al. (2014) have argued comprehensively that diseases affect dietary intake of an individual.

### **5.9.3 Relationships between Demographic Information and Nutrition Status**

Young maternal age, maternal education level and marital status play a very crucial in infant nutrition status according to (Islam, et al., 2016). There was no relationship between the young mother demographic characteristics and the child's nutrition status. Not all the three forms of malnutrition showed a significant relationship with education.

## **Conclusions**

### **5.10.1 Demographic and Socio-Economic Characteristics**

The results of this study concluded that most of the respondents were young teenage mothers of primary level of education because of dropping out of school due to pregnancy and lack of school fees. They depended on their families as their main sustenance and others did casual jobs to fend for themselves and their infants. The majority of the adolescent mothers could be classified as of low socio-economic backgrounds, which were based on socio-economic backgrounds and their source of income.

### **5.10.2 Infant feeding practices**

The majority of infants were still breastfeeding at the time of study. Early initiation of breastfeeding (within 1 hour) was prevalent among the infants with those that were exclusively breastfed being half of the infants aged less than 6 months old. Almost all of the infants 6-8 months old had been given solids, semi-solids and soft foods. The majority of the breastfed children 9 to 12 months old met the recommended meal frequency. The children that were not breastfeeding and met the recommended meal frequency were in the age group of 6 to 12 months. The study has demonstrated that dietary diversity of the infants was generally good. Despite the good dietary diversity, reported most of the infants had poor nutritional status. Morbidity incidence among the infants was noted to be low. Additionally, the importance of exclusive breastfeeding was highlighted through the positive association between exclusive breastfeeding and nutrition status.

### **5.10.3 Health Status of the Infants**

The morbidity burden was not very high among the infants. The most prevalent illnesses were malaria and common cold. Health seeking behaviour of mothers for their sick infants was appropriate with the majority of them seeking assistance from different hospitals within 24 hours of the child falling sick.

#### **5.10.4 Malnutrition and Associated Factors among the Infants**

The prevalence of under nutrition among the infants 1-12 months old was as follows; wasting 17.1%, underweight 22.0 per cent while stunting was 22.0 per cent Compared to the Kenya National rates for infants 1-12 months, the three indices in this study was higher (KDHS 2014). Infant feeding practices showed a positive significant relationship with nutritional status (underweight); that is exclusive breastfeeding and meal frequency. Infants who attained the minimum meal frequency and those who achieved the minimum acceptable diet were less likely to be underweight. Being that maternal education was the only significant caregiver characteristics that showed a relationship with nutrition status.

#### **5.11 Recommendations**

From the research findings, the following were the recommendations:

##### **5.11.1 Policy Recommendations**

- i.Children of young mothers are more vulnerable to malnutrition hence should be given more priority by the government and other stakeholders.
- ii.There should be a family approach that focuses on creating awareness not just for adolescent mothers, but also for fathers and mothers-in-law who are strong household influencers of infant feeding behaviour. This will help to curb the challenge of early introduction of pre-lacteal foods.
- iii.In order to contribute to the health needs of young mothers and their infants, support groups should be strengthened that provide peer counselling with a focus on promoting, protecting and supporting breastfeeding.
- iv.The Ministry of Health should provide ongoing training of the health care workers on IYCF among young mothers. This will acquaint them with the required skills and education on IYCF knowledge in the study area in order to contribute to improved uptake of exclusive breastfeeding.
- v.There is need to train community health workers on infant and young child feeding among teenage mothers in the study area.

### **5.11.2 Recommendations for Further Research**

- i. A similar study focusing on caloric adequacy should be conducted in the study area as this study only focused on frequency and diversity of meals, which are the indicators of infant feeding.
- ii. This study looked at malnutrition among infants of young mothers. A study that looks at the nutritional status of the children of adult mothers and compares with infants of young mothers would be beneficial.

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## **APPENDICES**

### **APPENDIX I: CONSENT FORM AND INTRODUCTORY LETTER**

My name is Brigid Chebet, Masters Student from Kabarak University. I am conducting a study on “**Dietary practices, Health and Nutrition Status of Infants Born to Adolescent Mothers in Transmara West, Narok County, Kenya**”. This study will be beneficial in making decisions about interventions concerning the health of the infants of young mothers.

#### **Procedures in this study**

With the help of my research assistant, we are going to ask you some questions in order to find out the dietary practices, health and nutrition status of your infant. The questionnaire will be used to record the information. My research assistant will take the measurements of your child which includes the weight and height. All the information will be coded and recorded in the questionnaire. The process will take the shortest time possible between 30 to 40 minutes. Your participation in study is voluntary and that you are free to ask any questions at any time.

#### **Discomforts and risks**

There are no risks involved in this study however the questions that will be asked may be of intimate subject and may be uncomfortable and may choose to stop at any time.

#### **Benefits**

There are no benefits or rewards involved if you agree to participate in this study however the information will be used to only improve the health of your infant.

#### **Confidentiality**

Information obtained will be treated with utmost confidentiality and your name will not be indicated anywhere in this questionnaire. This interview will be conducted in a private room in this hospital. The discussions will be conducted in a private section within the hospital and the questionnaires will be kept in a locked cabinet.

#### **Contact information**

Any questions in this study may be directed to:

Dr. Wesley Bor on 0716555520 or Dr Jane Situma on 0713909737 or the Kabarak University Ethical Review Committee Secretariat on [wtoo@kabarak.ac.ke](mailto:wtoo@kabarak.ac.ke)

**Participant’s Statement**

By signing below, I \_\_\_\_\_ a resident of \_\_\_\_\_ hereby declare that:

All the information has been given to me regarding my involvement and participation in this study.

I have been given a chance to ask questions

I understand that taking part in this study is voluntary and that I am free to leave at any time

I have been assured of confidentiality on any information given

Name of the respondent \_\_\_\_\_

\_\_\_\_\_

Signature

\_\_\_\_\_

Date

**Researcher statement**

As the investigator, I have explained all the risks and benefits pertaining to this study and that they are free to leave at any time.

Name of Investigator: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX II: PARENT GUARDIAN CONSENT FORM

ID-NO \_\_\_\_\_

### **Introduction**

Dear parents/guardians,

Greetings! My name is **Brigid Chebet** a student of Master of Clinical Nutrition at Kabarak University. I am undertaking this research as part of my studies with the main objective of “**Dietary practices, Health and Nutrition Status of Infants Born to Adolescent Mothers in Transmara West, Narok County, Kenya**”

### **About the study:**

A total of 246 adolescent mothers’ will be interviewed from Transmara West in this study. Hence, including your child in the study will also mean that I will ask him/her few questions regarding your socio economic, socio demographic and individual characteristics at your home. I will also take his/her height and weight measurements during this study. This would take not more than 20 minutes of your time.

### **Participating in this study involves:**

If you allow him/her to participate in this study, you will be required to sign this consent form and give back this letter to him/her.

### **Benefits**

From participating in this study, no benefits will be provided however the information provided by your child will help us to understand their infant’s nutritional status and some direct associated factors. Findings from this study will inform the school administration and other stakeholders on consolidating future nutrition programs aiming at reducing malnutrition problem among school children.

### **Risks**

This study involves no invasive procedures so we expect that no harm will be done to any participant.

**Confidentiality**

All the information that you provide will be kept between you and the interviewer. It will also be coded and kept in a safe place.

**Voluntary participation**

Your daughter’s participation in this study is on voluntary basis and that they are free to leave at any time. You are free to leave at any point even if you have already consented to this study. There will be no loss or any benefits if you withdraw from this study.

**Contacts of chairman in case you have any questions**

You can contact the investigator, Brigid Chebet of Kabarak University of School of Medicine and Health Sciences, P. O. Box Private bag-20157, or you may call Prof. Wesley Too-0714710889, **Chairman** of the Ethics and research committee. P. O. Box 20157, Nakuru,

Do you agree? Yes..... No.....

I \_\_\_\_\_have read the information provided of this consent form and my questions have been adequately answered. I therefore agree to participate in this study.

Signature of the participant \_\_\_\_\_Date \_\_\_\_\_

Signature of the interviewer \_\_\_\_\_Date \_\_\_\_\_

**APPENDIX III: INSTRUMENT 1-STRUCTURED QUESTIONNAIRE**

| <b>PART A: IDENTIFICATION INFORMATION</b>                 |   |
|---|---|
| 1.1   | Health facility name: .....   |
| 1.2   | Questionnaire number <input type="text"/>   |
| 1.3   | Enumerator names: 1.....<br>2.....  |
| 1.4   | Date of the interview: .....  |
| <b>PART B: DEMOGRAPHIC AND SOCIO-ECONOMIC INFORMATION</b> |   |
| 2.1   | Mother/Infant number: .....   |
| 2.2   | Age of the mother..... (Age assessment will be done by a clinician using the mother child booklet and tanner stages for breast development to determine the age of the adolescent). |
| 2.3   | Age of the infant (Approximate in months from the card).....  |
| 2.4   | Gender of the infant.....1.Female <input type="radio"/><br>2. Male <input type="radio"/>  |
| 2.5   | What is your marital status?<br>Married<br>Single<br>Divorced<br>Cohabiting<br>Other specify.....   |
| 2.6   | Who do you live with?<br>Parents<br>Spouse<br>Friends<br>Relatives<br>Other specify.....  |



|   |   |
|---|---|
| 2.7   | <p>What is your household size?</p> <p>1-2 persons</p> <p>3-4</p> <p>5 and above persons</p> <p>Other(Specify)</p>  |
| 2.8   | <p>What is your main source of income?</p> <p>Options</p> <p>Savings</p> <p>Family</p> <p>Support from government</p> <p>Others (Specify).....</p>                      |
| 2.9   | <p>What is your approximate household monthly income from all sources?</p> <p>1) 500-3000</p> <p>2) 3000-10000</p> <p>3) 10000-20000</p> <p>4) Other (Specify).....</p> |
| 2.10  | <p>What is your highest academic qualification?</p> <p>1) Primary</p> <p>2) Secondary</p> <p>3) Others.....</p> <p>4) Are you still schooling? ( if no go to 2.12)</p>  |
| 2.12  | <p>What is your reason for leaving School?</p> <p>1) Started working</p> <p>2) Lack of fees</p> <p>3) Pregnancy</p> <p>4) Others .....</p>                              |
| <p><b>3.0 PART C:INFANT FEEDING PRACTICES</b></p> |   |
| 3.1   | <p>Are you currently breastfeeding your child (name)?</p> <p>1) Breastfeeding</p> <p>2) Not breastfeeding</p>   |

| 3.2         | <p>When was your child (name of child) introduced to breast milk after birth?</p> <ol style="list-style-type: none"> <li>1) Immediately</li> <li>2) After one hour</li> <li>3) Within the first one hour</li> </ol>  |                 |                       |                 |             |  |  |
|-------------|--|-----------------|-----------------------|-----------------|-------------|--|--|
| 3.3         | <p>Did you give anything to the child to drink other than breast milk in the first days of delivery?</p> <ol style="list-style-type: none"> <li>1) Yes, was given</li> <li>2) Not given</li> </ol>   |                 |                       |                 |             |  |  |
| 3.4         | <p>If the parent agrees in 3.4 above, what did you give? (<i>Multiple responses</i>)</p> <ol style="list-style-type: none"> <li>1) Plain water</li> <li>2) Salt and water</li> <li>3) Sugar and water</li> <li>4) Others (Specify).....</li> </ol>   |                 |                       |                 |             |  |  |
| 3.5         | <p>If yes in 3.3, why did you give other feeds before initiating breastfeeding?</p> <ol style="list-style-type: none"> <li>1) The baby was crying</li> <li>2) I had no milk</li> <li>3) I was advised by the health worker</li> <li>4) It is my culture</li> <li>5) Religious beliefs</li> <li>6) Other specify.....</li> </ol>  |                 |                       |                 |             |  |  |
| 3.6         | <p>Was your child given the first fluid that came out of your breast within the first three days after delivery?</p> <ol style="list-style-type: none"> <li>1) Yes</li> <li>2) No</li> </ol>   |                 |                       |                 |             |  |  |
| 3.7         | <p>Is (name of child) currently exclusively breastfed?</p> <ol style="list-style-type: none"> <li>1. YES</li> <li>2. NO ( if No go to 3.8, if yes stop)</li> </ol>   |                 |                       |                 |             |  |  |
| 3.8         | <p>Please tell us what foods your child ate yesterday during the day and night and what were the proportions? (<b>Indicate number of cups or spoons</b>)</p> <table border="1" data-bbox="263 1794 1390 1966"> <thead> <tr> <th data-bbox="263 1794 794 1906"></th> <th data-bbox="794 1794 1098 1906">Number of cups/Spoons</th> <th data-bbox="1098 1794 1390 1906">Number of times</th> </tr> </thead> <tbody> <tr> <td data-bbox="263 1906 794 1966">Breast milk</td> <td data-bbox="794 1906 1098 1966"></td> <td data-bbox="1098 1906 1390 1966"></td> </tr> </tbody> </table> |                 | Number of cups/Spoons | Number of times | Breast milk |  |  |
|             | Number of cups/Spoons  | Number of times |                       |                 |             |  |  |
| Breast milk |  |                 |                       |                 |             |  |  |

|     |  |                                |   |
|-----|--|--------------------------------|---|
|     | Infant formulae  |                                |   |
|     | Sweetened juices   |                                |   |
|     | Salt and water   |                                |   |
|     | Tea  |                                |   |
|     | Plain water  |                                |   |
|     | Porridge   |                                |   |
|     | Other (Specify).....   |                                |   |
| 3.9 | Did (name of the child) eat the following <b>solid/semi-solid</b> foods yesterday during the day and night. <b>1. Yes</b> (Tick the specifics and Indicate number of cups, spoons or pieces)<br><b>2. No</b> |                                |   |
|     |  | Indicate number of cups/spoons | How many times yesterday during the day and night |
|     | Eggs   |                                |   |
|     | Flesh foods(Meat, chicken, beef, kidney, liver, goat, mutton, fish)  |                                |   |
|     | Legumes and nuts(beans, cow-peas, pigeon peas, ground nuts, lentils)   |                                |   |
|     | Dairy products(Milk, cheese, ghee)   |                                |   |
|     | Grains, roots and tubers(rice, pasta, carrots, arrowroots, potatoes)   |                                |   |
|     | Vitamin A rich foods (pawpaw, melon, sukumawiki, carrots, cowpeas, spinach, managu, murenda, avocado)  |                                |   |

|   |   |  |  |
|---|---|--|--|
|   | Other fruits and vegetables(onions, tomatoes, cabbages, orange, banana)   |  |  |
|   | How many times during the day and night did your child (name of child) eat any semi solid foods to make him/her full during the previous day and night? |  |  |
| <b>PART D.CHILDS HEALTH HISTORY AND MATERNAL HEALTH SEEKING BEHAVIOUR</b> |   |  |  |
| 4.1   | In the last two weeks, has your child been sick?<br>1) The child was sick<br>2) Not sick  |  |  |
| 4.2   | If yes for 4.1 above, what was your child suffering from;<br>1) Malaria<br>2) Acute Respiratory infections<br>3) Diarrhoea<br>4) Others (Specify).....  |  |  |
| 4.3   | Where did you seek medical treatment for your child?<br>1) Clinic<br>2) Herbalist<br>3) Hospital<br>4) Chemists<br>5) Other (Specify).....              |  |  |
| 4.4   | For how long did the illness or injury last?.....   |  |  |
| 4.5   | Can you describe the symptoms your child was suffering from in the past two weeks?.....<br>.....  |  |  |
| 4.6   | Are there any foods that were withheld during illness? If yes (specify).....  |  |  |
| 4.7   | Did you attend the ANC during your last pregnancy?<br>1) Yes  |  |  |

| 4.8             | <p>2) No</p> <p>If yes, how many times.....</p> <p>Is there an immunization card for your child? 1. Yes 2. No</p> <p>Immunizations given as per the card</p> <table border="1" data-bbox="280 412 1396 1032"> <thead> <tr> <th data-bbox="280 412 584 468">Immunization</th> <th data-bbox="584 412 887 468">Yes(1)</th> <th data-bbox="887 412 1190 468">Not given(2)</th> <th data-bbox="1190 412 1396 468">I don't know(</th> </tr> </thead> <tbody> <tr> <td data-bbox="280 468 584 524">BCG</td> <td data-bbox="584 468 887 524"></td> <td data-bbox="887 468 1190 524"></td> <td data-bbox="1190 468 1396 524"></td> </tr> <tr> <td data-bbox="280 524 584 580">OPV 0</td> <td data-bbox="584 524 887 580"></td> <td data-bbox="887 524 1190 580"></td> <td data-bbox="1190 524 1396 580"></td> </tr> <tr> <td data-bbox="280 580 584 636">OPV 1</td> <td data-bbox="584 580 887 636"></td> <td data-bbox="887 580 1190 636"></td> <td data-bbox="1190 580 1396 636"></td> </tr> <tr> <td data-bbox="280 636 584 692">OPV 2</td> <td data-bbox="584 636 887 692"></td> <td data-bbox="887 636 1190 692"></td> <td data-bbox="1190 636 1396 692"></td> </tr> <tr> <td data-bbox="280 692 584 748">OPV 3</td> <td data-bbox="584 692 887 748"></td> <td data-bbox="887 692 1190 748"></td> <td data-bbox="1190 692 1396 748"></td> </tr> <tr> <td data-bbox="280 748 584 804">DPT 1</td> <td data-bbox="584 748 887 804"></td> <td data-bbox="887 748 1190 804"></td> <td data-bbox="1190 748 1396 804"></td> </tr> <tr> <td data-bbox="280 804 584 860">DPT 2</td> <td data-bbox="584 804 887 860"></td> <td data-bbox="887 804 1190 860"></td> <td data-bbox="1190 804 1396 860"></td> </tr> <tr> <td data-bbox="280 860 584 916">DPT 3</td> <td data-bbox="584 860 887 916"></td> <td data-bbox="887 860 1190 916"></td> <td data-bbox="1190 860 1396 916"></td> </tr> <tr> <td data-bbox="280 916 584 972">Measles</td> <td data-bbox="584 916 887 972"></td> <td data-bbox="887 916 1190 972"></td> <td data-bbox="1190 916 1396 972"></td> </tr> <tr> <td data-bbox="280 972 584 1032">Fully immunized</td> <td data-bbox="584 972 887 1032"></td> <td data-bbox="887 972 1190 1032"></td> <td data-bbox="1190 972 1396 1032"></td> </tr> </tbody> </table> | Immunization | Yes(1)        | Not given(2) | I don't know( | BCG |  |  |  | OPV 0 |  |  |  | OPV 1 |  |  |  | OPV 2 |  |  |  | OPV 3 |  |  |  | DPT 1 |  |  |  | DPT 2 |  |  |  | DPT 3 |  |  |  | Measles |  |  |  | Fully immunized |  |  |  |
|-----------------|---|--------------|---------------|--------------|---------------|-----|--|--|--|-------|--|--|--|-------|--|--|--|-------|--|--|--|-------|--|--|--|-------|--|--|--|-------|--|--|--|-------|--|--|--|---------|--|--|--|-----------------|--|--|--|
| Immunization    | Yes(1)  | Not given(2) | I don't know( |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| BCG             |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| OPV 0           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| OPV 1           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| OPV 2           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| OPV 3           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| DPT 1           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| DPT 2           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| DPT 3           |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| Measles         |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| Fully immunized |   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| 4.9             | <p>From the above information is the child fully immunized?</p> <p>1) Yes</p> <p>2) No</p>  |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| 4.10            | <p>Was your child weighed at birth?</p> <p>1) Yes</p> <p>2) No</p> <p>3) Don't know</p>   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| 4.11            | <p>Do you take your child every month for growth monitoring?</p> <p>1) Yes</p> <p>2) No</p> <p>3) If no what was the reason?.....</p>   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |
| 4.12            | <p>Does your child sleep under a treated mosquito net?</p> <p>1) Yes</p> <p>2) No</p>   |              |               |              |               |     |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |       |  |  |  |         |  |  |  |                 |  |  |  |

|     |  |
|-----|--|
| 5.1 | <b><u>PART E: WATER, SANITATION AND HYGIENIC PRACTICES</u></b>   |
|     | <p>What is your source of water?</p> <ol style="list-style-type: none"> <li>1) River</li> <li>2) Borehole</li> <li>3) Tap</li> </ol>   |
| 5.2 | <ol style="list-style-type: none"> <li>4) Other (Specify).....</li> </ol> <p>How far is your water source?</p> <ol style="list-style-type: none"> <li>1) Within my compound</li> <li>2) 2km away</li> <li>3) 3km away</li> <li>4) 3-5km</li> </ol>                                 |
|     | <ol style="list-style-type: none"> <li>5) Others (specify).....</li> </ol> <p>How many times do you birth your child in a day?</p> <ol style="list-style-type: none"> <li>1) Once</li> <li>2) Two times</li> <li>3) Once per week</li> </ol>                                       |
| 5.3 | <ol style="list-style-type: none"> <li>4) Other (specify).....</li> </ol> <p>What do you do to water before giving it to your child?</p> <ol style="list-style-type: none"> <li>1) Boiling</li> <li>2) Treating the water</li> </ol>   |
|     | <ol style="list-style-type: none"> <li>3) Nothing.....</li> </ol> <p>Where do members of your household relieve themselves?</p> <ol style="list-style-type: none"> <li>1) Own pit latrine</li> <li>2) Neighbours pit latrine</li> </ol>  |
| 5.4 | <ol style="list-style-type: none"> <li>3) Others (Specify).....</li> </ol> <p>At what point do you wash your hands?</p> <ol style="list-style-type: none"> <li>1) After toilet</li> <li>2) Before eating</li> <li>3) Before cooking</li> <li>4) Before feeding the baby</li> </ol> |
|     | <ol style="list-style-type: none"> <li>5) Others (specify).....</li> </ol>   |
| 5.5 |  |
|     |  |
| 5.6 |  |
|     |  |

|     |   |                         |                         |         |
|-----|---|-------------------------|-------------------------|---------|
| 6.0 | <b>PART F:ANTHROPOMETRIC MEASUREMENTS</b> |                         |                         |         |
|     |   | 1 <sup>st</sup> reading | 2 <sup>nd</sup> reading | AVERAGE |
|     | Weight                                    |                         |                         |         |
|     | Height                                    |                         |                         |         |
|     | <b><u>Thank you!</u></b>                  |                         |                         |         |

## APPENDIX IV: APPROVAL BY GRADUATE SCHOOL



### INSTITUTE OF POST GRADUATE STUDIES

Private Bag - 20157  
KABARAK, KENYA  
E-mail: [directorpostgraduate@kabarak.ac.ke](mailto:directorpostgraduate@kabarak.ac.ke)

Tel: 0773265999  
Fax: 254-51-343012  
[www.kabarak.ac.ke](http://www.kabarak.ac.ke)

2<sup>nd</sup> July, 2018

Ministry of Higher Education Science and Technology,  
National Council for Science, Technology & Innovation,  
P.O. Box 30623 – 00100,

Dear Sir/Madam,

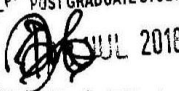
#### **RE: RESEARCH BY KOTUT BRIGID-GMND/M/2285/09/16**

The above named is a student at Kabarak University taking Masters Degree in Human Nutrition and Dietetics. She is carrying out research entitled “**Nutrition Status and Associated Factors of Infants Born to Adolescent Mothers in Transmara West, Narok County, Kenya.**”

The information obtained in the course of this research will be used for academic purposes only and will be treated with utmost confidentiality.

Please provide the necessary assistance.

Thank you.

Yours faithfully,  
  
Dr. Betty Tikoko  
DIRECTOR (POST GRADUATE STUDIES)  
KABARAK UNIVERSITY

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#### **Kabarak University Moral Code**

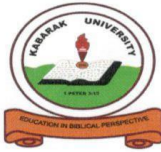
*As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord. (1 Peter 3:15)*



Kabarak University is ISO 9001:2015 Certified



## APPENDIX V: APPROVAL BY IREC



### KABARAK UNIVERSITY

#### INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

P.O. Private Bag – 20157 Kabarak M: +254 724 887 431 F: +254 51 343 529  
[www.kabarak.ac.ke/irecsecretariat.html](http://www.kabarak.ac.ke/irecsecretariat.html) E: [irecsecretariat@kabarak.ac.ke](mailto:irecsecretariat@kabarak.ac.ke)

7<sup>th</sup> August 2018

Reference: KABU01/IREC/003/VoL1/2018

**Formal Approval Number: KABU/IREC/012**

Ms Brigid Chebet Kotut Reg GMN/M/2285/09/16, Department of Human Nutrition and Dietetics  
School of Medicine and Health Sciences, Kabarak University

Dear Brigid

#### **FORMAL APPROVAL OF RESEARCH PROPOSAL**

The Institutional Research and Ethics Committee reviewed your research proposal titled:

***“Nutritional Status and Associated Factors of Infants born to Adolescent Mothers in Trans Mara West, Narok County, Kenya.”***

Your proposal has been granted a Formal Approval Number: **KABU/IREC/012** on 6<sup>th</sup> August 2018. You are therefore permitted to start your study.

Note that this approval is for 1 year; it will thus expire on 6<sup>th</sup> August 2019. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to KABU IREC secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you MUST notify the committee of any proposal change(s) or amendment(s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The committee expects to receive a final report at the end of the study.

Yours faithfully,

  
**Prof. Wesley Too, PhD, MPH**  
Chairman, Institutional Research and Ethics Committee.  
C.C: Registrar- Academic Affairs and Research  
Dean School of Medicine and Health Sciences  
Director, Institute of Post Graduate Studies



#### **Kabarak University Moral Code**

As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord. (1 Peter 3:15)



Kabarak University is ISO 9001:2015 Certified

## APPENDIX VI: RESEARCH AUTHORIZATION BY NACOSTI



### NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,  
2241349, 3310571, 2219420  
Fax: +254-20-318245, 318249  
Email: dg@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

NACOSTI, Upper Kabete  
Off Waiyaki Way  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/12621/24814**

Date: **6<sup>th</sup> September, 2018**

Brigid Chebet Kotut  
Kabarak University  
Private Bag - 20157  
**KABARAK.**

#### **RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *“Nutrition status and associated factors of infants born to adolescent mothers in Transmara West, Narok County, Kenya”* I am pleased to inform you that you have been authorized to undertake research in **Narok County** for the period ending **5<sup>th</sup> September, 2019**.

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Narok County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

  
**BONIFACE WANYAMA**  
**FOR: DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner  
Narok County.

The County Director of Education  
Narok County.

**APPENDIX VII: RESEARCH PERMIT BY NACOSTI**

**THIS IS TO CERTIFY THAT:  
MS. BRIGID CHEBET KOTUT  
of KABARAK UNIVERSITY, 0-20100  
NAKURU, has been permitted to conduct  
research in Narok County**

**Permit No : NACOSTI/P/18/12621/24814  
Date Of Issue : 6th September,2018  
Fee Received :Ksh 1000**

**on the topic: NUTRITION STATUS AND  
ASSOCIATED FACTORS OF INFANTS  
BORN TO ADOLESCENT MOTHERS IN  
TRANSMARA WEST,NAROK  
COUNTY,KENYA**

**for the period ending:  
5th September,2019**



**Applicant's  
Signature**



**Director General  
National Commission for Science,  
Technology & Innovation**

