

**EFFECT OF FATHER-TARGETED NUTRITION
EDUCATION ON FEEDING PRACTICES, NUTRITIONAL
STATUS AND MORBIDITY AMONG INFANTS IN
KISUMU EAST, KENYA**

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**Effect of Father-Targeted Nutrition Education on Feeding
Practices, Nutritional Status and Morbidity among Infants in
Kisumu East, Kenya**

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**A thesis submitted in fulfilment for the Degree of Doctor of
Philosophy in Food Science and Nutrition in Jomo Kenyatta
University of Agriculture and Technology**

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DECLARATION

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

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DEDICATION

This piece of work is dedicated to my loving husband, Sylus Owiti, my children, Natalia Arely and Emmanuel Aidric, my parents, Mr. Aloys Dinga and Mrs. Rose Dinga, my brothers, Kenneth, Eric and Phillip. Thank you for your unwavering support and encouragement that has always been my greatest source of motivation.

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ACRONYMS

ANC	Antenatal clinic
ARI	Acute respiratory infections
FGD	Focus Group Discussion
HFA	Height for Age
IGME	Inter-agency Group for Child Mortality Estimation
IYCF	Infant and Young Child Feeding
KDHS	Kenya Demographic Health Survey
KII	Key Informant Interview
KNBS	Kenya National Bureau of Statistics
KNH	Kenyatta National Hospital
MCH	Maternal and Child Health clinic
MoH	Ministry of Health
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children’s Fund
UoN	University of Nairobi
USAID	US Agency for International Development
WB	World Bank
WFA	Weight-for-Age
WFH	Weight-for-Height
WHO	World Health Organization

ABSTRACT

Fathers play a very important role in infant feeding, however, most interventions on behavior change around infant feeding target mothers with little attention to the fathers. Many of the studies about engaging men in breastfeeding promotion and support are in higher-income countries and are thus of unknown relevance to low and middle income countries. The main objective of this study was to determine the effect of father targeted nutrition education on feeding practices, nutritional status and morbidity among infants in Kisumu East Sub County, Kisumu County. A randomized control trial was conducted on 290 father-mother pairs who were split into an intervention (145 pairs) and a control group (145 pairs). The intervention group received nutrition education on breastfeeding and complementary feeding, while the control group did not receive any intervention during the nine month research period. Quantitative and qualitative data were collected on breastfeeding knowledge of the father and mother, father support in infant feeding practices, infant feeding practices (early initiation of breastfeeding, exclusive breastfeeding, timely introduction of complementary foods, meal frequency and dietary diversity), nutritional status of the infant (wasting, stunting, underweight) and morbidity among the infants born. Descriptive data analysis was done for the variables as well as relationships assessed using chi-square test, independent t-test, odds ratio and multiple linear regression. Baseline and end line assessment were done and the results showed the homogeneity of the intervention and control group. Parity which was the only significantly different variable between the intervention and control group at baseline ($t=3.82$; $p=0.003$) and at end line ($t=3.86$; $p=0.004$) had no impact to the regression models when assessing relationship of significant variables on exclusive breastfeeding ($t=-0.24$; $p=0.61$) and minimum acceptable diet ($t=-0.29$; $p=0.72$). The initiation of breastfeeding within an hour of birth, was at 97.1% in the intervention group versus 52.1% in the control group, the difference was significant ($X^2=74.18$, $p < 0.001$); infants exclusively breastfed for the first 6 months of life were 77.7% in the intervention group versus 45.1% in the control group, the difference was significant ($X^2=9.58$, $p=0.001$). There were significantly more infants receiving the minimum acceptable diet at 9 months of age, in the intervention group compared to the control group, ($X^2=2.18$; $p < 0.001$). There were significantly more children at 9 months of age wasted ($X^2=2.08$; $p=0.015$) and underweight ($X^2 = 2.08$; $p=0.010$) in the control group than the intervention group. There were significantly more children with diarrhea ($X^2=6.12$; $p=0.015$), acute respiratory infections ($X^2=8.11$; $p=0.05$) and fever ($X^2=1.09$; $p=0.03$) in the intervention group at 6 months than in the control group. Post-intervention, fathers in the intervention group were 1.6 times more likely to be knowledgeable that breastfeeding should be initiated within an hour of birth (OR = 1.61; % CI: 1.07 – 2.42; $p=0.02$), and were twice likely to be more knowledgeable on exclusive breastfeeding (OR = 2.01; % CI: 1.27 – 3.19; $p < 0.01$). There were significantly more fathers providing support in terms of providing encouragement and motivation on following the recommended breastfeeding practice ($X^2=19.71$; $p < 0.001$). Therefore, providing nutrition education to fathers during the antenatal period improved their knowledge and subsequently support towards infant feeding. Hence, fathers should be included in education sessions on infant feeding at the health facility and community levels, all of which may be an important step in the survival and development of the child.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Optimal feeding of infants for the first 1000 days of life can avert 19% of all deaths in children under five and increase chances of survival in the developing world (Black *et al.*, 2013). Exclusive breastfeeding for the first 6 months of a child's life lessens their chances of dying compared to a non-breastfed child, and it drastically reduces deaths from acute respiratory infection and diarrhea, two major child killers (Black *et al.*, 2008). Protective effect of breastfeeding has been shown against sudden infant death syndrome, digestive diseases, insulin-dependent diabetes mellitus, ulcerative colitis, Crohn's disease, allergic diseases, lymphoma, and a probable enhancement of cognitive development (Gartner *et al.*, 2005).

Good nutritional status and growth in infants and young children results from timely introduction of appropriate complementary foods (Michaelsen *et al.*, 2000). Inadequate complementary feeding has been shown to have negative impacts on the child by bringing about growth retardation (Rivera *et al.*, 2003), hindering mental development (Berkman *et al.*, 2002) and increasing infant morbidity (Kalanda *et al.*, 2006) and mortality (Edmond *et al.*, 2006). Recommendation from the Kenyan National IYCF are that breastfeeding should be initiated within the first hour of birth, exclusively breast feed for the first six months of a child's life and introduce complementary foods at six months with continued breastfeeding into the second year and beyond (MOH, 2010; WHO, 2010).

In developing countries, there are many documentations of suboptimal breastfeeding and complementary feeding practices. Only 39% of infants are exclusively breastfed for the first 6 months in developing countries, and the proportion is lower at 25% in Africa (UNICEF, 2013). The Kenya Demographic and Health Survey conducted in 2014 reported that 61% of children had been exclusively breastfed for the first 6 months of life (KNBS

and ICF Macro, 2014). However, it was still much lower the recommended coverage target of 90% (Jones *et al.*, 2003).

Complementary feeding practices are largely suboptimal. The recommended minimum acceptable diet for breastfed children 6-23 months consists of foods from four or more food groups daily. Non-breastfed children should be fed on milk or milk products in addition to foods from four or more food groups. The recommendation also requires that breastfed infants aged 6-8 months be fed at least twice a day and those aged 9-23 months be fed at least three times a day in addition to being breastfed on demand. Minimum meal frequency recommended for non-breastfed children aged 6-23 months is at least four times a day including milk feeds (MoH, 2013). Only 21% of children aged 6-23 months consume an acceptable diet in Kenya (KNBS and ICF Macro, 2014).

Promotion of appropriate infant feeding needs multilevel supportive measures with interventions being implemented through several channels (Rollins *et al.*, 2016). Fathers have been identified as one recommended channel in promoting infant feeding (Swigart *et al.*, 2017; Brown and Davies, 2014). Limited attention has been focused to fathers in the promotion of infant feeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Observational studies point towards a positive correlation between the support of the male partner and the likelihood of continuation of breastfeeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Many of the studies about engaging men in breastfeeding promotion and support were in higher-income countries and are thus of unknown relevance to low and middle income countries (Abbass-Dick and Dennis, 2017; Brown and Davies, 2014; Maycock *et al.*, 2013).

Randomized control studies have been recommended as ideal in determining the effectiveness of interventions which target breastfeeding (Lumbiganon *et al.*, 2011; Mitchell-Box *et al.*, 2013). Interventions targeting the father have consisted of Information-Education-Communication methodologies including; face-to-face discussions, power-point presentations, usage of brochures, usage of models, leaflets, and electronic media. In three studies (Su and Ouyang, 2016; Sahip and Molzan Turan, 2007;

Raeisi *et al.*, 2014) the intervention was done during the antenatal period. In two studies (Özlüses and Celebioglu, 2014; Maycock *et al.*, 2013) the intervention started in the antenatal period and extended into the neonatal period. In three studies (Susin and Giugliani, 2008; Pisacane *et al.*, 2005; Abbass-Dick, 2015), the intervention was done in the neonatal period. In Kenya, most community programs seeking to improve the well-being of women and children target young mothers and their children, with little attention paid to fathers who are key influencers. The main objective of this study was to determine the effect of father targeted nutrition education on feeding practices, nutritional status and morbidity among infants in Kisumu East Sub County, Kisumu County.

1.2 Problem Statement

Key indicators of infant and young child feeding practices have been sub optimal in Kenya. Exclusive breastfeeding rates are at 61% for children under 6 months, timely initiation of breastfeeding done by 58% of mothers, 41 % of children 6-23 months being fed from the requisite number of food groups and 53% of children breastfeeding till 2 years of age. In addition, 26% of children are stunted, 11% underweight and 4% wasted. (KNBS and ICF Macro, 2014). Infant mortality rate in Kisumu County, where the study was conducted is 95 per 1000 live births, which is 50% higher than the national figure of 52 deaths per 1000 live births (Republic of Kenya, 2012).

Most nutrition intervention programs seeking to improve the health of children target mothers and little attention given to other key influencers like the fathers. In fact, male involvement with child care is poor in most communities despite studies showing that engagement of men can significantly improve infant and young child feeding practices (Susin and Giugliani, 2008; Pisacane *et al.*, 2005). Therefore, this study engaged the fathers and the expectant women in their last pregnancy trimester. The fathers were provided with information on infant feeding through nutrition education sessions in a classroom setting. Fathers can positively influence the infant feeding practices through offering encouragement and motivation towards recommended infant feeding practices, helping in caring for the baby and mother, providing a favorable environment for

breastfeeding and assisting in household chores. Fathers can be mobilized in programs aimed at improving infant feeding practices.

1.3 Justification of the Study

Majority of mothers want to follow the recommended infant feeding practices as stipulated by the World Health Organization. However, they face many barriers in their communities and even within their own families. Lack of family and social support has been deemed to negatively impact on the exclusivity and duration of breastfeeding (Doğa Öcal *et al.*, 2017). Qualitative studies conducted separately with health providers and men and women of childbearing age as well as community elders revealed strong maternal intentions to breastfeed and good overall knowledge of the benefits of breastfeeding. However, Social pressures often overrode mothers' intentions to exclusively breastfeed, leading to mixed feeding in the early postpartum period (Reinsma *et al.*, 2012).

Promotion of appropriate infant feeding needs multilevel supportive measures with interventions being implemented through several channels (Rollins *et al.*, 2016). Fathers have been identified as one recommended channel in promoting infant feeding (Swigart *et al.*, 2017; Brown and Davies, 2014). Limited attention has been focused to fathers in the promotion of infant feeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Observational studies point towards a positive correlation between the support of the male partner and the likelihood of continuation of breastfeeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Many of the studies about engaging men in breastfeeding promotion and support were in higher-income countries and are thus of unknown relevance to low and middle income countries (Abbass-Dick and Dennis, 2017; Brown and Davies, 2014; Maycock *et al.*, 2013).

Few initiatives in Kenya have engaged men in efforts to improve infant feeding. A rapid assessment has been done in which discussion on male involvement was done using focus group discussions with the respondents being women of child bearing age and results showing that men are key influencers on infant feeding (Nduati *et al.*, 2008). A formative

Infant feeding assessment has also been done to evaluate community-based approach to improve practices around infant feeding by engaging men to support the practices and men were again observed to be key influencers (Thuita, 2008).

A pilot training workshop to sensitize men's group leaders on male involvement on infant feeding was done in Western Kenya. However, an operational research has not been undertaken built on this experience (Martin *et al.*, 2009). Hence this study contributes in addressing the gap of assessing intervention strategies that involve men for improved infant feeding practices in Kenya. The information may be used by government ministries such as Ministry of Health as well as other non-governmental organizations in formulating effective community initiatives for improving infant feeding practices. This research adds to the body of knowledge on strategies of improving infant feeding practices and is useful in policy making.

1.4 Main Objective of the Study

The main objective of this study was to assess the effect of father-targeted nutrition education on feeding practices, nutritional status and morbidity among infants in Kisumu County, Kenya.

1.5 Specific Objectives

1. To assess father support, beliefs, practices and knowledge on infant feeding in Kisumu East Sub County, Kisumu County.
2. To develop and test a father targeted nutrition education program in Kisumu East Sub County, Kisumu County.
3. To assess the effect of the father targeted nutrition education intervention strategy on improving infant feeding practices in Kisumu East Sub County, Kisumu County.

4. To determine the effect of father involvement in infant feeding on nutritional status and morbidity among children 0-12 months in Kisumu East Sub County, Kisumu County.

1.6 Study Hypotheses

1. Father's support, beliefs, practices on infant feeding does not significantly improve through nutrition education.
2. Nutrition education targeting the father incorporating information on male involvement does not significantly increase their knowledge on infant feeding practices.
3. Nutrition education targeting fathers has no significant contribution to the improvement of infant and young child feeding practices.
4. Nutrition education targeting fathers has no significant contribution to the improvement of nutritional status and morbidity among children 0-12 months.

1.7 Conceptual framework

Father involvement through nutrition education is expected to result to better breastfeeding practices, adequate knowledge on infant feeding by the father, fathers' know how of supportive role they can play in infant feeding. These will result to improved adherence to recommended infant feeding practices at the household level with improved nutritional status of the infant expected contributing ultimately to reduction in malnutrition rates and morbidity patterns (Figure 1).

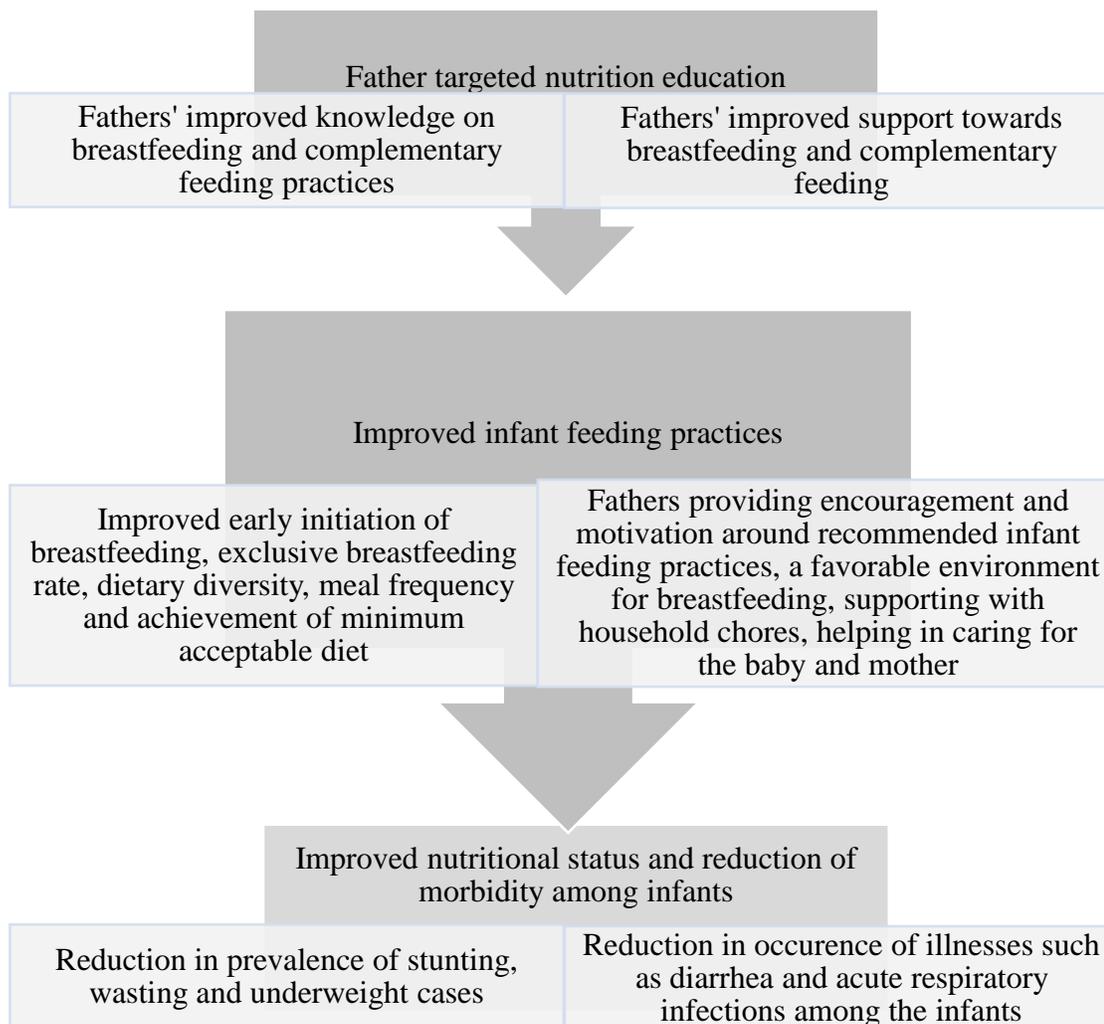


Figure 1.1: Conceptual framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

An estimated 1.3 million (Jones *et al.*, 2003) childhood deaths in developing countries are attributed to poor breastfeeding practices. In Kenya, poor breastfeeding and infant feeding practices contribute to more than 10,000 deaths per year (MoH, 2010). Under five mortality rates estimated as number of deaths per 1,000 live births is 51 globally, 57 in developing regions, 109 in Sub-Saharan Africa (IGME, 2012). About one in every 26 Kenyan children dies before reaching age 1, and about one in every 19 does not survive to his or her fifth birthday ((KNBS and ICF Macro, 2014).

Fathers can make a difference in the rate of infant feeding practices but they need information in order to make a difference (Kenosi *et al.*, 2011 and Tohotoa *et al.*, 2009). A study showed that men did not feel that the method of infant feeding is their decision; they felt left out of the mother–baby relationship. It was noted that more needed to be done to help fathers recognize their important contribution to infant feeding (Rempel and Rempel, 2011). Providing fathers with knowledge and skills for optimal breastfeeding practices as well as engaging them in breastfeeding promotion and education has been shown to positively impact exclusive breastfeeding rates (Pisacane *et al.*, 2005; Susin and Giugliani, 2008). Interventions targeting male partners have been recommended in Kenya but no attempts have been made to initiate and investigate the impact of such interventions.

2.2 History of infant feeding promotion strategies

For over 25 years, various strategies have been put forward and implemented to support early, exclusive, and continued breastfeeding. In the 1980s, breastfeeding was promoted as part of the “child survival revolution” along with growth monitoring, oral rehydration,

and immunization. The largest part of the breastfeeding promotion efforts focused on health provider skills, hospital practices, and policies (Jelliffe, D. and Jelliffe, E. 1988). In 1990, representatives from 30 countries and multilateral and bilateral partners gathered to make a global action plan to reverse declining breastfeeding rates (WHO, 2008). From this meeting emerged the Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding. Maternity services were linked to the community through Step 10: “foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic,” but this step proved to be an obstacle for many programmes (WHO, 2008).

The community was endorsed by the World Health Assembly in 2002 as a key component of the comprehensive Global Strategy for Infant and Young Child Feeding (WHO, 2003). The strategy reaffirms the operational targets of the Innocenti Declaration and adds five additional targets, including one that particularly refers to the community: make certain that the health and other relevant sectors protect, promote, and support exclusive breastfeeding for six months and continued breastfeeding up to two years of age or beyond, while providing women access to the support they need in the family, community, and workplace. The Global Strategy states that community-based support networks should be welcomed within the health care system and should “participate actively in the planning and provision of services”. Many women have limited contact with health care providers, but they do have daily contact with family members, friends, neighbors, employers, and others in their community who can influence their infant feeding behavior (WHO, 2008).

2.3 Father Involvement interventions

Existing interventions involving fathers have mainly been conducted within the parameters of information sessions (Pisacane *et al.*, 2005; Susin, and Giugliani, 2008; Wolfberg *et al.*, 2004). The majority of these interventions included information delivered by a trained facilitator (Pisacane *et al.*, 2005; Susin and Giugliani, 2008) through the use of media, such as handouts, videos, and slides, containing information about WHO recommendations, breastfeeding techniques, breastfeeding problem management, and

ways fathers can support their breastfeeding partner (Susin and Giugliani, 2008; Wolfberg *et al*, 2004). Some interventions included the opportunity for open discussions mostly directed and determined by the participants (Susin and Giugliani, 2008; Wolfberg *et al*, 2004).

Topics largely covered in these interventions include breastfeeding problems and problem management (Piscane *et al*, 2005; Susin, and Giugliani, 2008); technical aspects of breastfeeding, such as WHO recommendations and the biology of breasts (Susin and Giugliani, 2008; Wolfberg *et al*, 2004); benefits and advantages of breast feeding (Wolfberg *et al*, 2004), breastfeeding fears and concerns (Wolfberg *et al*, 2004). A few interventions also addressed the importance of paternal involvement (Piscane *et al*, 2005; Susin and Giugliani, 2008; Wolfberg *et al*, 2004), and skills for advocating that breastfeeding is best to (Wolfberg *et al*, 2004). Inclusion of fathers is associated with higher rates of exclusive breastfeeding rates in the first six months (Susin and Giugliani 2008). Doing away with misconceptions through education, and teaching fathers how to advocate for breastfeeding impacts breastfeeding initiation (Wolfberg *et al*, 2004). Information on breastfeeding problem management delivered to fathers decreased their partners' perceived severity of problems, and improved the chances of exclusive breastfeeding to six months (Piscane *et al.*, 2005).

2.4 Knowledge gap

In Kenya, most community programs seeking to improve the well-being of women and children target young mothers and their children (Thuita, 2008). Few initiatives in the country have engaged men in efforts to improve infant and young child feeding and maternal dietary practices (Thuita, 2008). A pilot project done in Western Kenya, engaged men through nutrition education on infant and young child feeding practices through group training of men facilitators using a training manual targeted to men (Martin *et al*, 2009). Research has not been done on nutrition education to the husband and wife pair of which this study will address through training of these persons using a revised manual that will contain key information for both the husband and wife. Engaging male partners in

breastfeeding promotion and education, as well as providing fathers with knowledge and skills for optimal breastfeeding practices, has been shown to positively impact exclusive breastfeeding rates(Susin and Giugliani, 2008; Pisacane *et al.*, 2005). Hence this study might contribute to improved community initiatives for optimal infant and young child feeding.

CHAPTER THREE

THE PARTICIPATION OF FATHERS IN BREASTFEEDING PROCESS: KNOWLEDGE, BELIEFS AND PRACTICES IN KISUMU, KENYA

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3.1 Abstract

Fathers' support is an essential component in ensuring success in improving infant feeding practices which have the overall impact of reducing infant mortality rates by 19%. Fathers are usually not targeted with information on infant feeding at the health facility or community level. Fathers have been identified as lacking knowledge, hence, not able to support the recommended infant feeding practices. The study was conducted in Kisumu East Sub County, Kisumu County, which was selected because of the high infant mortality rate in the region. A nutrition education intervention strategy was employed targeting the fathers with information on breastfeeding and complementary feeding through an interventional study in which 290 father-and-mother pairs were recruited. There was randomization of study participants into either intervention group (145 pairs) where nutrition education was given, or control group (145 pairs) where nutrition education was not given. Eligibility criteria was of all the women who were 23-27 weeks pregnant and attending antenatal clinic at Kisumu County Hospital between January-April 2016. The women gave the contacts of the father-to-be, which enabled follow-up to reach the fathers. Quantitative data were collected from the fathers through a pre-tested structured questionnaire that explored their knowledge of breastfeeding pre-intervention. Qualitative data were collected through focus group discussions to assess knowledge, beliefs, and practices on breastfeeding pre-intervention and post-intervention (9 months later). Results did not show any significant differences in the knowledge level on breastfeeding of fathers in the intervention and control group pre-intervention ($p > 0.05$). Significant differences were observed post-intervention on knowledge levels on initiation of breastfeeding within an hour of birth ($p = .01$), continuation of breastfeeding for 2 years and beyond ($p = .02$) and exclusive breastfeeding ($p = .02$) and group affiliation. A Wilcoxon signed-rank test showed a statistically significant change in knowledge of the fathers in the intervention after receiving the nutrition education sessions ($Z = -10.181, p = 0.000$). The focus group discussions showed that fathers largely saw their role as the provision of food for maternal and infant feeding pre-intervention in both groups, while fathers reported additional roles post intervention in the intervention group including being a source of motivation and

information to the mother. In conclusion, fathers have low knowledge levels on breastfeeding process which in turn affects their influence on breastfeeding practice. Nutrition education involving the fathers increases their knowledge on breastfeeding and influence to breastfeeding practice ultimately contributing to improved breastfeeding practices.

Key words: Father, support, breastfeeding, nutrition education, knowledge, Kisumu, Kenya

3.2 Introduction

Evidence of effective ways to assist fathers in their supportive role with breastfeeding is scarce, with limited published examples within the Kenyan context. Effective strategies to support breastfeeding are required because breastfeeding practices in Kenya are still below the World Health Organization recommendations with 61% exclusive breastfeeding rates versus WHO target of 90% (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). Behavior change strategies for adoption of recommended breastfeeding practices focus on improving the knowledge gaps of mothers with little attention to the influence of fathers on improved infant feeding practices (McInnes, *et al.*, 2013). A mother's decision to initiate and continue breastfeeding has been strongly linked to the father's support and influence (Britton *et al.*, 2007). Fathers can make a difference in the rate of infant feeding practices but they need information to be able to do so (Kenosi, *et al.*, 2011; Tohotoa *et al.*, 2009). Engagement of fathers through educating them on breastfeeding and men's group activities can greatly improve infant feeding and health behaviors (Sloand, *et al.*, 2010).

A randomized controlled trial of a two-hour pre-natal intervention with fathers consisting of infant care information as well as encouragement for fathers to advocate for breastfeeding and assist their partner, resulted in 74% v. 41% breastfeeding initiation among women whose partners had attended the class, in comparison with the controls (Wolfberg, *et al.*, 2004). In Italy, a study found that teaching fathers how to prevent and

manage the most common lactation difficulties had a marked, positive impact on breastfeeding continuation. Only 15% of mothers whose partners had been simply told about the benefits of breastfeeding were still breastfeeding at six months; but when the men were individually coached for just 40 minutes on managing common problems (such as pain and discomfort, fear that baby “isn’t getting enough” and breastfeeding issues when mum returns to work) the percentage of mothers still breastfeeding at six months was 25%. The impact was particularly strong among women who had reported difficulties with lactation (4.5% v. 24%) (Pisacane, *et al.*, 2005).

The objective of this study was to assess the knowledge of fathers on breastfeeding, beliefs, and practices on breastfeeding. There has been less attention on male involvement in infant feeding thus the basis of our study.

3.3 Materials and Methods

3.3.1 Study location

The study area was Kisumu East Sub County, Kisumu County in Kenya. The county covers an area of 1,960.2Km² and has a population of 544,166 with 3.24% (14,715) being pregnant women and 25.9% (117,629) women of reproductive age (Republic of Kenya, 2012). The study area was selected since it falls within Nyanza region where the highest infant mortality rate (82 deaths per 1,000 live births) has been reported compared to the national levels of 39 deaths per 1,000 live births (Kenya National Bureau of statistics (KNBS) and ICF Macro., 2014).

3.3.2 Study design

A randomized control trial was used. Randomization helps remove bias and truly allows for a direct comparison between two groups in a trial, providing a real representation of how the intervention will play out in the wider population. The study group were pregnant women who were selected at 6 months gestational age while attending the antenatal clinic at Kisumu County hospital in Kisumu East Sub County. The contacts of the father-to-be

linked to the women who agreed to participate in the study were taken and follow up made to the fathers and written consent was obtained from the father and mother pair who were the target group. Pregnant women were selected as the target group during recruitment into the study to allow for nutrition education intervention strategy to have an impact on behavior change prior to delivery. Those who agreed to participate were requested to come with their partners to the health facility for collection of data and nutrition education to the intervention group.

Authorization to conduct the study was obtained from the ethics review committee at Kenyatta National Hospital/University of Nairobi, the County Director of Health in Kisumu and the medical superintendent at Kisumu county hospital. The respondents were informed of the objectives of the study and the interviewer sought their consent to participate in the study. All information and conversations provided to the investigators by the participant were regarded as confidential. Codes were used as identifiers to the father and mother pair.

3.3.3 Sampling

The women who were 6 months pregnant between January and April 2016 and attending the antenatal clinic at Kisumu County hospital were eligible to be recruited into the study. The sample population was 30 based on hospital records. The total number of mothers to be reached per day was 10 thus the sampling interval was 3. Sample size was calculated using the formula by Johnson *et al.*, (Johnson, *et al.*, 1995). The study considered an effect size of 20% difference in the breastfeeding outcome between the intervention and control group based on the intervention of nutrition education targeting both father and mother. The outcome of this study was expected to be better than that of a similar study done in Italy because in this study the father-mother pairs were recruited during antenatal period with the expectation that with the information received they will be able to make a timely informed decision in regards to infant feeding right from delivery. In the study done in Italy, nutrition education had taken place post-natal considering the difference in the effect of the intervention of 15% and used the standard deviation of 0.58 (Pisacane, *et al.*, 2005).

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

Where:

n- Estimated sample size

Z_α level of significance (set at 0.95 α=0.05=1.96); **Z_{1-β}** power of the study (80%)

Σ standard deviation (estimated at 0.58)

Δ difference in effect of interventions which is required (estimated at 20% based on previous studies)

Hence

$$n = \frac{2(1.96 + 0.8416)^2 (0.58)^2}{(0.20)^2}$$

n=132.

Considering a 10% attrition rate, the total sample size was 145 this figure was doubled to 290 since the intervention study would involve an intervention and control group.

A total of 290 father and mother pairs were randomly recruited. Ten participants were recruited per day from those who agreed to take part in the study from a daily attendance at the antenatal clinic of 75 pregnant women with an approximation of 40% being 6 months pregnant according to the hospital profile. The recruited study participants were linked to the fathers to participate in the study. A total of 4 focus group discussions were conducted, with 2 done pre-intervention and 2 done post-intervention. Each FGD targeted 8 fathers in the intervention group and 8 fathers in the control group.

3.3.4 Delivery of the nutrition education intervention

Nutrition education intervention was given to the intervention group. The mothers who had been recruited during the antenatal clinic visit gave their phone contacts and follow up phone calls were made to the fathers to be. Consent was sought from the fathers and mothers to participate in the study. Those who consented to participate in the study together with their partners were invited to Kisumu County Hospital for nutrition education session prenatally on breastfeeding and complementary feeding which lasted 4 hours. The education sessions were delivered once to the intervention group. The language of communication during the intervention delivery was dholuo, a local language that could be easily understood by the study participants. Nutrition education was provided in the form of group facilitated sessions to the intervention group. Fathers were educated on how they can support infant feeding such as caring for the baby (helping to change diapers, playing, putting to sleep, soothing, and bathing), caring for the mother), feeding the baby (helping to cup feed expressed breast milk, swaddle baby after feeding, help to burp baby after feeding, help with positioning and latching), caring for the mother (allowing mother time to sleep, rest, do other things, pump, break from the baby, massages, buying or preparing healthy foods to support or increase milk production), giving encouragement and support towards recommended feeding practice and providing a favourable environment for breastfeeding.

3.3.5 Data collection

Data on knowledge was collected through pre-tested structured questionnaires administered to the fathers. Pre-testing was done in Kisumu West Sub County in Osiri sub location, a community with similar characteristics as the study population. Thirty fathers were reached for pre-testing after which the questionnaire was modified and finalized as necessary for the easy understanding by participants. A focus group discussion guide was used to facilitate qualitative data collection through focus group discussions, which were conducted by a team of three comprising of one facilitator and two note takers. All

interviews from the focus group discussions were recorded using voice recorders after consent was given. Paper transcripts were used as back-ups.

Information was gathered to assess knowledge on how soon after delivery babies start breastfeeding, use of pre-lacteal feeds, types of other foods given to the newborn baby (including water), adequacy of breast milk alone to support the growth of an infant up to 6 months old and duration of breastfeeding a child. Focus group discussions were conducted with 8 fathers from the intervention group and 8 fathers from the control group. The focus group discussion guide explored the following topics: perceptions on breastfeeding; beliefs and breastfeeding practices and support by the father for feeding of the infant.

3.3.6 Data management and analysis

Data were coded and entered into the computer software. Statistical package for social sciences (version 21) was used. Descriptive data analysis was done using a box plot to assess pre and post test scores of fathers in the intervention group during the nutrition education session, a Wilcoxon rank test was used to determine change of knowledge among the fathers in the intervention group and a chi-square test was used to determine significant differences in terms on knowledge of the fathers' pre and post intervention in the intervention and control group. Qualitative data from the focus group discussions were transcribed from the field notes and digital recording, then reviewed. The data were then consolidated into emerging themes along the main thematic lines based on the question guide.

3.4 Results and Discussion

Fathers' knowledge on breastfeeding was assessed. At baseline, a chi-square test showed no difference in the knowledge levels on breastfeeding between the intervention and control groups (Table 3.1). Post-intervention, a chi-square test was performed and significant differences were found between knowledge levels on initiation of

breastfeeding within an hour of birth and group affiliation, $X^2=12.29$, $p =.01$, knowledge levels on continuation of breastfeeding for 2 years and beyond and group affiliation, $X^2=11.34$, $p =.02$ and knowledge levels on exclusive breastfeeding and group affiliation, $X^2=13.11$, $p =.02$ (Table 3.2).

Educating fathers about the benefits of breastfeeding has an effect on the number of mothers choosing to breastfeed; this education is recommended to take place during the antenatal period and the baby's first quarter (Maycock, *et al.*, 2013). Pre-intervention, fathers' knowledge on breastfeeding was low on aspects of exclusive breastfeeding, similar to results of a cross-sectional study done involving 143 fathers at health centers in the region of North Portugal indicating a significant lack of breastfeeding knowledge among fathers during pregnancy (Cardoso, *et al.*, 2017). In this study, fathers in the intervention group received nutrition education with their expectant partners' antenatal visits, resulting in significantly more fathers in the intervention group being knowledgeable about breastfeeding than the control group post-intervention. This may be a pointer that if fathers have more access to information, they are more aware of the benefits of breastfeeding, thus resulting in positive outcomes as identified in studies done (Piazzalunga and Lamounier, 2009; Palmqvist, Zather, and Larsson, 2015).

This study, qualitative findings from the focus group discussions showed that fathers in the intervention group were more knowledgeable on the benefits of breastfeeding post-intervention. Pre-intervention, only mentioned one benefit of breastfeeding, that of enhancing child health. This concurs with another study showing that in the father's view, the mother was not thought of as benefiting in the breastfeeding process (Silva, *et al.*, 2012). Post-intervention, more benefits were mentioned such as breast milk containing components that help in avoiding diseases, satisfies the child's needs for nutrients, reduces spending on other types of food, preventing breast engorgement for the mother, helping the mother's uterus to contract, increasing bonding of mother and child, and reducing costs to the parents because of less illnesses as the child is healthy. This shows a possible change in the profile of fathers regarding their knowledge of the matter following the intervention.

Fathers in the control group during the focus group discussions mentioned few benefits of breastfeeding pre- and post-intervention. The fathers' responses were: 'breastfeeding is important to the child until 4 months before other feeds are introduced', and 'breast milk is a good source of food and supports good growth and development of the child'. The father's knowledge of breastfeeding was low and not in line with WHO recommendations of exclusive breastfeeding until 6 months of age (WHO, 2003). Pre-test and post-test results of the intervention group during the nutrition education sessions shows the center for post-test scores being much higher than the center for pre-test scores with more spread being observed in the pre-test scores than the post-test scores based on the box plot in figure 3.1. The results of the pre-test scores appear not to be symmetrically distributed while post-test scores are symmetrically distributed with outliers. The mean score posttest is higher than pretest. Indeed, median pre-test score was 50% while the post-test score was 83.3% showing a change in knowledge levels.

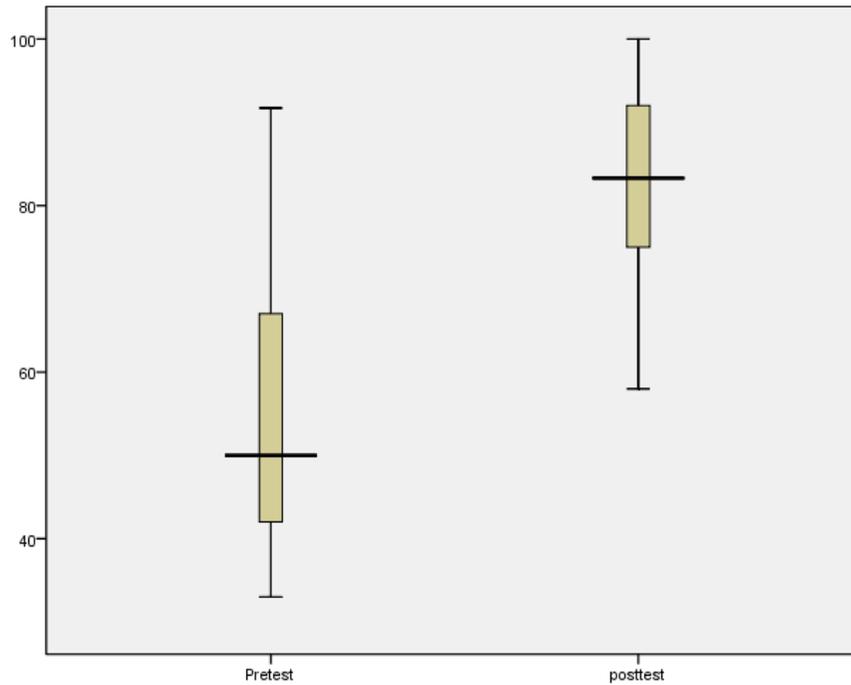


Figure 3.1: Pre-test and post-test results on fathers' knowledge

The Wilcoxon signed-rank was used since data was not normally distributed to compare the pretest and posttest scores of the fathers in the intervention group. The results showed that nutrition education involving the fathers elicited a statistically significant change in the knowledge of fathers in the intervention group on breastfeeding ($Z = -10.181$, $p < 0.001$). A belief on breastfeeding cited by fathers both in the intervention group and control group during the focus group discussions was that a child should not be breastfed outside in the public where there are many people as the child can be cursed. Fathers in the control group also mentioned that it is believed that when a mother is HIV positive, she is not recommended to breastfeed unless the doctor approves it.

Regarding beliefs about breastfeeding, several studies made note of the concern fathers have about breastfeeding in public, terming it as inappropriate (Henderson, *et al.*, 2011; Freed, *et al.*, 1992; Shepherd, *et al.*, 2000). Breastfeeding in public was also a concern of the fathers involved in this study as evidenced by statements from FGDs conducted in

which the fathers felt it was not acceptable for mothers to breastfeed in public as she is exposing her breasts and can invite a curse to the child resulting in poor growth.. This can be a pointer on the need to create breastfeeding spaces for mothers in public areas such as workplaces and hospitals to ensure there is a supportive environment to support breastfeeding.

Regarding practices on breastfeeding, fathers in the intervention group stated that most infants are introduced foods early in the community but for them, since they had been taught that it is important to give only breast milk for the first 6 months, they tried to ensure the child was given only breast milk till the child turned 6 months. They were also supportive of the mother, protecting her against stress so as to produce enough milk by helping out with household chores and taking care of the older children. The fathers also were able to encourage the mother to continue breastfeeding as recommended for the baby to benefit from the breastfeeding process. In the control group, fathers responded that infants are well breastfed in the community up to 3 months of age when they should be given other foods, but breastfeeding continues until one year of age after which it should be stopped as the child is now grown up and can walk.

During the focus group discussions, fathers in the intervention group mentioned more roles they can play in the breastfeeding process post-intervention than fathers in the control group. The fathers in the intervention group mentioned the following roles: provision of food for the family, help in feeding the baby, supporting the mother to ensure information shared on breastfeeding is followed, helping the mother with household chores and taking care of the other children to reduce stress for the mother especially during the 14 days provided for fathers as paternity leave, and providing encouragement and emotional support. Fathers in the control group mentioned two roles they can play which were: buying foods for the child and helping in giving the child food.

Fathers' role in the infant feeding process is important. A lack of familial support, particularly from fathers, has been identified as a barrier to breastfeeding (Van Wagengen, 2015). Fathers' provision of practical support for their breastfeeding partners is critical in

promoting breastfeeding, supported by findings from the present study as identified by fathers in the FGDs and in other studies (Deave and Johnson, 2008; Sherriff and Hall, 2011; Sherriff, *et al.*, 2009). In addition, fathers' role in providing emotional support and encouragement was viewed as valuable in this study, similar to another study done in the United States which proposed that fathers' empathy for their partners during the breastfeeding experience was critical to success (Avery and Magnus, 2011). In the present study, it was noted that fathers in the intervention group stated more types of support they could provide towards infant feeding process compared to the fathers in the control group. The results could be an indication of fathers from the intervention group applying skills gained from the nutrition education sessions.

3.5 Conclusion

In conclusion, the fathers had low knowledge levels on infant feeding. Nevertheless, there is a need for them to gain more information and understanding of the breastfeeding process. Fathers should be included in education sessions on infant feeding at the health facility and community levels, all of which may be an important step in infant feeding practices. Fathers are also keen to support breastfeeding mothers but lack the relevant know-how. When fathers are provided with knowledge on infant feeding, they are well equipped to play a more supportive role in infant feeding.

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Table 3.1: Fathers' knowledge about breastfeeding practices at baseline

Characteristic	Control (N=145)	Intervention (N=145)	χ^2	<i>p</i>
Knowledge about breastfeeding				
Breast milk first feed	95.2 (138)	94.5 (137)	2.52	0.41
Start breastfeeding within 1 hour	52.3 (75)	56.5 (82)	1.39	0.29
Breastfeed for 2 years	55.2 (80)	55.5 (79)	5.88	0.65
EBF	40.1 (58)	38.6 (56)	6.21	0.76

Note level of significance based on chi-square test (χ^2) is p value <0.05 . The figures in bracket are 'n' with $N=145$ per group (control and intervention group) and figures outside bracket represent the percentage within the groups. EBF=Exclusive breastfeeding.

Table 3.2: Fathers' knowledge about breastfeeding 6 months post-intervention

Characteristic	Control (N=141)	Intervention (N=130)	χ^2	<i>p</i>
Knowledge about breastfeeding				
Breast milk first feed	95.0 (134)	97.6 (127)	3.56	0.11
Start breastfeeding within 1 hour	58.2 (82)	80.0 (104)	6.78	0.01**
Breastfeed for 2 years	56.7 (80)	76.2 (99)	5.11	0.02**
EBF	43.9 (62)	67.7 (88)	5.13	0.02**

*Note level of significance based on chi-square test (χ^2) is p value <0.05 indicated with **. The figures in bracket are 'n' with $N=141$ in the control group and $N=130$ in the intervention group. The figures outside bracket represent the percentage within the group. EBF=Exclusive breastfeeding.*

CHAPTER FOUR

NUTRITION EDUCATION STRATEGY WITH FATHER INVOLVEMENT TO IMPROVE INFANT FEEDING PRACTICES IN KISUMU, KENYA

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4.1 Abstract

Fathers' support is an essential component in ensuring success in improving the infant feeding practices. A nutrition education intervention strategy was employed targeting the fathers in the intervention group with information on breastfeeding and complementary feeding over a period of one year. A total of 290 father-and-mother pairs were recruited. Study participants were randomized into either intervention group (n=145 pairs) or control group (n=145 pairs). The fathers completed a pre-tested structured questionnaire that explored their knowledge of breastfeeding pre and post-intervention. Kisumu County was selected because of the high infant mortality rate (95 deaths per 1,000 live births) in the region. Results of this study did not show any statistically significant differences in the knowledge level on breastfeeding of fathers in the intervention and control group pre-intervention based on odds ratio test of the following indicators: initiation of breastfeeding within an hour of birth (p=0.44), exclusive breastfeeding for 6 months (p=0.79) and breastfeeding for 2 years and beyond (p=0.90). However, statistically, significant differences were observed post-intervention as follows: initiation of breastfeeding within an hour of birth (p=0.01), exclusive breastfeeding for 6 months (p=0.01) and breastfeeding for 2 years and beyond (p=0.02). A Wilcoxon signed-rank test showed a statistically significant change in knowledge of the fathers in the intervention group after receiving the nutrition education sessions (Z=-10.181, p=0.000). Therefore, we conclude from our study that nutrition education targeting the fathers increases their knowledge on breastfeeding and this presents a good opportunity to enhance their support towards the mother, ultimately contributing to improved infants feeding practices.

Key words: Father Involvement, nutrition education, Kisumu, Kenya.

4.2 Introduction

Evidence of effective ways to assist fathers in their supportive role with breastfeeding is scarce with limited published examples within the Kenyan context (Thuita, 2008). The exclusive breastfeeding rate in Kenya is at 61%, and this is below the WHO

recommendations of 90% (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). Effective strategies to support exclusive breastfeeding are required. Behavior changes strategies for the adoption of recommended breastfeeding practices focus on improving the knowledge gaps of mothers with little attention to the influence of fathers in the improved infant feeding practices (McInnes, *et al.*, 2013). A mother's decision to initiate and continue breastfeeding has been strongly linked to the father's support and influence (Britton *et al.*, 2007). Fathers can make a difference in the rate of the infant feeding practices, but they need information in order to make a difference (Kenosi, *et al.*, 2011; Tohotoa, *et al.*, 2009).

Engagement of fathers by educating them on breastfeeding and men's group activities can greatly improve infant feeding and health behaviors (Sloand, *et al.*, 2010). A randomized controlled trial was done in Italy in which fathers went through a two-hour pre-natal education session on infant care as well as breastfeeding assistance to their partner. The result was a 33% difference in breastfeeding initiation among women whose partners had attended the class, in comparison with the controls (Wolfberg, *et al.*, 2004). Another study in Italy, also found that teaching fathers how to prevent and manage the most common lactation difficulties had a marked, positive impact on breastfeeding continuation. Few (15%) mothers whose partners had been simply told about the benefits of breastfeeding were still breastfeeding at age six months; but when the men were individually given information for just 40 minutes on management of common problems (for example pain and discomfort, fear that baby isn't 'getting enough' and breastfeeding-issues when mum returns to work) the percentage of mothers still breastfeeding at age six months was 25%. The impact was particularly strong among women who had reported difficulties with lactation (4.5% vs. 24%) (Pisacane, *et al.*, 2005).

In Kenya, most community programs seeking to improve the well-being of women and children target young mothers and their children (Thuita, 2008). Few initiatives in the country have engaged men in efforts to improve the infant feeding (Thuita, 2008). A pilot project done in Western Kenya, engaged men through nutrition education on the infant

and young child feeding practices through group training of men facilitators using a training manual targeted to men (Martin *et al.*, 2009). Based on the outcomes in the study done in Italy, we hypothesize that the study in the Kenyan context would result in positive outcomes on the infant feeding when fathers are reached with information on breastfeeding and complementary feeding. The objective of this study was to assess the effect of nutrition education to mothers and fathers as a strategy to improve infant feeding. This is because studies have shown that there has been less attention on male involvement in the infant feeding thus the timeliness of our study.

4.3 Methodology

4.3.1 Development of the nutrition education intervention material

Nutrition education material were developed on recommended breastfeeding and complementary feeding practices with targeted information to the fathers highlighting their important role in the success of breastfeeding and complementary feeding. The education material were aligned to the UNICEF integrated infant and young child feeding counseling, a training course released in 2012 (UNICEF, 2012) and Infant and Young Child Feeding and Gender manual prepared by the Infant & Young Child Nutrition (IYCN) Project for the men's groups activities (Martin *et al.*, 2009).

4.3.2 Study setting and study design

This study was conducted in Kisumu East Sub County, Kisumu County, Kenya. The county has 6 sub-counties namely: Kisumu East, Kisumu West, Kisumu North, Nyando, Muhoroni, and Nyakach. Kisumu East Sub County has a total area of 135.9Km² and a population of 150,124 (Republic of Kenya, 2012). Kisumu County was selected because of the high infant mortality rate (95 deaths per 1,000 live births) in the region (Republic of Kenya, 2012). The study participants were recruited from the Kisumu County hospital in Kisumu East Sub County. It is a Level 5 Hospital providing services such as antenatal, basic emergency, obstetric care, curative, out-patient and in-patient services, family

planning and growth monitoring among others. The study was a randomized controlled trial (RCT) where participants were randomized into either an intervention (receiving education on infant feeding) or a control group (not receiving education on infants feeding). The target population was fathers and mother pair.

4.3.3 Sampling

Calculation of the sample size was done using the formula by Johnson *et al.* (Johnson, *et al.*, 1995). The study expected an effect size of 20% based on the intervention of nutrition education targeting both father and mother. This was because the outcome was expected to be better than that of a previous study done in Italy which conducted the nutrition education sessions post-natal thus, not much time for father-mother pairs to make an early informed decision. Our study conducted the nutrition education sessions pre-natal with the expectation that father-mother pairs will be in a position to make an early informed decision which could influence right from early initiation of breastfeeding. The study in Italy had considered a difference in the effect of the intervention of 15% and used a standard deviation of 0.58 (Pisacane, *et al.*,2005).

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

Where:

n- Estimated sample size

Z_{α} level of significance (set at 0.95 $\alpha=0.05=1.96$); $Z_{1-\beta}$ power of the study (80%)

Σ standard deviation (estimated at 0.58)

Δ difference in effect of interventions which is required (estimated at 20% based on previous studies) (Pisacane, *et al.*,2005).

$$\text{Hence: } n = \frac{2(1.96 + 0.8416)^2 (0.58)^2}{(0.20)^2}$$

n=132. Considering a 10% attrition rate, the total sample size was 145 which was the number considered for the intervention group which would receive the nutrition education intervention.

A total of 290 father-mother pairs were recruited. The hospital antenatal daily attendance list was used to recruit ten participants per day from those who agreed to take part in the study through convenience sampling. From the attendance list, there was an average of 75 pregnant women who were 6 months pregnant and this was about 40% of all the pregnant women attending the antenatal clinic. Contacts of the recruited study participants were taken and used to follow up on the fathers for their consent to participate in the study.

4.3.4 Delivery of the nutrition education intervention

Nutrition education intervention was given to the intervention group. The mothers who had been recruited during the antenatal clinic visit gave their phone contacts and follow up phone calls were made to the fathers. Consent was sought from the fathers and mothers to participate in the study. Those who consented to participate in the study together with their partners were invited to Kisumu County Hospital for nutrition education session prenatally on breastfeeding and complementary feeding which lasted 4 hours. The education sessions were delivered once to the intervention group. The language of communication during the intervention delivery was dholuo, a local language that could be easily understood by the study participants. Nutrition education was provided in the form of group facilitated sessions to the intervention group. The study participants started with a pre-test of knowledge on infants feeding to assess their knowledge levels on the same. Questions on breastfeeding on demand, exclusive breastfeeding, good positioning and attachment to the breast, benefits of breastfeeding, food consistency and frequency during complementary feeding were read to the study participants and responses recorded

on questionnaires. A post-test was also conducted with similar questions in the pre-test after the nutrition education sessions. At the end of the nutrition education sessions, a leaflet with the main points of the session was provided to the participants.

Direct (teacher-directed), interactive (discussion, sharing) and experiential (learner-centered, activity-oriented) instructional strategies were used in the education sessions. Demonstrations on positioning and attachment of the baby to the breast, expressing of breast milk and food demonstrations were done for maternal nutrition and complementary feeding to show how to ensure consistency, frequency, and variety per different age groups. Role plays were done to demonstrate how the father can rub the back of the mother to stimulate milk production, how a father can encourage the mother to build her confidence in breastfeeding, cup feeding for the expressed breast milk and playing with the baby to stimulate growth and development. Case studies were done on how to manage common breast conditions such as engorgement, inverted nipples, and flat nipples. Cooking demonstrations were done to gain practical knowledge on how to prepare the infants food and ensuring adequate consistency and amount as per the age group. The recipes were based on the seven food groups recommended for children (Tohotoa *et al.*, 2009).

Fathers were also enlightened on the supportive role they can play such as ensuring there is adequate nutritious food for the mother during pregnancy and lactation, supporting the mother during delivery by encouraging her to put the baby to the breast within an hour of birth, rubbing the mothers back to stimulate milk production, holding the baby for the mother to get rest, cup feeding the baby on expressed breast milk, providing adequate nutritious food for the baby during complementary feeding, helping in feeding the baby, helping in taking care of older children and doing household chores. The study considered the social cognitive theory for behavior change. Father involvement through nutrition education was expected to result in adequate knowledge on infants feeding by the father and fathers' know-how of the supportive role they can play in infant feeding. This would result in positive environmental influence to the mother and improved adherence to

recommended infant feeding practices at the household level. Hence leading to an improved nutritional status of the infant expected to contribute ultimately to the reduction in malnutrition rates and morbidity patterns.

4.3.5 Data management and analysis

Data was coded and entered into the statistical package for social sciences (version 21). Frequencies and associations were done on knowledge on breastfeeding including breast milk as first feed, initiation of breastfeeding, exclusive breastfeeding and continued breastfeeding. The data were compared between the intervention and control group pre and post intervention. The differences in the median score of the pre-test and post-test scores that were recorded from the intervention group were analyzed. Analysis on assessment of the nutrition education sessions by the intervention group were also done.

4.4 Results

A total of 290 father-mother pairs were analyzed at baseline with 145 pairs in the intervention group and control group respectively. At 3 months post-intervention; in the intervention group, 8 father-mother pairs were lost to follow up due to relocation (5 pairs), the death of the child (1 pair) and separation of the couple (2 pairs). In the control group, 3 father-mother pairs were lost to follow up due to relocation (2 pairs) and death of the child (1 pair). The dropout rate does not influence the current results as the sampling used considered an attrition rate of 10%.

4.4.1 Fathers' knowledge on infant feeding

At baseline, the odds of fathers in the intervention group being more knowledgeable on breastfeeding than fathers in the control group were measured. The result was not statistically significant (Table 4.1).

Table 4.1: Odds ratio for father’s knowledge about breastfeeding pre-intervention

Characteristic	Control (N=145)	Intervention (N=145)	Odds ratio (95% CI)	P
Knowledge about breastfeeding				
Breast milk first feed	95.2 (138)	94.5 (137)	1.01 (0.73- 1.42)	0.93
Breastfeed within 1 hour	52.3 (75)	56.5 (82)	0.84 (0.54- 1.31)	0.44
Breastfeed for 2 years	55.2 (80)	55.5 (79)	1.03 (0.67- 1.59)	0.90
EBF	40.1 (58)	38.6 (56)	1.07 (0.64- 1.81)	0.79

Note EBF-exclusive breastfeeding; level of significance based on odds ratio is p value <0.05. The figures in bracket are ‘n’ with N=145 in the control group and N=145 in the intervention group. The figures outside bracket represent the % within the group.

Post-intervention when comparing fathers in the intervention group compared with the control group, fathers in the intervention group were 1.6 times more likely to be knowledgeable that breastfeeding should be initiated within an hour of birth (OR = 1.61; % CI: 1.07 – 2.42; $p=0.02$), 1.7 times more likely to be knowledgeable that breastfeeding should continue until 2 years and beyond (OR = 1.72; % CI: 1.14 – 2.59; $p=0.01$) and were twice likely to be more knowledgeable on exclusive breastfeeding (OR = 2.01; % CI: 1.27 – 3.19; $p<0.01$) (Table 4.2).

Table 4.2: Fathers' knowledge about breastfeeding 3 months post-intervention

Characteristic	Control (N=142)	Intervention (N=137)	Odd ratio (95% CI)	P
Knowledge about breastfeeding				
Breast milk first feed	97.8 (139)	94.5 (137)	1.11 (0.79-1.57)	0.54
Breastfeed within 1 hour	57.7 (82)	75.4 (104)	1.61 (1.07-2.42)	0.02*
Breastfeed for 2 years	56.3 (80)	71.7 (99)	1.72 (1.14-2.59)	0.01*
EBF	43.9 (62)	63.7 (88)	2.01 (1.27-3.19)	0.00**

*Note EBF-exclusive breastfeeding; level of significance based on odds ratio is p value <0.05. * used for P<0.05 and ** used for P<0.01. The figures in bracket are 'n' with N=142 in the control group & N=137 in the intervention group. The figures outside bracket represent the % within the group.*

4.4.2 Pre-test and post-test results for the intervention group

Based on the box plot in figure 4.2, the center for post-test scores is much higher than the center for pre-test scores with more spread being observed in the pre-test scores than the post-test scores. The results of the pre-test scores appear not to be symmetrically distributed while post-test scores are symmetrically distributed with outliers. A Wilcoxon signed-rank test showed that nutrition education involving the fathers elicited a statistically significant change in knowledge of the fathers on infant feeding ($Z = -10.181$, $p = 0.000$). Indeed, median pre-test score was 50% while post-test score was 83.3%.

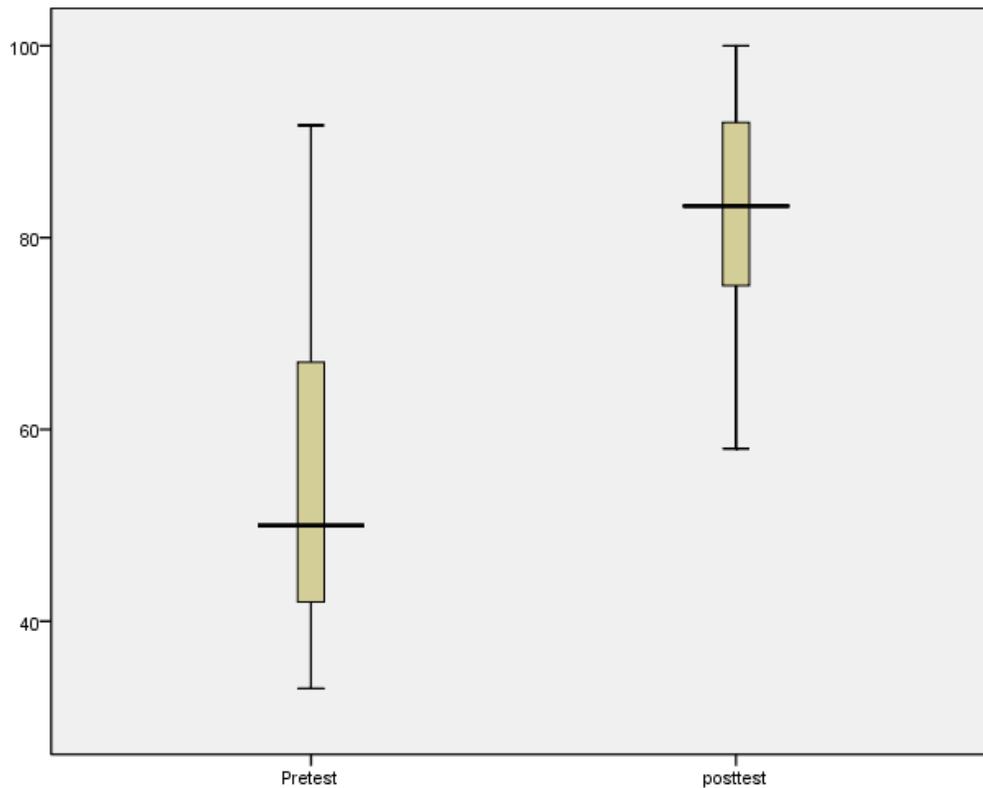


Figure 4.2: Pre-test and post test results for fathers in the intervention group

4.4.3 Assessment and rating of the nutrition education sessions

The major (66.9%, n=97) source of information on infant feeding for the mothers in the intervention group prior to the study, was the health facility during antenatal clinic visits. Majority (76.6%, n=111) of the fathers reported that they did not have any source of information on infant feeding. A high (92.1%, n=134) proportion of fathers from the intervention group felt that they had received new information from the nutrition education session offered by the research team. Less than half (40%, n=58) of the mothers felt that they had received new information from the nutrition education session. New knowledge received as reported by the intervention group was in the areas of paternal support that can be provided during infant feeding, how breastfeeding works, expressing

of breast milk, and preparation of complementary foods (ensuring frequency, amount, thickness, variety and hygiene).

In terms of time allotment, majority of the fathers (73.4%, n=106) felt that the 4 hours allocated was about right while 58.5% (n=85) of the mothers shared the same view. Over half (55.3%, n=80) of the fathers were of the opinion that the content taught was extremely relevant in assisting participants in practicing recommended infant feeding practices. A third (54.5%, n=79) of the mothers agreed to the opinion of the content being extremely relevant in assisting in the practice of recommended infant feeding practice. In terms of teaching quality, over three-quarters (75%, n=109) of the fathers felt that it was very high with a similar high percent of the mothers holding the same opinion (77%, n=112). The teaching method which encompassed a lot of discussions, demonstrations and role plays was termed by majority of the fathers and mothers as appropriate at 67% (n=97) and 74.8% (n=108) respectively. The interest level of the participants in the contents taught was rated as very high by both the father and mother at 79.3% (n=115) and 81% (n=117) respectively (Table 4.3).

Table 4.3: Rating for the nutrition education sessions by the intervention group

Ratings for nutrition education sessions	Father %(n)	Mother %(n)	x²	p
Time allocation			7.58	0.82
Too short	20.7 (30)	27.6 (40)		
About right	73.4 (106)	58.5 (85)		
Too long	5.9 (9)	13.9 (20)		
Relevance of the content			8.61	0.93
Extremely relevant	55.3 (80)	54.5 (79)		
Somewhat relevant	37.9 (55)	40.7 (59)		
Not very relevant	6.8 (10)	4.8 (7)		
Quality of the teaching			10.12	0.79
Very high	75.0 (109)	77.1 (112)		
Somewhat high	21.4 (31)	18.6 (27)		
Somewhat low	3.6 (5)	4.3 (6)		
Teaching methods used			9.10	0.88
Appropriate	67.0 (97)	74.8 (108)		
Need adjustment	33.0 (48)	25.2 (37)		
Interest level of the participants in the session			8.44	0.72
Very high	79.3 (115)	81.0 (117)		
somewhat high	13.8 (20)	15.2 (22)		
somewhat low	6.9 (10)	3.8 (6)		

Note that the figures in bracket are n with N=145 per gender group and figures outside bracket represent the percentage within the gender groups. Level of significance <0.05.

4.5 Discussion

Studies have shown that a lack of knowledge on breastfeeding can influence the success and duration of breastfeeding (Hauck, *et al.*, 2007; (Susin and Giugliani, 2008; Fairbank, *et al.*, 2000). The fathers' knowledge level about breastfeeding was considered key for supporting the mothers' decisions and actions (Wolfberg, *et al.*, 2004). Similar to this study at baseline, a cross-sectional study was done in Brazil that assessed paternal breastfeeding knowledge during pregnancy. The findings showed a lack of breastfeeding knowledge among the fathers with a specific knowledge deficit on how to manage breastfeeding complications, promote lactation and assure a proper latch (Cardoso, *et al.*, 2017). Our findings indicated an increase in knowledge on infant feeding by fathers when fathers were exposed to nutrition education. This, therefore, is a pointer that nutrition education strategies that involve fathers could positively impact on their knowledge levels.

In this study, the nutrition education sessions took place prenatal within a hospital setting to fathers and mother in the intervention group. The exclusive breastfeeding rates were higher in the group in which both the mothers and the fathers were educated about exclusive breastfeeding than in the groups in which there was no education and in which only the mothers were educated (Susin and Giugliani, 2008). Recommendations from another study are that nutrition education to the father should take place during the antenatal period and the baby's first quarter (Arora, *et al.*, 2000). A trial offering fathers a 2-hour breastfeeding antenatal class and postnatal support found that breastfeeding levels were increased at 6 weeks post-partum (Arora, *et al.*, 2000; Maycock, *et al.*, 2013). Another study that invited fathers to attend breastfeeding antenatal classes alongside their partner increased the duration of exclusive, but not overall, breastfeeding (Hauck, *et al.*, 2007). Health professionals can utilize opportunities such as antenatal visits to educate the fathers on infant feeding which can be a cost-effective channel of reaching the fathers.

Majority of the fathers reported receiving new information and seeing relevance on what was taught. This can demystify the notion that childcare is only a woman's concern and look for avenues to reach out to the fathers as well. The main limitation of our study is

that though it draws upon literature from other countries, the analysis does not take into account possible cultural similarities and diversities with regards to what constitutes a father's support. Hence further research that includes testing an international model of the fathers' support relating to infants feeding which could build on and expand the findings reported here, paying particular attention to the cost-benefit analysis to investigate the cost-effectiveness of the classroom-based nutrition education strategy and to ascertain the feasibility of implementing it in various settings. In addition, the study sample was selected from a hospital setting which has possible differences with the community settings as antenatal clinic visits are not optimal in Kenya which could have affected the representation of the population sampled.

4.4.6 Conclusions

The fathers had low knowledge levels on breastfeeding at pre intervention. However, with nutrition education to the intervention group, there was increase in knowledge gained. Fathers in the intervention group reported that the 4 hours allotted for nutrition education was about right and the information received was relevant for them. This points to the importance of healthcare professionals to consider avenues of reaching out to the fathers in prenatal infant feeding promotion interventions.

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CHAPTER FIVE

FATHER-TARGETED NUTRITION EDUCATION IMPROVES EARLY INITIATION AND BREASTFEEDING EXCLUSIVITY: THE CASE OF KISUMU COUNTY, KENYA

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5.1 Abstract

Mothers who have physical and emotional support during the early post-partum period have a greater likelihood of succeeding in breastfeeding. This study examined the effect of nutrition education on fathers in improving breastfeeding practice in the first 3 months of a child's life. A randomized control study involving 290 expectant father and mother pairs was conducted in Kisumu East Sub County, Kenya. The study site was selected based on the high infant mortality rate in the region. Study participants were randomized into either intervention group or control group, with each group having 145 father-mother pairs. The participants were recruited from when the women were 6 months pregnant (23-27 weeks) and follow up done until the children born were 3 months. Follow up data on early initiation of breastfeeding, exclusive breastfeeding at 3 months of age and support provided by the father towards breastfeeding was collected. No intervention was given in the control group while both father-mother pairs in the intervention group received nutrition education on breastfeeding. At 97.1%, initiation of breastfeeding within an hour of birth was significantly higher among the intervention group compared to 52.1% in the control group ($\chi^2=10.01$; $p<0.001$). Likewise, at 81.1%, sustained exclusive breastfeeding at 3 months was significantly higher among the intervention group compared to 63.4% in the control group ($\chi^2=9.69$; $p=0.001$). Mothers in the intervention group were 31 times more likely to initiate breastfeeding within an hour of birth compared to the mothers in the control group (OR = 30.8; 95% CI: 10.8 – 87.8; $p<0.001$). Based on maternal perceptions on support received from the father around infant feeding, significantly more mothers reported receiving support in terms of caring for the baby ($\chi^2=6.99$; $p=0.01$), feeding the baby ($\chi^2 =12.86$; $p<0.001$), caring for the mother ($\chi^2 =13.63$; $p<0.001$), providing encouragement and motivation on following the recommended breastfeeding practice ($\chi^2=19.71$; $p<0.001$), being in agreement on how the infant should be fed ($\chi^2=5.49$; $p=0.02$), providing a favorable breastfeeding environment ($\chi^2 =6.62$; $p=0.01$). The intervention seems to have influenced on early initiation and sustenance of exclusive breastfeeding in the first 3 months of life. Nutrition education at the health facility or

community level should involve fathers as key influencers of the breastfeeding process, which contributes to improved infant feeding practices.

Keywords: Father Support, Nutrition Education, Early initiation, breastfeeding

5.2 Introduction

Support from the infant's father in the form of active participation in the decision to breastfeed, and knowledge about the importance of breastfeeding, has been shown to have a strong influence on the initiation and duration of breastfeeding (UNICEF, 2009; Edmond *et al.*, 2006). The World Health Organization (WHO) and United Nations Children's Emergency Fund (UNICEF) recommend initiation of breastfeeding within the first hour after birth otherwise known as early initiation of breastfeeding (UNICEF/WHO/World Bank/UN-DESA Population Division, 2017). This, combined with exclusive breastfeeding, reduce child morbidity and mortality in the first two years of life (UNICEF/WHO/World Bank/UN-DESA Population Division, 2017), and can reduce 22% of neonatal deaths (UNICEF/WHO, 2017). Sub-Saharan Africa remains the region with the highest infant mortality rate with 56 deaths per 1,000 live births compared to the global rate of 32 deaths per 1,000 live births (UNICEF/WHO/World Bank/UN-DESA Population Division, 2017). In Kenya, infant mortality rate is 39 deaths per 1,000 live births (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). Globally, under half of the newborns are breastfed within an hour of delivery, with only 44% in the African region (UNICEF, 2013). In Kenya, 62% of infants are breastfed within an hour after birth (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014), which is below the recommended WHO target coverage of 90% (UNICEF/WHO, 2017). Fathers can make a difference by influencing positive infant feeding practices but they need information in order to make this difference (Sloand *et al.*, 2010; Pisacane, *et al.*, 2005). Engagement of fathers through educating them on breastfeeding can greatly improve infant feeding and health behaviors (Susin and Giugliani, 2008; Rempel and Rempel, 2004). This study assessed the impact of nutrition education targeting fathers on improving breastfeeding practices.

5.3 Materials and methods

5.3.1 Study design

The study was a randomized control trial, with randomization of study participants into two groups, an intervention and a control group.

5.3.2 Study setting

The study was conducted at Kisumu County Hospital located in Kisumu East Sub-county, Kenya. The county covers an area of 1,960.2 Km² and has a 2016 projected population of 544,166 with 3.24% (14,715) being pregnant women and 25.9% (117,629) women of reproductive age (Republic of Kenya, 2012). The main occupation of men living in Kisumu East Sub County is casual labor in light industries located in the city center while women are mainly housewives. Infant mortality rate is high for Kisumu County at 95/1000 (Republic of Kenya, 2012). Kisumu East Sub County which was randomly selected while Kisumu County hospital was selected because it is the main government hospital within the Sub County.

5.3.3 Sample

Sample size was calculated using the formula by Johnson *et al.*, 1995. The study considered an effect size of 20% with reference to better results outcome from that of a study done in Italy of 15% and standard deviation of 0.58 (Pisacane, *et al.*,2005). Considering a 10% attrition rate, the sample size was 145 per study group making a total of 290.

5.3.4 Recruitment, inclusion and exclusion criteria for study participants

All the women who were 6 months pregnant between January and April 2016 and attending the antenatal clinic at Kisumu County hospital were eligible for inclusion in the study. Convenience sampling was used to select the pregnant women at the hospital. A total of 290 father-mother pairs were recruited during that period. Once recruited, each woman provided the telephone contact of the father-to-be, who was subsequently invited to participate in the study. A meeting between the father-mother pairs and the study team took place within 2 weeks of the first contact. By picking one among pre-numbered papers, the pair were randomly allocated into either the intervention or control group. Those in the intervention group would then receive nutrition education session.

Inclusion was of: women who were 6 months (23-27 weeks) pregnant and attending the antenatal clinic at Kisumu County hospital at the time of recruitment; women who were living together with the father of the unborn child; women who were from Kisumu east sub-county; women who were planning to breastfeed; fathers to the child expected by the pregnant women and who were willing to be visited at home. Exclusion was of women who were 6 months pregnant and attending the antenatal clinic at Kisumu County hospital but were not from Kisumu East Sub County. Women who indicated that they did not plan to breastfeed and those with documented chronic diseases or were very ill. Women who were not residing together with the father to be were also excluded from the study.

The respondents were informed of the objectives of the study and the interviewer sought their written consent to participate in the study. All information and conversations provided to the investigators by the participant were regarded as confidential.

5.3.5 Data collection

The researchers developed nutrition education materials on recommended breastfeeding practices with specific information tailored for fathers emphasizing their unique and vital role in the success of breastfeeding. The educational material was based on the UNICEF

integrated infant and young child feeding counseling training course of 2012 (UNICEF, 2012) and Infant and Young Child Feeding and Gender manual prepared by UNICEF's Infant & Young Child Nutrition (IYCN) Project for the men's groups activities (Martin *et al.*, 2009). The father-mother pair in the intervention group received a 4-hour nutrition education session after recruitment at the health facility with similar content on exclusive breastfeeding and male involvement. This was different from the routine health education provided health facilities which usually targets women during antenatal visits. The education sessions were delivered once to the intervention group. The language of communication during the intervention delivery was dholuo, a local language that could be easily understood by the study participants. Nutrition education was provided in the form of group facilitated sessions to the intervention group.

A total of 145 father-mother pairs were trained with each session having 15 pairs. The training content included maternal nutrition, early initiation of breastfeeding, benefits of exclusive breastfeeding, positioning and attachment, human milk expression, breastfeeding in the context of HIV and male involvement. On male involvement, fathers were enlightened on the supportive role they can play, ensuring there is adequate nutritious food for the mother during pregnancy and lactation, supporting the mother during delivery by encouraging the mother to put the baby to the breast within an hour of birth, rubbing the mothers back to stimulate milk production, holding the baby for the mother to get rest, cup feeding the baby on expressed mother's milk, helping in taking care of older children and doing household chores. Lecture, group discussions and role play was used to cover the sessions. The sessions were delivered by the researcher and 3 trained nutritionists in a classroom setting. At the end of the sessions, a summary of the main points on exclusive breastfeeding was provided to the participants in form of a leaflet.

Quantitative data was collected at baseline during recruitment, 3 months after recruitment and 6 months after recruitment using semi structured questionnaires to assess breastfeeding initiation, early post-partum breastfeeding, and postpartum breastfeeding

support received from the father, and sustained exclusive breastfeeding at 3 months post-partum. WHO guideline on the assessment of IYCF indicators (WHO, 2010) was used as the reference on how to assess breastfeeding practice. Father's support was based on father's practices during the mother's delivery and post-partum periods. Different paternal actions during these periods were assessed with each positive response regarded as a supportive action suggesting that the father participated in that particular activity.

5.3.6 Data analysis

Quantitative data was cleaned in the field by checking on completeness and accuracy of filing the questionnaires then later coded and entered into SPSS version 21 and cleaned by checking on the kurtosis and skewness before analysis. Descriptive analysis including frequencies and proportions presented in tables and graphs on early initiation of breastfeeding, father support to breastfeeding, sustenance of exclusive breastfeeding at 3 months and giving of pre-lacteal was done. Associations between early initiation, breastfeeding exclusivity and breastfeeding support from the father was assessed using chi-square tests. Factor analysis was performed to summarize paternal practices into 7 major themes grouped as in Table 5.1.

Table 5.1: Paternal practices to support breastfeeding process

Paternal practice	Description
Household chores and responsibilities	Father helps with cleaning, cooking, home maintenance, shopping, laundry and bill pay.
Caring for the baby	Father helps care for baby such as diapers, playing, putting to sleep, soothing, and bathing.
Feeding the baby	Father is involved with breastfeeding process, helps to swaddle baby after feeding, helps to burp baby after feeding, helps with positioning and latching.

Caring for the mother	Father allows mother time to sleep, rest, do other things, pump, break from the baby, massages, buys or prepares healthy foods to support or increase milk production
Encouragement and motivation	Father offers words of encouragement and motivation such as “you can do it”, “keep going”, “I’m proud of you” and practical support with breastfeeding challenges
Being in agreement	Father feels breastfeeding is a joint responsibility, agrees on breastfeeding method and decision
Favourable environment	Father helps create a relaxed and/or stress-free environment for mother to breastfeed, keeps things positive and/or has a positive attitude about breastfeeding

Each type of father’s support was scored dichotomously either 0 or 1. Since types of father’s support consisted of more than 1 item, a score of 0 was given when either item received a negative response, whilst a score of 1 was given only when all items received positive responses.

5.4 Results

5.4.1 Early initiation of Breastfeeding

Figure 5.I shows early initiation of breastfeeding among the study participants. Majority (74.3%) of the mothers initiated breastfeeding within an hour after birth with a significantly higher proportion among the intervention group (97.1%) compared to the control group (52.1%) $X^2= 74.18, p <0.001$.

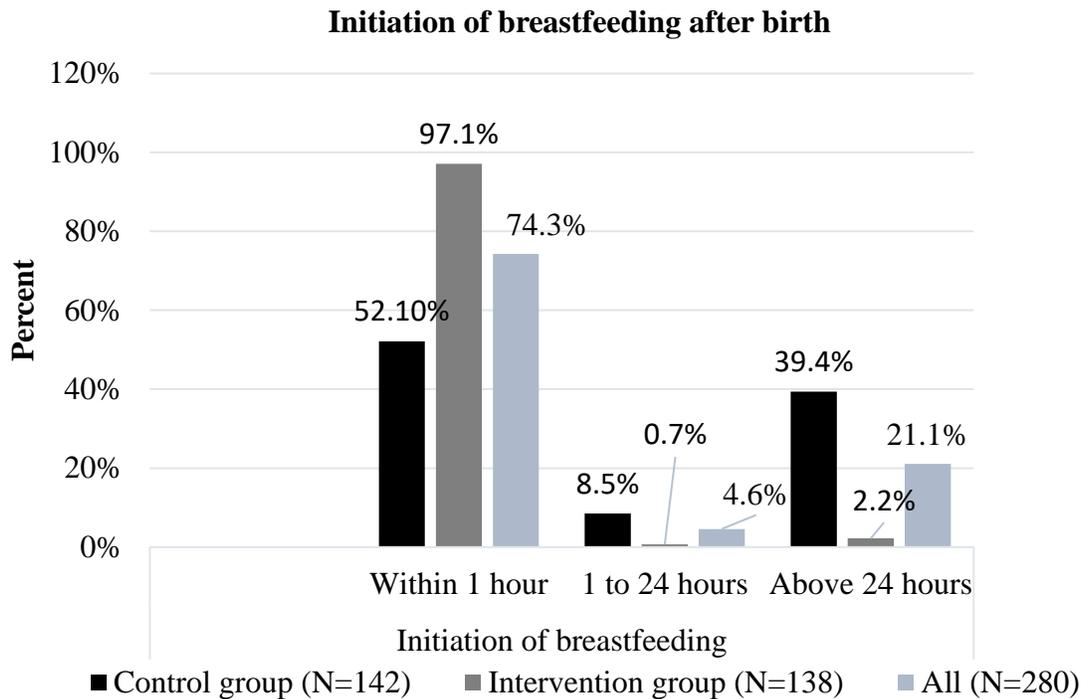


Figure 5.1: Early initiation of breastfeeding

Mothers in the intervention group were 31 times more likely to initiate breastfeeding within an hour of birth compared to the mothers in the control group (OR = 30.8; 95% CI: 10.8 – 87.8; $p < 0.001$).

5.4.2 Provision of pre-lacteal feeds

The introduction of pre-lacteal feeds is shown in Table 5.2. Overall, 26.1% of children were given pre-lacteal within the first 3 days after delivery. Mothers in the intervention group were significantly less likely (7.2%) to introduce pre-lacteal feeds in the first three days of life compared to those in the control group (44.4%), $\chi^2 = 50.0$, $p < 0.001$. Plain water was a common pre-lacteal given (43.8%) followed by sugar-salt-water solution (35.6%).

Table 5.2: Post-partum feeding of infants among study participants in Kisumu County

Pre-lacteal given	Intervention group n (%)	Control group n (%)	χ^2	p
Plain water	5 (50)	27 (42.9)	3.15	0.01**
Sugar-salt-water	4 (40)	22 (34.9)	4.03	0.02**
Other milk	1 (10)	10 (7.0)	7.11	0.90
Tea/infusions	0 (0)	3 (4.8)	8.01	0.94
Infant formula	0 (0)	1 (0.7)	10.06	1.34

Note that the figures outside the bracket are n with N=10 in the intervention group representing those who gave pre-lacteals and N=63 in the control group. The figures in bracket represent the percentage within the groups. Level of significance $p < 0.05$

5.4.3 Feeding on Colostrum

Most (97.9% n=274) infants in both the intervention and control group were fed on colostrum in the first 3 days after birth. Mothers in the intervention group were significantly more likely (100%) to feed the baby on colostrum in the first 3 days after birth compared to those in the control group (95.8%), $\chi^2 = 5.9$, $p = 0.02$ (Figure 5.2).

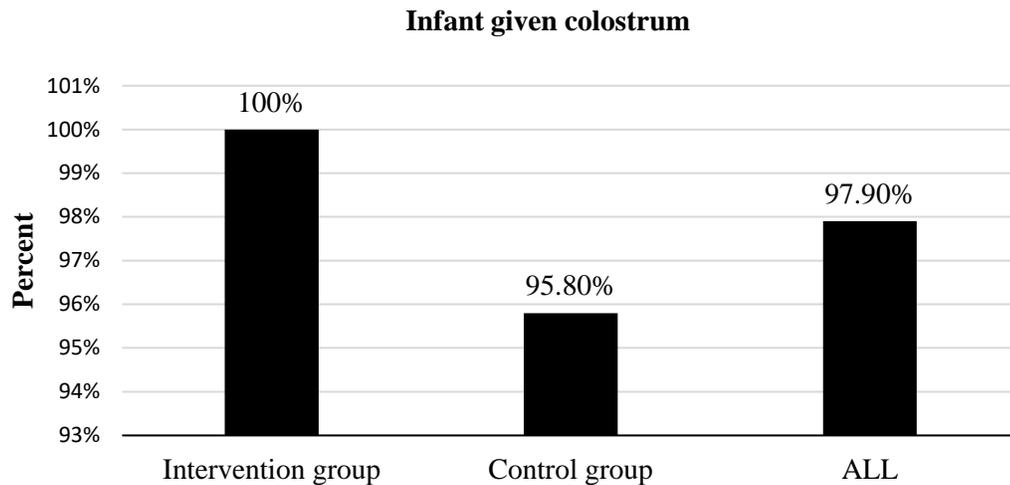


Figure 5.2: Feeding the neonate on colostrum

5.4.4 Father's support

Mothers were asked if the newborn's father helped with breastfeeding during the first 72 hours after the birth of the child. From the intervention group, 87.6% of the mothers reported receiving support from the father and this was significantly higher than the control group which was 37.2% $\chi^2 = 90.9$, $p < 0.001$. Majority (74.5%) of those who initiated breastfeeding within an hour had received support from the father. Based on maternal perceptions on support received from the father around infant feeding, significantly more mothers reported receiving support in terms of caring for the baby ($\chi^2 = 6.99$; $p = 0.01$), feeding the baby ($\chi^2 = 12.86$; $p < 0.001$), caring for the mother ($\chi^2 = 13.63$; $p < 0.001$), providing encouragement and motivation on following the recommended breastfeeding practice ($\chi^2 = 19.71$; $p < 0.001$), being in agreement on how the infant should be fed ($\chi^2 = 5.49$; $p = 0.02$), providing a favorable breastfeeding environment ($\chi^2 = 6.62$; $p = 0.01$). Mothers from the intervention group 74.5% of them reported receiving support from the father which was also significantly higher than 36.1% in the control group $\chi^2 = 34.5$, $p < 0.001$ (Table 5.3).

Table 5.3: Father support at birth among the intervention and control groups

Support given	CG (N=142)	IG (N=138)	Chi-square	
	n (%)	n (%)	<i>x</i>	<i>p</i>
Household responsibilities	66.7 (92)	73.9 (105)	1.77	0.18
Caring for the baby	60.1 (83)	71.8 (102)	4.26	0.04*
Feeding the baby	59.4 (82)	72.5 (103)	5.37	0.02*
Caring for the mother	58.7 (81)	73.2 (104)	6.60	0.10
Encouragement and motivation	44.2 (61)	72.5 (103)	23.15	0.00**
Being in agreement	47.1 (65)	71.8 (102)	17.78	0.00**
Favourable environment	50.7 (70)	68.3 (97)	8.99	0.00**

*Note level of significance based on chi-square test (χ^2) is p value <0.05 . *used for $p<0.05$ & ** for values < 0.01 . The figures in bracket are 'n' with $N=142$ in the control group & $N=138$ in the intervention group. The figures outside bracket represent the % within the group. CG=Control group, IG=Intervention group.*

5.4.5 Exclusive breastfeeding at 3 months

Exclusive breast feeding (feeding an infant with no food or drink other than breast milk) was computed based on 24-hour recall to enable easier recall period for the mother and enhance accuracy of information provided. Overall, 71.5% of the study participants sustained exclusive breastfeeding at 3 months. The intervention group showed a 81.1%, sustained exclusive breastfeeding at 3 months which was significantly higher than the 63.4% in the control group $\chi^2 = 10.6$, $p = 0.001$. At 3 months, mothers in the intervention group were twice more likely to practice exclusive breastfeeding compared to the mothers in the control group (OR = 2.5; 95% CI: 1.4 – 4.4; $p = 0.001$). At 3 months post-partum, significantly more (84.8%) mothers reported receiving support from the father in the intervention group compared to 39% in the control group ($\chi^2 = 60.3$, $p < 0.001$). The kind

of support given by the fathers at 3 months as reported by the mothers is indicated in Table 5.4.

Table 5.4: Father Support at 3 months among the intervention and control groups

Support given	Control group (N=142) n (%)	Intervention group (N=138) n (%)	Chi-square x^2 p	
Household responsibilities	55.1 (79)	67.4 (93)	2.59	0.11
Caring for the baby	54.3 (77)	69.9 (96)	6.99	0.01*
Feeding the baby	48.8 (70)	70.1 (97)	12.86	0.00*
Caring for the mother	47.1 (67)	69.1 (95)	13.63	0.00*
Encouragement/motivation	45.7 (65)	72.1 (100)	19.71	0.00*
Being in agreement	50.7 (72)	64.7 (89)	5.49	0.02*
Favourable environment	48.6 (69)	64.0 (88)	6.62	0.01*

*Note level of significance based on chi-square test (x^2) is p value <0.05 . *used for $p<0.05$ & ** for values < 0.01 . The figures in bracket are 'n' with $N=142$ in the control group & $N=138$ in the intervention group. The figures outside bracket represent the % within the group.*

5.5 Discussions

Breastfeeding support provided by the father has been shown to have a strong influence on the initiation and duration of breastfeeding. This study findings indicate that the father plays an important role in breastfeeding outcomes at the early stages, with more mothers in the intervention group practicing early initiation compared to the mothers in the control group. The findings are similar to that of a previous study conducted in the United States which tested the effectiveness of a 2-hour class delivered to fathers on breastfeeding promotion, where breastfeeding was initiated by 74% of women whose partners attended the intervention class as compared with 41% of women whose partners did not receive the

intervention (Wolfberg, *et al.*, 2004). A similar study in the United States also reported an increase in early initiation rate from 71 to 76% to 83% in three months following dissemination of breastfeeding information to the fathers (Arora, *et al.*, 2000).

In this study, more mothers in the intervention group reported receiving support from the father towards breastfeeding compared to the mothers in the control group. This was consistent with previous studies done in the northwestern Pennsylvania and Canada, which confirm that a father's support creates a stress-free environment so that the mother is enabled to breastfeed successfully (Arora, *et al.*, 2000; Rempel and Rempel, 2011). In fact, a study in Australia showed that mothers whose husbands received breastfeeding education before the birth, liked breastfeeding the most and were supported the most by their husbands (Tohotoa, *et al.*, 2009).

In the intervention group, the mothers reported more positive support that they had received from the father than the mothers in the control group, possibly as a result of the fathers' having participated in the nutrition education sessions and gaining knowledge on breastfeeding and what role they can play. Similar study in Brazil has also reported that fathers may provide support to breast-feeding mothers by relating information learned in the intervention to breast-feeding mothers (Susin and Giugliani, 2008). Father's support to the mother and infant can be in many ways such as approving the woman's decision to breastfeed and giving physical support to the mother and infant in between or during feedings (Kenosi, *et al.*, 2011).

5.6 Conclusion

Father involvement and support of breastfeeding has a role in early initiation and sustenance of exclusive breastfeeding for the first 3 months post-partum. Moreover, nutrition education targeting the father helps them to play a more supportive role which positively impacts on breastfeeding practice. This study suggests that health education programs need to be developed that target fathers especially as a means of not only

increasing breastfeeding knowledge among fathers but also potentially increasing early initiation and sustenance of exclusive breastfeeding among mothers.

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Conflict of interest statement

All the authors do not have any possible conflicts of interest.

CHAPTER SIX

EFFECT OF NUTRITION EDUCATION AMONG FATHERS ON EXCLUSIVE BREASTFEEDING OF INFANTS IN KISUMU COUNTY, KENYA

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6.1 Abstract

Breastfeeding is essential for infants providing them the much needed nutrients for a health start. The World Health Organization recommends exclusive breastfeeding for the first six months of the infant's life. The objective of this study was to assess the influence of nutritional education among fathers on exclusive breastfeeding practices for infants aged 0-6 months in Kisumu County, Kenya. An interventional study was conducted. The study setting was Kisumu East Sub County, Kenya. A total of 290 father-mother pairs were recruited into the study. Recruitment took place at Kisumu County hospital when the mothers were at 23-27 weeks gestational age. Father-mother pairs were randomized into either intervention or control group with 145 pairs per group. Father-mother pairs in the intervention group were taken through nutrition education on breastfeeding and how fathers can be involved, while those in the control group did not receive any intervention during the one year research period. Quantitative data on exclusive breastfeeding practice, maternal and paternal knowledge and support towards breastfeeding were collected using an interviewer administered pretested questionnaire, while qualitative data were collected through 4 focus group discussions in both intervention and control groups. At 77.7%, significantly more infants were exclusively breastfed for the first 6 months of life in the intervention group, than in the control group at 45.1% ($p < 0.001$). Mothers in the intervention 4 times more likely to EBF at 6 months than mothers in the control group (OR = 4.19; $p < 0.01$). Nutrition education to fathers on breastfeeding influences positively on breastfeeding rates.

Key words: Nutrition Education, Father, Exclusive breastfeeding, Kenya.

6.2 Introduction

Breast milk remains the best source of nutrition for the infant. It improves the quality of life for infants through its nutritional, immunological, and psychological benefits (Hansen, 2016). It is estimated that 820,000 lives could be saved annually by scaling up

infant feeding interventions (Rollins, *et al.*, 2016). Breastfeeding is the normal way of providing young infants with the nutrients they need for healthy growth and development (Victora, *et al.*, 2016). Based on the documented benefits of breastfeeding, the World Health Organization (WHO), recommends that all infants should be put to the breast within an hour of birth, be breastfed exclusively for the first six months of life and thereafter be introduced to nutritionally adequate and safe foods that complement breastfeeding with continued breastfeeding for two years and beyond (WHO, 2003).

Globally, exclusive breastfeeding rates at 6 months stand at 41% (UNICEF, 2018). In sub-Saharan Africa, the rate is 43%, which is far below the recommended WHO coverage target of 90% (UNICEF, 2018). In Kenya, there has been a significant improvement in exclusive breastfeeding rates at 6 months from 32% in 2008 to 61.4% in 2014 (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). Evidently, many children are still sub-optimally breastfed. The influence of fathers on the adoption of optimal infant feeding practices by mothers has been overlooked with more emphasis placed upon improvement of maternal knowledge gaps, as a behavior change strategy (McInnes *et al.*, 2013). Yet, a mother's decision and commitment towards breastfeeding has been shown to be greatly influenced by the father. Positive attitude, involvement and support from the father was associated with increased breastfeeding rates and duration (Hibah, *et al.*, 2017).

Therefore, this study assessed the impact of nutrition education on fathers in improving exclusive breastfeeding practice at 0-6 months. Limited research has focused on fathers and breastfeeding in Kenya.

6.3 Materials and Methods

6.3.1 Study design

The study used an interventional study design with randomization of study participants into an intervention and a control group. The study participants were informed of the

objectives of the study and the study interviewers sought their written informed consent to participate in the study. All information and conversations provided to the investigators by the participant were regarded as confidential and anonymity of the study participants was maintained.

6.3.2 Study setting

The study was conducted in Kisumu County Hospital located in Kisumu East Sub-county, Kenya. The county covers an area of 1,960.2 Km² and has a 2016 projected population of 544,166 with 3.24% (14,715) being pregnant women and 25.9% (117,629) women of reproductive age (Republic of Kenya, 2012). The main occupation of men living in Kisumu East Sub County was in casual labor in the light industries located in the city center while women are mostly housewives. Infant mortality rate is high for Kisumu County at 95/1000 (Republic of Kenya, 2012). Kisumu County hospital was selected because it is the main government hospital within Kisumu East Sub County and Kisumu East Sub County was randomly selected among the 6 sub counties in Kisumu County.

Data collection took place between January 2016 to May 2017 which included recruitment of study participants, administration of the intervention and follow up of the study groups to compare breastfeeding practices. Qualitative data was collected through focus group discussions (FGD) conducted post-intervention led by the researcher and assisted by 2 nutrition graduates who took notes and recorded the sessions. There were 2 FGDs engaging control group and 2 FGDs engaging intervention group participants with a membership of 8 participants in each group pre and post-intervention. Participants were randomly selected from the randomized group of the father-mother pair with the separation of the two genders during group discussion.

6.3.3. Sample size determination

The sample size was calculated using a formula by Johnson *et al*, 1995. This study considered an effect size of 20% with reference to better results outcome from that of a study done in Italy of 15% and standard deviation of 0.58 (Pisacane, *et al.*,2005). Considering a 10% attrition rate, the sample size arrived at was 145 per study group making a total of 290 from both study groups.

6.3.4 Recruitment, Inclusion and exclusion criteria for study participants

During follow up of the study participants, when infant were 6 months of age, 15 pairs were lost to follow up in the intervention group due to death of the child, separation of the father-mother pair or father-mother pair being unreachable. In the Control group, 4 pairs were lost to follow up due to death of the child and father-mother pair being unreachable (Figure 6.1).

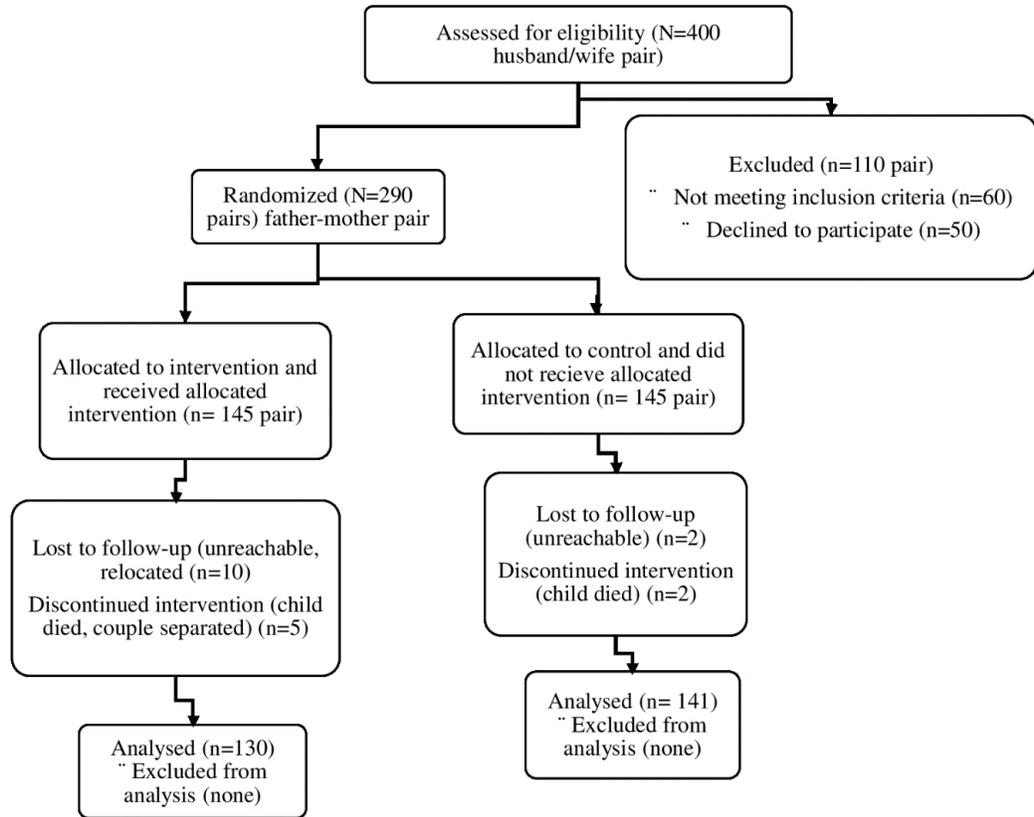


Figure 6.1: Sampling schemer

All the women who were 6 months pregnant between January and April 2016 and attending the antenatal clinic at Kisumu County hospital were eligible for inclusion in the study. A total of 290 father-mother pairs were recruited. Once recruited, each woman provided the telephone contact of the father-to-be. The later were then invited to participate in the study. A meeting between the father-mother pairs and the study team

took place within 2 weeks of the first contact. The pair was asked to pick one among pre-numbered papers which randomly put them in either the intervention or control group.

Inclusion was of: women who were 6 months (23-27 weeks) pregnant and attending the antenatal clinic at Kisumu County hospital at the time of recruitment; women who were living together with the father of the unborn child; women who are from Kisumu east sub-county; women who are planning to breastfeed; fathers to the child expected by the pregnant women and who are willing to be visited at home. Exclusion was of: women who were 6 months pregnant and attending the antenatal clinic at Kisumu County hospital but are not from Kisumu East Sub County as were women who indicated that they did not plan to breastfeed and those with documented chronic diseases or are very ill.

6.3.5 Intervention and Data collection

The researchers developed nutrition education materials on recommended breastfeeding practices with specific information tailored for fathers emphasizing their unique and vital role in the success of breastfeeding. The education material was based on the UNICEF integrated infant and young child feeding counseling, a training course released in 2012 (UNICEF, 2012) and Infant and Young Child Feeding and Gender manual prepared by the Infant and Young Child Nutrition (IYCN) Project for the men's groups activities (Martin *et al.*, 2009).

Written informed consent was obtained from the study participants assigned to the intervention and control group. The father-mother pair in the intervention group received a 4-hour nutrition education session after recruitment at the health facility with similar content on exclusive breastfeeding and male involvement. This was different from the routine where health education at health facilities is targeted to women during antenatal clinics.

A total of 145 father-mother pairs were trained with each session having 15 pairs. Lecture, group discussions and role play was used to cover the sessions on maternal

nutrition, early initiation of breastfeeding, benefits of exclusive breastfeeding, positioning and attachment, human milk expression, breastfeeding in the context of HIV and male involvement. On male involvement, fathers were enlightened on the supportive role they could play; ensuring there is adequate nutritious food for the mother during pregnancy and lactation, supporting the mother during delivery by encouraging her to put the infant to the breast within an hour of birth, rubbing the mothers back to stimulate milk production, holding the infant for mother to get rest, how the infant should be cup-fed on expressed milk, helping in taking care of older children and doing household chores. At the end of the sessions, a leaflet with the main points on exclusive breastfeeding was provided to the participants. The sessions were delivered by the researcher and 3 trained nutritionists in a classroom setting. Those in the control group did not receive any nutrition education intervention during the study period.

Baseline data were collected from each father-mother pair at the time of enrollment. A semi-structured questionnaire was pre-tested among father-mother pairs with children <1 year old in Osiri, Kisumu West Sub County. Data collected included demographic information: age, level of education and household size. Socio-economic status: occupation. Pregnancy-related characteristics: gestational age at first antenatal clinic (ANC), number of ANC visits, parity, maternal and paternal knowledge on breastfeeding. Follow up data on breastfeeding practices was collected postpartum from the father-mother pair in the intervention and control group at household level. Data on proportion of infants exclusively breastfed at 6 months was also collected from the father-mother pair. WHO guideline on assessment of IYCF indicators (WHO, 2009) was used as reference on how to assess breastfeeding practice. Data on paternal knowledge of breastfeeding and paternal support towards breastfeeding was also collected.

Qualitative data was collected using a discussion guide through 4 FGDs conducted pre and post intervention. The FGDs separated the intervention and control groups with 2 FGDs in each group. There was gender segregation with the groups with separate discussions conducted with fathers and mothers. Each FGD had 8 participants. Data on

feeding practice in the first 6 months of a child's life and father's support was discussed. Pre-testing of the guide was done in Osiri, Kisumu West Sub County with a group of fathers and mothers to help modify the tool.

6.3.6 Data analysis

Quantitative data was cleaned at the field then later coded and entered into SPSS version 21 and cleaned before analysis. Descriptive statistics were performed for the socio-demographic characteristics at baseline for the intervention and control group. Knowledge of fathers was assessed pre and post intervention for both groups. Maternal knowledge on breastfeeding was assessed for both groups at baseline. Data on paternal knowledge on breastfeeding from the intervention and control group was also analyzed pre and post intervention. In this study, the exposure is nutrition education among fathers while the outcome is exclusive breastfeeding practices in the first 6 months of life. An odds ratio (OR) was used to assess the odds of an outcome (knowledge on breastfeeding) given exposure to nutrition education. Associations of the categorical variables at baseline was measured using chi-square test and differences of means of continuous variables was measured using the independent t-test between the groups. Statistical significance was based on the two-tailed *p*-value.

Multiple linear regressions modeling was used to explain the relationship between the independent and the dependent variables when all the variables with the statistical significant relationships were brought together. Qualitative data from FGD discussion data was transcribed from dholuo language and then translated into the English language. Then similar responses were grouped and summarized based on thematic area or the key variables of the study and results were analyzed according to their thematic area descriptively. Finally, results of the qualitative study were triangulated with the quantitative results.

6.4 Results

6.4.1 Characteristics of study participants at baseline

A total of 290 father-mother pairs participated in the study at baseline. A chi-square test was performed and no significant difference was found between socio-demographic characteristics and group affiliation (Table 6.1). At the baseline level, results did not indicate any significant difference in terms of age of the fathers in the intervention group ($M=30.74$, $SD=6.6$) and control group ($M=29.45$, $SD=5.7$) $t(288) = 1.79$, $p=.26$. Likewise, results did not indicate any significant difference in terms of age of the mothers in the intervention group ($M=24.62$, $SD=4.3$) and control group ($M=24.57$, $SD=4.7$) $t(288) = 0.10$, $p=.038$. The only significant difference that was found was in a number of children birthed in the intervention group ($M=1.75$, $SD=1.49$) and control group ($M=1.16$, $SD=1.12$) $t(288) = 3.82$, $p=0.003$ (Table 6.2). This shows that father-mother pair in the intervention group had more children than those in the control group hence could be a pointer to differences in experience on infant feeding.

Table 6.1: Baseline Comparison of key demographic, socio-economic and knowledge traits for the study groups

Characteristic		CG (N=145)	IG (N=145)	Chi-square	
				χ^2	p
Education	Father			2.34	0.31
	Primary level	39.3 (57)	37.2 (54)		
	Secondary level	47.6 (69)	54.5 (79)		
	College level	13.1 (19)	8.3 (12)		
	Mother			4.29	0.12
	Primary level	42.1 (61)	53.8 (78)		
	Secondary level	48.3 (70)	40 (58)		
	College level	9.7 (14)	6.2 (9)		

Occupation	Father			7.50	0.11
	Self-employment	31.8 (46)	33.7 (49)		
	Formal employment	20 (29)	25.5 (37)		
	Casual employment	48.3 (70)	40.7 (59)		
	Mother			2.39	0.67
	Housewife	44.1 (64)	48.3 (70)		
	Self-employment	37.9 (55)	33.1 (48)		
	Formal employment	6.2 (9)	9 (13)		
	Casual employment	11.7 (17)	9.7 (14)		
Household size				3.58	0.17
	1-3	49.7 (72)	59.3 (86)		
	4-6	46.2 (67)	38.6 (56)		
	7 and above	4.1 (6)	2.1 (3)		
Maternal knowledge about breastfeeding.					
	Mothers milk first feed	97.9 (142)	94.5 (137)	2.03	0.36
	Start BF within 1hr	59.3 (86)	63.4 (92)	2.57	0.17
	BF for 2 years	57.2 (83)	61.4 (89)	3.28	0.55
	EBF for 6 months	43.4 (63)	42.3 (58)	1.17	0.56

Note CG=Control Group; IG=Intervention Group. BF = breastfeeding; EBF = exclusive breastfeeding. Level of significance based on chi-square test (χ^2) is p value <0.05. The figures in bracket are 'n' with N=145 in the control group and N=145 in the intervention group. The figures outside bracket represent the % within the group.

Table 6.2: Baseline Comparison of age and perinatal traits for the study groups

Characteristic	CG	IG	Independent t test	
	n=145 M(SD)	n=145 M(SD)	t	p
Age				
Father	29.45 (5.7)	30.74 (6.6)	1.79	0.26
Mother	24.57 (4.7)	24.6 (4.3)	0.10	0.38
Perinatal-related characteristics				
Gestational age	4.51 (1.5)	4.19 (1.5)	-1.82	0.68
1st ANC visit				
No. of ANC visits	1.93 (0.83)	1.96 (0.85)	0.28	0.93
Parity	1.16 (1.12)	1.75 (1.49)	3.82	0.003**

Note CG=Control Group; IG=Intervention Group. Level of significance based on t- test (t) is p value <0.05. **used for values p value < 0.01. The figures in bracket are standard deviation (SD) with N=145 in the control group & N=145 in the intervention group. The figures outside bracket represent the mean within the group.

At baseline, the odds of fathers in the intervention group being more knowledgeable on breastfeeding than fathers in the control group were measured. The result was not statistically significant (Table 6.3).

Table 6.3: Odds ratio for father's knowledge about breastfeeding pre-intervention

Characteristic	Control (N=145)	Intervention (N=145)	Odds ratio (95% CI)	p
Knowledge about breastfeeding				
Breast milk first feed	95.2 (138)	94.5 (137)	1.01 (0.73-1.42)	0.93
Start BF within 1 hour	52.3 (75)	56.5 (82)	0.84 (0.54-1.31)	0.44
BF for 2 years	55.2 (80)	55.5 (79)	1.03 (0.67-1.59)	0.90

EBF 40.1 (58) 38.6 (56) 1.07 (0.64-1.81) 0.79

Note BF=breastfeeding; EBF-exclusive breastfeeding; level of significance based on odds ratio is p value <0.05. The figures in bracket are 'n' with N=145 in the control group & N=145 in the intervention group. The figures outside bracket represent the % within the group.

6.4.2 Results on effect of nutrition education to the study participants

Post-intervention, fathers in the intervention group were 1.6 times more likely to be knowledgeable on initiation of breastfeeding within an hour of birth (OR = 1.61; $p=0.02$), 1.7 times more likely to be knowledgeable on continued breastfeeding until 2 years and beyond (OR = 1.72; $p=0.01$) and were twice likely to be more knowledgeable on exclusive breastfeeding (OR = 2.01; $p<0.01$) (Table 6.4).

Table 6.4: Odds ratio for father’s knowledge about breastfeeding 9 months post-intervention

Characteristic	Control (N=141)	Interventio n (N=130)	Odd ratio (95% CI)	p
Knowledge about breastfeeding				
Breast milk first feed	95.0 (134)	97.6 (127)	1.11 (0.79-1.57)	0.54
Start BF within 1 hour	58.2 (82)	80.0 (104)	1.61 (1.07-2.42)	0.02*
BF for 2 years	56.7 (80)	80.8 (105)	1.72 (1.14-2.59)	0.01*
EBF	43.9 (62)	67.7 (88)	2.01 (1.27-3.19)	0.00**

*Note BF=breastfeeding; EBF-exclusive breastfeeding; level of significance based on odds ratio is p value <0.05. * used for $P<0.05$ and ** used for $P<0.01$. The figures in bracket are 'n' with N=141 in the control group & N=130 in the intervention group. The figures outside bracket represent the % within the group.*

When it came to mothers, mothers in the intervention group were 4 times more likely to exclusively breastfeed at 6 months than mothers in the control group (OR = 4.19; $p<0.01$),

reported receiving support from the father on breastfeeding and were twice more likely to exclusively breastfeed for six months than mothers who did not report receiving support from the father on breastfeeding (OR=2.21; $p=0.03$), they were more aware that an infant should be exclusively breastfed for six months were also twice more likely to exclusively breastfeed than mothers who were not aware that an infant should be exclusively breastfed for six months (OR=2.37; $p=0.02$).

In regard to practices on breastfeeding, fathers in the intervention group during the focus group discussions stated that most infants are introduced to foods early in the community. However, since they had been taught that it is important to give only mother's milk for the first 6 months, they had tried to adhere to the same. They reported being supportive of the mother to avoid her having stress so as to produce enough milk by helping out with household chores and taking care of the older children. The fathers were able to encourage the mother to continue breastfeeding as recommended for the infant to benefit from the breastfeeding process. While in the control group, fathers responded that infants are well breastfed in the community up to 3 months of age when they should be given other foods. In addition, breastfeeding continues until one year of age after which it should be stopped as the child had grown up and can walk.

Multiple linear regressions modeling was used to explain the relationship between the independent variables (fathers' knowledge about early initiation of breastfeeding, fathers' knowledge about duration of breastfeeding for 2 years and above, fathers' knowledge about exclusive breastfeeding, fathers' support on caring for the baby, fathers' support on feeding the baby, fathers' support on providing encouragement and motivation to the mother, fathers' support on being in agreement on how the infant should be fed, fathers' support on providing a favorable environment for the mother to breastfeed and parity) and the dependent variable (exclusive breastfeeding rate). The results were as shown in Table 5. Maternal knowledge on exclusive breastfeeding and parity did not contribute significantly to the regression model showing ($p=.45$) and ($p=.61$), respectively. However, fathers support towards breastfeeding contributed significantly

to the regression model, ($p=.02$). A significant regression equation was found $F(1, 272) = 25.93, p=.03$, with an R^2 of .65 (Table 6.5). Overall, nutrition education targeting the father-mother pair and father support in breastfeeding ultimately impacts positively on exclusive breastfeeding rates.

Table 6.5: Multiple linear regression analysis of factors associated with exclusive breastfeeding

Variable	B	SE	t	P
Fathers' know BF within 1hr of birth	0.24	0.34	-0.39	0.45
Fathers' know BF for 2 years and above	1.68	3.89	0.43	0.67
Fathers' know about EBF	0.01	0.03	2.43	0.03*
Fathers' support, caring for the baby	-0.06	0.07	-0.84	0.40
Fathers' support, feeding the baby	-0.05	0.08	-0.55	0.58
Fathers' support, encouragement and motivation	13.21	1.34	9.82	0.00*
Fathers' support, being in agreement	-0.17	0.06	-2.63	0.02*
Fathers' support, favourable environment	0.63	0.29	-2.51	0.01*
Parity	0.27	0.31	-0.24	0.61
R^2	0.63			
Adjusted R^2	0.65			
F value	25.93			
F significance	0.03			

*Note level of significance based on multiple regression analysis is p value <0.05 . * used for $P<0.05$; B=Beta, measure of how strongly each predictor variable influences dependent variable, SE=Standard error.*

6.5 Discussion

All the fathers who were engaged in this study were in a form of relationship with the expectant mother. Indeed, another study showed that married mothers or those cohabiting with their partners are more inclined to breastfeed for a longer duration even maintaining lactation throughout the whole first year of the infant's life (Tohotoa, *et al.*, 2009). Moreover, another study from the Democratic Republic of Congo, Kinshasa also showed that cohabiting men were more likely to be involved in maternal and child health practices (Ditekemena, *et al.*, 2012). In our study majority of the fathers had above primary level education. Indeed the educational level of fathers has been linked as a positive factor in paternal support towards exclusive breastfeeding (Robert, *et al.*, 2015). This may be a pointer that if fathers have more access to information, they are more aware of the benefits of breastfeeding resulting in positive outcomes.

During the study, fathers were asked to accompany their partners to the clinic for the nutrition education session. Men as in many parts of Africa do not generally accompany their partners for antenatal clinic visits as culturally this is seen as a female domain (August, *et al.*, 2016; Kakaire, *et al.*, 2011). This is further supported by qualitative findings from this study in which the fathers mentioned that it was hard to participate in the antenatal clinic visits as sometimes no attention is paid to them, they are busy with work and they feel culturally it is not suitable for a man to be seen going to the clinic. This is a pointer that there is a need to make deliberate efforts to reach the fathers during the antenatal clinics so they can be part of the process and can get information to provide a supportive role.

The fathers in this study who received nutrition education sessions reported confidence on the support they can provide to the mother during lactation. This was in agreement with a study done in Italy that found a 10% difference in increase of exclusive breastfeeding rates at 6 months between the intervention group and control group following the nutrition education intervention given to the fathers on the recommended breastfeeding practices (Pisacane, *et al.*, 2005). Similarly, significant difference in

exclusive breastfeeding rates between the intervention group and control group are reported in our study, following the nutrition education intervention. In addition, our findings from the qualitative assessment indicate that the kind of support provided by the fathers in the intervention group following the nutrition education session include: motivation and support to the mother to continue giving the infant only mother's milk for the first 6 months, holding the infant, taking care of older children and doing other household chores. Fathers felt by giving this kind of support the mother was less stressed and able to concentrate on giving the infant mother's milk only as recommended. The kind of father support cited by those in the control group mostly included the provision of basic needs such as food for the household.

At baseline, the reasons given by fathers in the intervention and control groups for the introduction of foods and drinks other than mother's milk before the child reached 6 months of age include: feeling that child could start feeding at 4 months, the perception of not having enough milk and returning to work. In addition, respondents felt that mother's milk was insufficient food to sustain the infant for 6 months. They were of the opinion that for adequate growth, foods should be introduced at 2 months of age for the male child, at 3 months of age for the female child. A difference was observed post intervention among fathers in the intervention group reporting that they only gave their children mother's milk for the first 6 months and noticed that their children were growing well and gaining weight. Expressing of breast milk was also reported by the mothers in the intervention group as something they would do when they were away from the baby. Introduction of other foods to the infant at around age 3 months was reported by the fathers in the control group as something they do. In addition, mothers in the control group reported that they had to leave porridge for their infant from around 3 months of age when they were away from them.

6.6 Limitations

The limitation of this study was that it was conducted among fathers who were in a family context and whose spouses were attending the antenatal clinic at Kisumu County hospital.

Father-mother pair in the intervention group may have overstated the role of fathers, and possibly the control group understated, as an effect of study participation. Other factors have been identified to influence infant feeding practices which can be confounding factors in this study. The confounders were minimized through randomization of study participants. Behavior change strategies take time, attempting to affect these practices in a short period may require more intensive education and actions involving the wider sphere of influencers. After the initial intervention, there may be a greater impact on a mother's next child. Though this study draws upon literature from other countries, the analysis does not take into account possible cultural similarities and diversities with regards what constitutes father support. Hence further research that includes testing an international model of father support relating to infant feeding which could build on and expand the findings reported here.

6.7 Conclusion

From our study, we conclude that educating fathers' on breastfeeding prenatally increase exclusive breastfeeding rates significantly. Fathers need to be provided with information from the health system and healthcare professionals. Fathers should be included in education sessions on infant feeding at the health facility and community levels, all of which may be an important step in improving infant feeding practices.

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Conflict of interest statement

The authors confirm there is no conflict of interest.

CHAPTER SEVEN

EFFECT OF FATHER INVOLVEMENT IN INFANT FEEDING ON INFANT NUTRITIONAL STATUS AND MORBIDITY IN KISUMU, KENYA

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7.1 Abstract

Interventions promoting optimal breastfeeding could prevent 13%, while those promoting optimal complementary feeding could prevent another 6%, of infant deaths in countries with high mortality rates. This study determined the influence of father's participation in promoting infant feeding on nutritional status and morbidity of infants in Kisumu East Sub County, Kisumu County. An interventional study was conducted with randomization of study participants into either experimental group or control group with each group having 145 father-mother pairs. Recruitment was done when the mothers to be were 6 months pregnant. Followed up was done until the children birthed reach 12 months of age. No intervention was given in the control group while both father-mother pairs in the experimental group received nutrition education on breast feeding and complementary feeding. Overall, more children were wasted, underweight and stunted in the control group than intervention group at 3 months, 6 months and 9 months of age with significantly higher values being observed at 9 months on wasting and underweight (chi-square test; $p=0.015$ and $p=0.010$, respectively) in the control group. Statistically significantly higher percentage of children in the intervention group were sick than in the control group (chi-square test; $p=0.001$) at 3 months. The prevalence of acute respiratory infections was significantly higher among the control group at 3 months (chi-square test; $p=0.000$).

Conclusion: Nutrition education to fathers impacts positively on infant feeding practices as well as nutritional status.

Key words Father Involvement, infant feeding, nutritional status, morbidity, Kenya.

7.2 Introduction

Under five mortality rates estimated as number of deaths per 1,000 live births is 51 globally, 57 in developing regions and 109 in Sub-Sahara Africa (IGME, 2012). In Kenya, poor infant feeding practices contribute to more than 10,000 deaths per year (MOH, 2010). Breastfeeding is critical for child survival, it is the best way of providing

young infants with the nutrients they need hence provides a child with the best start to life (WHO, 2013). Most importantly, it is the most effective preventive health measure for both mother and child. Evidence further indicates that breastfeeding in childhood is associated with intelligence quotient, educational attainment, higher income in adulthood, protection against breast, ovarian cancer, type 2 diabetes, and improved birth spacing among women (Victora, *et al.*, 2016). Breastfed children have at least six times better chance of survival in the early months than non-breastfed children. An exclusively breastfed child is 14 times less prone to death in the first six months than a non-breastfed child, and breastfeeding drastically reduces deaths from acute respiratory infection and diarrhea, two major child killers (Black, *et al.*, 2008).

Complementary feeding interventions alone have been estimated to prevent 6% of under five children mortality in developing countries (Black *et al.*, 2013). Inadequate complementary feeding has been shown to have negative impacts on the child increasing infant morbidity (Kalanda, *et al.*, 2006) and mortality (Edmond *et al.*, 2006). Recommendations are that breastfeeding should be initiated within the first hour of birth, exclusive breast feeding for the first six months of a child's life and introduction of complementary foods at six months with continued breastfeeding into the second year and beyond (MOH, 2010; WHO, 2010). In developing countries, suboptimal breastfeeding and complementary feeding practices have been documented. Only 39% of infants are exclusively breastfed for the first 6 months of life with a lower proportion at 25% in Africa (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). According to the Kenya Demographic and Health Survey conducted in 2014, 61% of children were exclusively breastfed for the first 6 months of life while only 21% of those aged 6-23 months receiving an acceptable diet (Kenya National Bureau of statistics (KNBS) and ICF Macro., 2014).

Father engagement significantly improves infant feeding practices as shown by studies done (Pisacane, *et al.*, 2005; Susin and Giugliani, 2008) Success in improving infant feeding practices depends on engaging key influencers at the household and community levels based on assessments on infant and young child feeding done in Kenya (MOH, 2010). In addition, within Kenya, most community programs seeking to improve the well-being of women and children target young mothers and their children with little

attention to fathers as key influencers. This study assessed the effect of father targeted nutrition education on nutritional status and morbidity among infants in Kisumu East Sub County.

7.3 Materials and Methods

7.3.1 Study design and setting

The study was a Randomized Control Trial (RCT). The target group was fathers who had pregnant partners between 23 and 27 weeks gestation and attending antenatal clinic at Kisumu county hospital located in Kisumu east sub county, Kenya. The county covers an area of 1,960.2 Km² and has a population of 544,166 with 3.24% (14,715) being pregnant women and 25.9% (117,629) women of reproductive age. Infant mortality rate is high for Kisumu County at 95/1000 (Republic of Kenya, 2012). The main occupation for men living in Kisumu east Sub County is casual labor in the light industries located within the city center. The participants were mainly casual laborers for the men and housewives for the women and their reported age ranged from 16 to 45 years.

Authorization to conduct the study was obtained from the ethics review committee at Kenyatta National Hospital/University of Nairobi, the County Director of Health in Kisumu and the medical superintendent at Kisumu county hospital. The respondents were informed of the objectives of the study and the interviewer sought their consent to participate in the study. All information and conversations provided to the investigators by the participant was regarded as confidential.

7.3.2 Sampling

The study group for quantitative data was identified through the pregnant women who were selected through convenience sampling at Kisumu County hospital. The study considered an effect size of 20% based on the intervention of nutrition education targeting both father and mother to be done since the outcome was expected to be better than that of a similar study done in Italy which considered difference in effect of intervention of 15% and used standard deviation of 0.58 (Pisacane, *et al.*,2005).

$$n = \frac{2(Z_{\alpha} + Z_{1-\beta})^2 \sigma^2}{\Delta^2}$$

Where:

n- Estimated sample size

Z_α level of significance (set at 0.95 α=0.05=1.96); **Z_{1-β}** power of the study (80%)

Σ standard deviation (estimated at 0.58)

Δ difference in effect of interventions which is required (estimated at 20% based on previous studies)

Hence: $n = \frac{2(1.96 + 0.8416)^2 (0.58)^2}{(0.20)^2}$; n=132.

$$(0.20)^2$$

Considering a 10% attrition rate, the total sample size was 145 this figure was doubled to 290 since the intervention study would involve an experimental and control group.

A total of 290 father-mother pairs were recruited. Ten participants were recruited per day from those who agreed to take part in the study from a daily attendance to antenatal clinic of 75 pregnant women with an approximation of 40% being 6 months pregnant according to the hospital profile. The recruited study participants were linked to the fathers to participate in the study. In addition, FGD was conducted with 8 fathers and mothers who were engaged in the study. There was 2 FGD engaging control group and 2 FGD engaging intervention group participants. Participants were randomly selected from the randomized group of father-mother pair.

7.3.3 Inclusion and exclusion criteria

Inclusion was of: women who were 6 months (23-27 weeks) pregnant and attending antenatal clinic at Kisumu County hospital at the time of recruitment; women who are from Kisumu east sub county; women who are planning to breast feed; male partners

of the pregnant women and who are willing to be visited at home. Exclusion was of: women who were 6 months pregnant and attending antenatal clinic at Kisumu County hospital but are not from Kisumu east Sub County; women not planning to breast feed; and women with documented chronic diseases or are very ill.

7.3.4 Intervention

Baseline data was collected from the father-mother pairs at time of enrollment from both the experimental and control group. Data collected include: demographic information such as age, level of education and household size; socio-economic status such as occupation and pregnancy related characteristics such as age of pregnancy at first ANC attendance and parity. Nutrition education was provided in the form of group facilitated sessions to the experimental group. The father-mother pairs in the experimental group received nutrition education sessions prenatally on breast feeding and complementary feeding. At the end of the sessions a leaflet with the main points of the session was provided to the participants.

7.3.5 Data collection and analysis

Data on nutritional status and morbidity for the children was collected progressively using semi-structured questionnaires. The nutritional status data was collected four times: at birth, at 3 months, at 6 months and at 9 months. Data was recorded from the child's clinic card on weight and length corresponding to the different time lines. Measurements of length were recorded to the nearest 0.5cm. Measurements of length were recorded to the nearest 0.1kg. Data on morbidity was collected using the questionnaire. Any morbidity that has been experienced by the child was recorded during the three month period under assessment.

Data was field edited, coded and entered into SPSS version 21 and cleaned before analysis. Descriptive statistics and comparison between groups was performed by means of the chi-square test. The child nutritional status was analyzed using WHO anthro and interpreted using the Z- Score (WHO, 2006)[14]. Children with a Z-score of below -2SD for weight-for-age (WFA), weight-for-height (WFH) and height-for-

age (HFA) were considered underweight, wasted and stunted, respectively. Those above -2SD were considered normal or well-nourished (WHO, 2006).

7.4 Study Results

7.4.1 Characteristics of study group

A total of 290 father-mother pair were reached for quantitative data collection. Randomization of the study groups was successful; the two study groups were similar in all aspects with the exception of one variable, namely parity ($p=0.003$) (Table 7.1 and Table 7.2). A statistically significant higher mean (1.75 ± 1.49) of number of children birthed was observed among the study participants from the control group than the intervention group (1.16 ± 1.12).

7.4.2 Infant feeding practices

Majority (74.3% $n=208$) of the mothers breastfed their infants within an hour after delivery. Early initiation of breastfeeding as significantly higher among the intervention group (97.1% $n=134$) compared to the control group (52.1% $n=74$); ($\chi^2=8.89$; 95% CI: 4.47–4.54; $p=0.000$). Exclusive breastfeeding for the first 6 months of life was also significantly higher in the intervention group (77.7% $n=101$) compared to the control group (45.1% $n=64$) ($\chi^2=9.58$; 95% CI: 6.67 – 6.78; $p=0.000$). In addition, higher exclusive breastfeeding rates were observed in the intervention group among mothers who had involvement and support from the father (73.4% $n=116$) than to mothers in the control group (60.2% $n=62$). The fathers in the intervention group reported that the kind of support they had provided include: motivation and support to continue breastfeeding, holding the baby, taking care of older children and doing other household chores. Fathers felt by giving this kind of support the mother was less stressed and able to concentrate on breastfeeding. The kind of support provided by the fathers in the control group mostly included provision of basic needs.

Based on a 24-hour recall, majority (63.4% $n=184$) of the children had been introduced to solids, semi-solids and soft foods at 6 months. Complementary foods were introduced significantly earlier in the control group than in the intervention group

($\chi^2=5.87$; 95% CI: 1.15 – 1.31; $p=0.000$). In the intervention group, majority of the children at 6-8 months old and 9-12 months old had attained the recommended minimum meal frequency of 2 times and 3 times per day at 96.9% ($n=123$) and 92.4% ($n=109$) respectively. In the control group, fewer children at 6-8 months old and 9-12 months old had attained the recommended minimum meal frequency of 2 times and 3 times per day at 83.3% ($n=105$) and 70.9% ($n=94$) respectively. Minimum meal frequency was higher in the intervention group than control group ($\chi^2=7.16$; 95% CI: 5.39 – 5.48; $p=0.000$).

Minimum dietary diversity was established based on the number of food groups the index child consumed in the previous 24 hours prior to the data collection. Seven food groups as recommended internationally by WHO (WHO, 2013). Children of 6–12 months of age who receive foods from 4 or more food groups are considered to have a diverse diet (Tohotoa, *et al.*, 2009). There was a significant difference ($\chi^2=11.01$; 95% CI: 8.41 – 8.64; $p=0.022$) in the dietary diversity score of the intervention group and control group at 6-8 months but there was no significant difference ($\chi^2=2.11$; 95% CI: 1.31 – 1.40; $p=0.10$) in the dietary diversity score of the intervention group and control group at 9-12 months. Mothers in the intervention group were twice more likely (OR = 2.09; 95% CI: 1.72– 2.54; $p=0.00$) to have minimum acceptable diet compared to the mothers in the control group. The indicators for minimum acceptable diet by study group for the children at age 9-12 months are summarized in Figure 7.1.

Follow up was made on fathers support to the mother during complementary feeding. More mothers in the intervention group (94.2% $n=113$) cited receiving support from the father than the control group (45% $n=59$). The kind of support provided by fathers include: motivation and information on infant feeding, purchase of food for the baby, preparation of food for the baby, holding the baby, taking care of older children and doing other household chores. Fathers felt confident in playing these roles based on the information they were provided with on infant feeding.

7.4.3 Nutritional status of the children

Nutritional status was based on anthropometric assessment of the infants was determined based on underweight, stunting and wasting. It was interpreted using the WHO Child Growth Standards (WHO, 2006). Prevalence of malnutrition at 3 months of age was as follows: stunting, 7.6% in the intervention group and 13.8% in the control group; wasting, 3.4% in the intervention group and 5.5% in the control group; underweight, 2.8% in the intervention group and 4.1% in the control group. Prevalence of malnutrition at 6 months of age was as follows: stunting, 11.7% in the intervention group and 19.3% in the control group; wasting, 4.8% in the intervention group and 6.9% in the control group; underweight, 4.1% in the intervention group and 6.2% in the control group. Prevalence of malnutrition at 9 months of age was as follows: stunting, 9.7% in the intervention group and 13.1% in the control group; wasting, 2.8% in the intervention group and 9.7% in the control group; underweight, 2.1% in the intervention group and 9% in the control group. There were significantly more children at 9 months of age wasted ($X^2=2.08$; $p=0.015$) and underweight ($X^2=2.08$; $p=0.010$) in the control group than the intervention group (Table 7.3).

7.4.4 Relationship between infant feeding practice and nutritional status

Assessment of the relationships between child nutritional status (wasting, underweight and stunting) and infant feeding practice in terms of initiation of breastfeeding, exclusive breastfeeding, minimum dietary diversity, minimum meal frequency and minimum acceptable was done. Children who had consumed fewer meals in a day were more likely to be wasted and underweight than those who were fed the minimum meal frequency as per WHO recommendations ($x^2=6.03$; 95% CI: 1.17 – 1.34; $p=0.004$ and $x^2=7.11$; 95% CI: 2.27 – 2.54; $p=0.000$ respectively). Children who had not consumed a diverse diet were also more likely to be wasted than those who had consumed a diverse diet ($x^2=3.45$; 95% CI: 4.22 – 4.44; $p=0.007$). In addition, children who had not consumed the minimum acceptable diet in terms of both meal frequency and dietary diversity were more likely to be wasted and underweight ($x^2=8.01$; 95% CI: 1.07 – 1.24; $p=0.001$ and $x^2=4.13$; 95% CI: 7.17–7.28; $p=0.000$ respectively).

However, a chi-square test did not reveal a significant relationship between initiation of breastfeeding, exclusive breastfeeding and child nutritional status.

7.4.5 Prevalence of Morbidity

Information on infant morbidity status was based on a two-week recall and data collected from the caregivers during months 3, 6 and 9 of the infants. At 3 months, 49.4% of the infants in the control group and 31.1% in the intervention group were reported sick ($\chi^2=2.17$; 95% CI: 1.98 – 2.10; $p=0.001$). Acute respiratory infections affected 41.8% of the infants in the control group and 20.5% in the intervention group ($\chi^2=2.04$; 95% CI: 1.86 – 1.93; $p=0.000$). The differences of having diarrhea and fever between the intervention and control group were insignificant ($\chi^2=10.10$; 95% CI: 6.28 – 6.39; $p=0.245$ and $\chi^2=5.13$; 95% CI: 1.27 – 1.47; $p=1.000$ respectively).

At 6 months, 44.9% of the infants in the control group and 34.7% in the intervention group were reported sick ($\chi^2=2.33$; 95% CI: 5.32 – 5.46; $p=0.154$). Significant differences were observed between the intervention and control group in terms of prevalence of diarrhea, ARI and fever ($\chi^2=6.12$; 95% CI: 1.68 – 1.84; $p=0.015$, $\chi^2=8.11$; 95% CI: 1.57 – 1.77; $p=0.050$ and $\chi^2=1.09$; 95% CI: 1.97 – 2.14; $p=0.030$ respectively). At 9 months, 42.7% of the infants in the control group and 49.2% in the intervention group were reported sick ($\chi^2=2.10$; 95% CI: 2.26 – 2.44; $p=0.188$). Fever affected 8.4% of the infants in the control group and 18.3% in the intervention group ($\chi^2=1.53$; 95% CI: 4.27 – 4.34; $p=0.025$). The differences of having diarrhea and ARI between the intervention and control group were statistically not significant ($\chi^2=4.51$; 95% CI: 1.25 – 1.41; $p=1.000$ and $\chi^2=9.01$; 95% CI: 1.72 – 1.94; $p=0.881$ respectively).

7.5. Discussion

At baseline level, the intervention and control group were similar in almost all aspects. All the fathers who were engaged in this study were in a form of relationship with the expectant mother. Fathers in a stable relationship create an environment of safety and comfort which can be transmitted on to the mother and eventually represent a reason for success in infant feeding practices and her confidence in the role of a mother (Piazzalunga and Lamounier, 2009). Regarding father's schooling, it was noted that

majority had above primary level education. The educational level of the father has been linked as a positive factor in paternal support towards infant feeding (Robert, *et al.*, 2015). A randomized controlled trial showed that exposing expectant fathers to a 2-hour intervention class on infant feeding was successful in improving infant feeding practices (Wolfberg, *et al.*, 2004). This education is recommended to take place during the antenatal period and the baby's first quarter (Maycock, *et al.*, 2013). In our study, the fathers and mothers in the intervention group went through a 2 hour education session on breastfeeding and complementary feeding during the antenatal period.

Majority of the infants in the study had a normal weight-for-age, length-for-age and weight-for-length z-scores. Overall, stunting rates were higher than underweight and wasting rates in both groups similar to findings of the Kenya demographic health survey in which more children were stunted than wasted and underweight in Kisumu County (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). In our study, under nutrition was observed in the infants as early as at 3 months of age. This was similar to results from a Malawian study which showed that infants that were commenced early on complementary feeds progressively had lower weight for age from as early as 2 months (Kalanda, *et al.*, 2006), validating the benefit of exclusive breastfeeding. In the present study, nutritional status was poor in children who had fewer meals and less diverse diets especially at 9-12 months of age. Indeed, it is at this age that significantly more children in the control group were found to be wasted and underweight. Hence the differences in the nutritional status in the intervention and control group could be attributed to the increased knowledge received by the fathers on infant feeding and consequently better involvement in infant feeding. Moreover, the importance of male involvement in health and nutritional matters has been emphasized in other studies (Johansson, *et al.*, 2011; Saha, *et al.*, 2011)

Based on our study, fewer infants had morbidities such as diarrhea, ARI and fever in the intervention group compared to those in the control group. This may be attributable to the nutrition education provided to the fathers in the intervention group resulting to a positive role in ensuring that the infants were fed as per WHO recommendations and consequently experienced less episodes of disease. Furthermore, our study reported

significantly higher exclusive breastfeeding rate in the intervention group than in the control. Lower morbidity and mortality from diarrhea as a result of exclusive breastfeeding has been reported in various studies too (Bhandari, *et al.*, 2003; Jones, *et al.*, 2003)]. In fact non-exclusively breastfed infants had a significantly higher prevalence of diarrhea in our study compared to exclusively breastfed infants which is in agreement with scientific evidence from Bangladesh which found out that infants exclusively breastfed for six months had a significantly lower 7-day prevalence of diarrhea than infants who were not exclusively breastfed (Seema, *et al.*, 2008).

In our study, better infant feeding practices were observed in the intervention group where mothers had reported receiving more paternal support and consequently better nutrition outcomes were observed. Research has demonstrated positive impact on child nutritional outcome with paternal involvement. In fact, a Vietnamese study showed that children whose fathers were not involved in taking them to the health facility for immunizations were about 1.7 times more likely to be malnourished which indicate the need for paternal involvement in child health care system in general and nutritional outcome in particular (Tran, 2008). Similarly, a study done in South Africa reported children whose fathers did not provide their family with financial support were found to be at higher risk of malnutrition (Madhavan *et al.*, 2007). A Peruvian study reported lower height-for-age Z-scores among children who did not see their fathers regularly during their infancy compared to children who saw their fathers regularly, after adjusting for other contextual factors (Dearden, *et al.*, 2013). Furthermore, a sub-Saharan Africa study found higher odds of stunting among children of single mothers compared to children whose mothers were in union (Noimo and Odimegwu, 2014). These studies indeed validate the importance of male involvement in the wellbeing of the child.

We therefore conclude that providing nutrition education to fathers during the antenatal period improves infant feeding practices and subsequently nutritional status of the child. Fathers need to be provided with more guidance from the health system and professionals. In fact, fathers should be included in education sessions on infant feeding at the health facility and community levels, all of which may be an important step in the survival and development of the child.

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Table 7.1: Baseline Comparison of key demographic, socio-economic, and knowledge traits for the study groups

Characteristic		CG (N=145)	IG (N=145)	Chi-square	
				x^2	<i>p</i>
Education	Father			2.34	0.31
	Primary level	39.3 (57)	37.2 (54)		
	Secondary level	47.6 (69)	54.5 (79)		
	College level	13.1 (19)	8.3 (12)		
	Mother			4.29	0.12
	Primary level	42.1 (61)	53.8 (78)		
	Secondary level	48.3 (70)	40 (58)		
	College level	9.7 (14)	6.2 (9)		
Occupation	Father			7.50	0.11
	Self-employment	31.8 (46)	33.7 (49)		
	Formal employment	20 (29)	25.5 (37)		
	Casual employment	48.3 (70)	40.7 (59)		
	Mother			2.39	0.67
	Housewife	44.1 (64)	48.3 (70)		
	Self-employment	37.9 (55)	33.1 (48)		
	Formal employment	6.2 (9)	9 (13)		
	Casual employment	11.7 (17)	9.7 (14)		
Household size				3.58	0.17
	1-3	49.7 (72)	59.3 (86)		
	4-6	46.2 (67)	38.6 (56)		
	7 and above	4.1 (6)	2.1 (3)		

Maternal breastfeeding knowledge				
Mothers milk first feed	97.9 (142)	94.5 (137)	2.03	0.36
Start BF within 1hr	59.3 (86)	63.4 (92)	2.57	0.17
BF for 2 years	57.2 (83)	61.4 (89)	3.28	0.55
EBF	43.4 (63)	42.3 (58)	1.17	0.56

Note BF=breastfeeding; EBF-Exclusive breastfeeding

Table 7.2: Baseline Comparison of age and perinatal traits for the study groups

Characteristic	CG	IG	Independent t test	
	n=145 M(SD)	n=145 M(SD)	t	p
Age				
Father	29.45 (5.7)	30.74 (6.6)	1.79	0.26
Mother	24.57 (4.7)	24.6 (4.3)	0.10	0.38
Perinatal-related characteristics				
Gestational age	4.51 (1.5)	4.19 (1.5)	-1.82	0.68
1st ANC visit				
No. of ANC visits	1.93 (0.83)	1.96 (0.85)	0.28	0.93
Parity	1.16 (1.12)	1.75 (1.49)	3.82	0.003**

Note CG=Control Group; IG=Intervention Group. Level of significance based on t-test (t) is p value <0.05. **used for values p value < 0.01. The figures in bracket are standard deviation (SD) with N=145 in the control group & N=145 in the intervention group. The figures outside bracket represent the mean within the group.

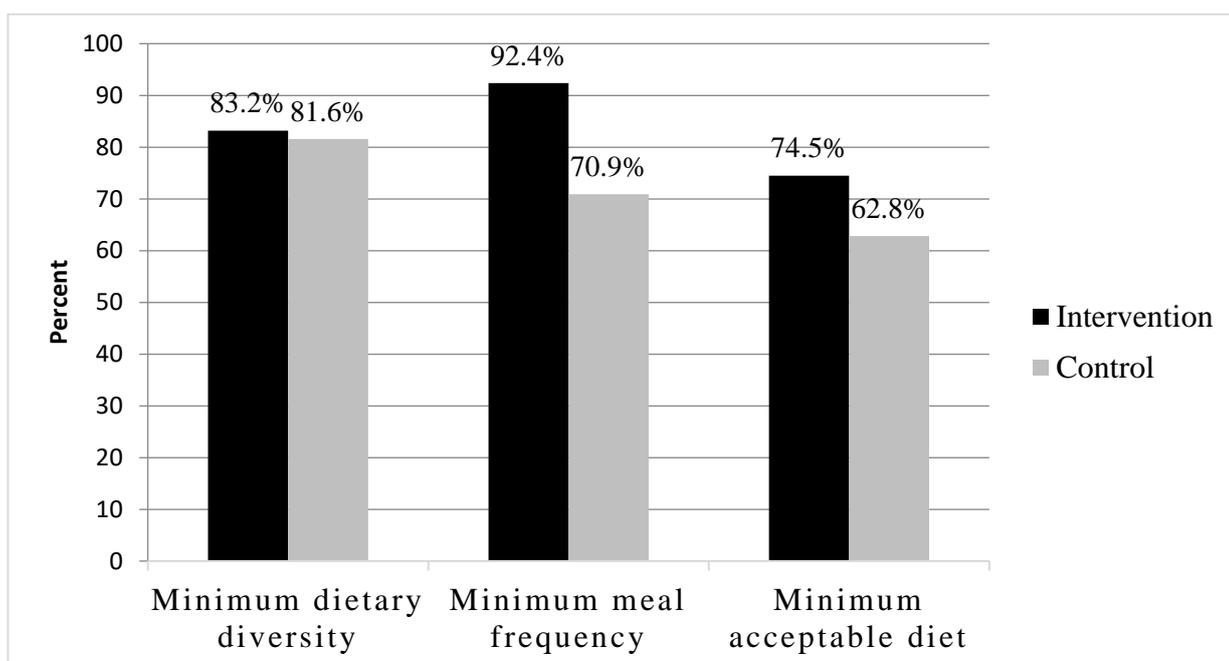


Figure 7.1: Indicators for minimum acceptable diet

Table 7.3: Prevalence of malnutrition by age and group

Variable	IG % (N=145)	(n)	CG% (N=145)	(n)	Chi-square		95% CI
					x^2	<i>p</i>	
3 months old							
Stunting	7.6% (11)		13.8% (20)		6.11	0.087	1.23-1.33
Wasting	3.4% (5)		5.5% (8)		0.61	0.395	0.91-1.01
Underweight	2.8% (4)		4.1% (6)		0.83	0.520	0.97-1.08
6 months old							
Stunting	11.7% (17)		19.3% (28)		4.52	0.074	1.10-1.21
Wasting	4.8% (7)		6.9% (9)		0.37	0.453	0.89-0.93
Underweight	4.1% (6)		6.2% (9)		0.58	0.426	0.76-0.82
9 months old							
Stunting	9.7% (14)		13.1% (19)		0.51	0.355	0.69-0.75
Wasting	2.8% (4)		9.7% (14)		6.56	0.015*	1.24-1.35
Underweight	2.1% (3)		9% (13)		5.09	0.015*	1.42-1.49

* Significant differences (Chi-square test $p < 0.05$)

CHAPTER EIGHT

EFFECT OF PATERNAL NUTRITION EDUCATION ON COMPLEMENTARY FEEDING PRACTICES AMONG INFANTS IN KISUMU COUNTY, KENYA

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8.1 Abstract

Improved health of infants is dependent on the supportive role of the fathers. There is limited research done in Kenya on father involvement and how it affects feeding practices of the infant. The objective of this study was to assess the effect of father targeted nutrition education on complementary feeding practices. A randomized control trial was conducted with 290 father-mother pairs recruited into the study. The mothers, who were six months pregnant and receiving antenatal services at Kisumu County hospital provided the contact point for recruitment of the fathers who were engaged in this study. The consenting mothers provided contacts of the 'expectant father' who were later reached and invited to go to the hospital together with the mother. Consent was obtained from the study participants in a written form. Randomization was done to the father-mother pairs and eventually, each group had 145 pairs. Fathers and mothers in the intervention group were educated on complementary feeding while the fathers and mothers in the control group did not get any intervention. Complementary feeding practices were assessed when the infants were aged six months and nine months. Qualitative assessment through focus group discussions was done to obtain information on fathers' support towards complementary feeding. Overall, the analysis was done on 278 pairs with 12 lost to follow up. Introduction to solids and semi-solids had been done by a majority (96.7%) by six months of the infant's age in both groups. Solid and semi-solid foods were introduced significantly earlier in the control group compared to the intervention group (chi-square test; $p < 0.01$). Minimum acceptable diet was significantly higher in the intervention group than the control group (chi-square test; $p < 0.01$). In conclusion that giving father's information on complementary feeding influences their support towards infant feeding resulting in positive outcomes in complementary feeding practice.

Key words: Father, Involvement, Infant, Complementary feeding, Nutrition Education, Kisumu, Kenya

8.2 Introduction

Mortality rates among children under-five stand at 51 worldwide, higher in developing countries at 57 and highest in Sub-Saharan Africa at 109 (IGME, 2012). In Kenya, poor feeding of infants accounts for over 10,000 deaths per year (MOH, 2010). Appropriate complementary feeding practices alone can avert 6% of deaths in developing countries (Black *et al.*, 2013). Complementary feeding is the provision of solid and semi-solid foods in addition to breast milk to children over 6 months of age (Carlo, 2008). Timely introduction of appropriate complementary foods has been linked to good nutritional status and adequate growth in infants (Michaelsen, *et al.*, 2000). Negative outcomes are associated with inappropriate complementary feedings such as retarded growth, (Rivera, *et al.*, 2003) low mental development (Berkman, *et al.*, 2002) and an increase in infant morbidity (Kalanda, *et al.*, 2006) and mortality (Edmond *et al.*, 2006).

Fathers' giving support practically or emotionally to the mother is recognized as key for improved infant nutrition. Health structures are seen as important avenues to support actualization of the provision of this support by the fathers (Matovu, *et al.*, 2008). Engagement of fathers is vital because of the significance of them providing physical and psychosocial support to the mother during the weaning period as well as the overall well-being of the mother and the family (Young, *et al.*, 2009).

Fathers' support in child-care is positively linked to developmental, cognitive, social and behavioral child outcomes in addition to improved breastfeeding practice (Wells, 2016). The Kenyan Government developed a national strategy in 2007 which aimed to promote infant feeding practices optimally. The strategic document outlines the father's role in infant feeding that includes involvement in making decisions on infant feeding, providing support physically, psychologically and financially to the breastfeeding mother (Ministry of Public Health and Sanitation, 2007). Limited research looking at father engagement in infant feeding has been undertaken in Kenya despite the existence of evidence that has shown fathers as influential on the feeding process (Thuita, *et al.*, 2015). This study aimed to

evaluate the impact on complementary feeding practice of nutrition education targeted to the father.

8.3 Materials and Methods

8.3.2 Study setting and design

The study design was a randomized control trial. The study was conducted in Kisumu East Sub County with an area of almost 2,000 Km² and a population of half a million. From the total population, almost 3% are pregnant women and a quarter are women of reproductive age (Republic of Kenya, 2012). Complementary feeding practices are sub optimal in Kenya with minimum acceptable diet at 21% (Kenya National Bureau of Statistics (KNBS) and ICF Macro., 2014). Kisumu County was chosen based on the high mortality rate of infants compared to the national levels at 50 deaths/1,000 live births against 95 deaths/1,000 live births (Republic of Kenya, 2012).

The mothers, who were six months pregnant and receiving antenatal services at Kisumu County hospital provided the contact point for recruitment of the fathers who were engaged in this study. The father-to-be connected to the ‘expectant mother’ identified at the antenatal clinics were later contacted on the phone if they had not accompanied the mother to the clinic. A specific date was assigned to the father-mother pairs to meet with the study team at the health facility. During the meeting date, informed consent was obtained in a written form from the pairs. Simple random sampling was used to assign the father and mother pairs into the different groups by picking papers from a bowl indicating either of the groups. Authorisation to undertake the study was granted by the Ethics Review Committee at Kenyatta National Hospital in partnership with the University of Nairobi, Kenya on 28/10/2015 registered as P533/08/2015.

8.3.3 Sampling

The study group for quantitative data collection was identified through the pregnant women in which there was convenience sampling of women who were 6 months pregnant

between January and April 2016 and attending the antenatal clinic at Kisumu County hospital. Johnson *et al.*, formula guided calculation of the sample size (Johnson, *et al.*, 1995). Based on the expectation of better outcomes from our study than that of the previous study done in Italy which used 15% effect size and a standard deviation of 0.58, a 20% effect size was considered (Pisacane, *et al.*, 2005). The study in Italy had provided the nutrition education to the fathers postnatal while our study provided it prenatally with the expectation that the father-mother pair receiving the intervention will be able to make an early informed decision which would influence on the feeding practice.

The total sample size calculated was 145 allowing for a 10% attrition rate. Thus each group had 145 father-mother pairs to be sampled. Among those assigned to the intervention and control group, 8 fathers and 8 mothers were selected randomly from each group for the focus group discussions (FGD) pre and post intervention.

8.3.4 Inclusion and exclusion criteria

Those included in the study were pregnant women (23-27 weeks gestation) seeking antenatal services from Kisumu County Hospital, women residing in Kisumu East Sub County, women living together with the father of the expected child, mothers with the intention to breastfeed and the ‘expectant father’. Those excluded from the study were pregnant women not residing in Kisumu East Sub County; women not living together with the ‘expectant father’, and pregnant women who were very sick or with known chronic illnesses.

8.3.5 The Intervention

Formative assessment was conducted to collect baseline data from both study groups to determine their comparability. Demographic characteristics including age, level of education, and household size were recorded in the semi-structured questionnaires. Data on livelihood, antenatal clinic visit frequency, and parity were collected. The nutrition education sessions were done by the researcher and 3 trained nutritionists in a 4-hour

group facilitated sessions to the fathers and mothers in the intervention group prenatally. The sessions focused on benefits of breastfeeding, the varieties of foods for children, ensuring adequate amount and consistency per age category and father support (provision of the required foods, how to prepare the foods, responsive feeding, reminding and motivating the mother on the key recommendations). A pamphlet summarizing the key messages from the sessions was given to the fathers and mothers at the end of the sessions.

8.3.6 Data collection

Pre-testing of the semi-structured questionnaire was done in Osiri, which is in Kisumu West Sub County through a cross sectional survey reaching thirty fathers and mothers who had children aged below one year. The sample for the pre-test was arrived at by taking 10% of the total study sample which was 290. Data were collected within one week of the infants' 6th month and 9th month birthday with the indicators aligned with the World Health Organization guideline (WHO, 2009). Data were collected on time of introduction of complementary food, meal frequency and diversity of the diet given to the infant using the pre-tested questionnaires. Data on infant feeding knowledge and father support were also collected.

Qualitative data were collected through FGDs using a discussion guide on complementary feeding practices with a focus on what are the challenges, beliefs and practices on infant feeding within the community. The FGDs were moderated by the principal investigator with assistance from the research assistants who are trained nutritionists. The data were recorded using phone and notes taken by the transcribers.

8.3.7 Statistical analysis

Data quality was assessed during data collection by reviewing the questionnaires to ensure completeness and accuracy of data entered. SPSS version 21 was used to analyze the data and chi-square test and multiple regression was used to assess relationships

between variables such as timely introduction of complementary foods, minimum dietary diversity (Tohotoa, *et al.*, 2009), minimum meal frequency (WHO, 2009), minimum acceptable diet and father's support towards complementary feeding. The chi-square test were used for determining significant differences between the categorical variables and the multiple linear regression was used to explain the relationship between father support towards complementary feeding and minimum acceptable diet. Qualitative data collected from the FGDs was transcribed and put into emerging themes then triangulated with the quantitative variables.

8.4 Study Results

The study groups were compared at baseline to determine if they were similar before commencement of the intervention. Parity was the only factor that was significantly different between the intervention and control group $\chi^2 = 14.04$, $p < 0.001$ (Table 8.1). Overall, 278 father and mother pairs were analyzed with the attrition of 12 father and mother pairs from both groups due to the death of the child, father and mother parting ways and vacating from study location. Timely introduction of complementary foods at 6 months of age was 63.4%. Timely introduction of solids and semi-solid foods was significantly earlier in the intervention group $\chi^2 = 5.87$, $p < 0.01$.

Findings from the qualitative assessment revealed the causes for lack of timely introduction of solid and semi-solid foods by the control group as feelings that the infant was ready to begin taking other feeds and reduction in the quantity of breast milk. In the intervention group, going back to work was the main reason for the lack of timely introduction of complementary foods. Both groups cited relentless crying of the infant as a contributor in communities encouraging feeding on solid and semi-solid foods early to the infant before 6 months of age. A majority (92.4%) of the infants had attained the recommended minimum meal frequency at 9 months of age compared to 70.9% in the control group. Minimum meal frequency was significantly higher for the intervention group $\chi^2 = 7.16$, $p < 0.01$.

Majority (86%) of the infants had attained the minimum food diversity at 9 months of age (Table 8.2). However, no significant differences were found in the dietary diversity score of the study groups at 9 months of age $\chi^2=2.11$, $p=0.10$. Significantly more infants were fed on eggs in the intervention group at 9 months of than the control group $\chi^2 =25.74$, $p=0.01$ (Table 8.3). Findings from the qualitative data show that beliefs around hindrance of speech when eggs are consumed is a major reason for infants not being fed on it. Majority of the infants had achieved both minimum meal frequency and diversity at 9 months of age in the intervention group (74.5%) and control group (62.8%). In the intervention group, significantly more infants had attained the minimum acceptable diet compared to the control group $\chi^2=22.51$, $p<0.01$ (Figure 8.1).

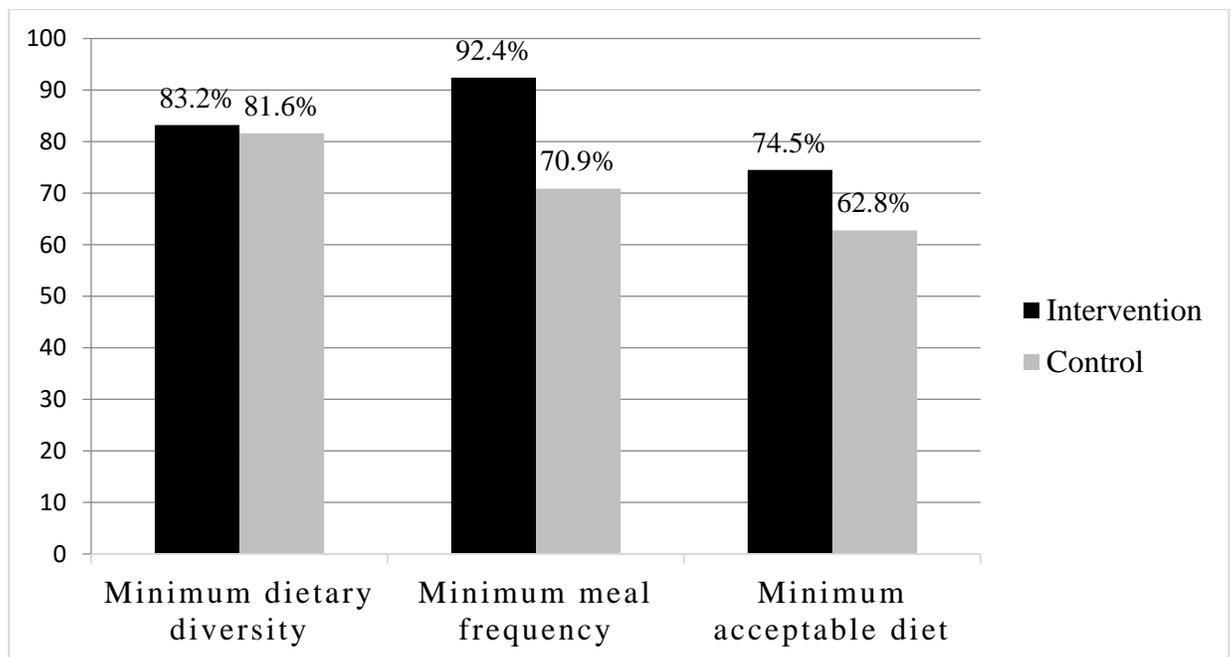


Figure 8.2: Level of minimum acceptable diet at 9 months of age

In the intervention group, a majority (94.2%) of the mothers reported receiving support from the father on complementary feeding compared to almost half (45%) of the mothers in the control group (Table 4). The odds of attaining minimum acceptable diet in the intervention group was twice that in the control group (OR = 2.09; 95% CI: 1.72 – 2.54;

$p=0.00$). Multiple regression analysis was performed on variables that had shown significance to assess prediction of attainment of minimum acceptable diet between the intervention and control group. Significant contributions to the regression model was made by support from fathers on the decision to the time of introduction of complementary foods, ($p=0.02$), decisions on meal frequency, ($p=0.01$), decisions on food diversity, ($p=0.03$) and providing the mother with appropriate information about complementary feeding ($p<0.01$). Parity which had showed significant differences at baseline and end line in the intervention and control group had no impact to the model. The regression equation was significant $F = 35.03$, $p=.01$, with an R^2 of 0.72 (Table 8.5).

8.5 Discussion

The father and mother pairs who participated in our study were living together. A study showed that when fathers and mothers are in a form of union with the mother, a breastfeeding-friendly home environment is created (Piazzalunga and Lamounier, 2009). The father and mother pairs had a 4-hour education session on breastfeeding and complementary feeding antenatal in this study with the expectation of improved infant feeding practices. Similarly, a study showed infant feeding practices were successfully improved after exposure of ‘fathers’ to be’ to a 2-hour session on infant feeding (Wolfberg, *et al.*, 2004). Another study recommended the infant feeding education sessions engaging the fathers should occur antenatal and early postnatal period (Maycock, *et al.*, 2013).

Our study reported that more infants had been introduced to solid and semi-solid foods timely in the intervention group which could be an indication that the intervention had a positive effect. This study did indicate a connection between the start of solid and semi-solid foods and study group. Mothers reported various types of father support received in this study. Ensuring food was available was reported as a major father support in both groups. Similar to another study done in Kenya which identified the perceived key role that can be played by fathers in infant feeding as the provision of food (Thuita, *et al.*, 2015). Fathers support in the form of household chores was reported in our study as

important. This is consistent with the findings of another study done in Australia which identified perceptions of what constitutes father support and helping with house chores was recognized as one form of support (Maycock, *et al.*, 2013).

This study reported the fathers in the intervention group as participating more in decisions on time to introduce complementary foods, the frequency of meals and food diversity which differs from fathers in the control group. The findings are in agreement to that of a study done in Ethiopia which aimed to increase male participation in infant feeding (Kimani-Murage, *et al.*, 2011) and another study done in Kenya that assessed maternal perception of male participation in infant and young child feeding (Thuita, *et al.*, 2015) which showed that men generally are less involved in decision-making for infant feeding. Thus the positive outcome by the intervention group could be attributable to the nutrition education received with fathers in the control group maybe still holding on to the cultural norm.

In this study, the minimum acceptable diet attainment was high among the intervention group and in the same group, most of the mothers had reported receiving father support in the form of motivation and information. This could be an indication that the intervention may have had an effect on the infant feeding practice. The findings of positive emotional support by our study are similar to another study that described the major role of the father as that of supporting infant feeding by using their knowledge to encourage and support mothers in infant feeding (Muchina, 2010). Another study also showed that mothers who had partners verbally encouraging them on breastfeeding had a higher success rate (Dewey and Begum, 2011).

8.6 Conclusion

Nutrition education targeting the father contributed positively to complementary feeding practices. Father support was found to be more in the decision making around timeliness of introduction of solid and semi-solid foods, the frequency of meals and food diversity as well as sharing of information and giving motivation on following the recommended infant

feeding practice in the intervention group. Fathers can be reached with information on complementary feeding through the health facilities which may contribute to improved infant feeding practices.

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Table: 8.1: Baseline Comparison of age and perinatal traits for the study groups

Characteristic	CG	IG	<i>Independent t test</i>	
	n=145 M(SD)	n=145 M(SD)	<i>t</i>	<i>p</i>
Age				
Father	29.45 (5.7)	30.74 (6.6)	1.79	0.26
Mother	24.57 (4.7)	24.6 (4.3)	0.10	0.38
Perinatal-related characteristics				
Gestational age 1st ANC visit	4.51 (1.5)	4.19 (1.5)	-1.82	0.68
No. of ANC visits	1.93 (0.83)	1.96 (0.85)	0.28	0.93
Parity	1.16 (1.12)	1.75 (1.49)	3.82	0.003**

*Note level of significance based on t- test (t) is p value <0.05. **used for values p value < 0.01. The figures in bracket are standard deviation (SD) with N=145 in the control group & N=145 in the intervention group. The figures outside bracket represent the mean within the group. CG=Control group, IG=Intervention group.*

Table 8.2: Dietary diversity score at 9 months of age

DDS	IG % (n) (N=137)	CG % (n) (N=141)	Chi-square	
			x^2	P
Infants 9 months of age			2.11	0.10
< 4 food groups	16.8 (23)	18.4 (26)		
≥ 4 food groups	83.2 (114)	81.6 (115)		

Note level of significance based on chi-square test (x^2) is p value <0.05. The figures in bracket are 'n' with N=137 in the intervention group & N=141 in the control group. The figures outside the bracket represent the % within the group. DDS=Dietary Diversity Score. IG=Intervention group. CG=Control group.

Table 8.3: Food variety intake at 9 months of age

Characteristics	IG %(n) (N=137)	CG % (n) (N=141)	Chi-square	
			x^2	p
Children at 9-12 months				
Grains, roots and tubers	97.5 (117)	95.4 (125)	0.78	0.50
Legumes and nuts	84.2 (101)	76.3 (100)	0.10	0.15
Dairy products	97.5 (117)	95.4 (125)	0.79	0.50
Flesh meat	91.7 (110)	90.8 (119)	0.41	0.83
Eggs	77.5 (93)	60.3 (79)	25.74	0.01**
Vitamin A rich fruits and veg	96.7 (116)	95.4 (125)	0.55	0.75
Other fruits and veg	96.7 (116)	95.4 (125)	0.55	0.75

Note level of significance based on chi-square test (x^2) is p value <0.05. **used for p<0.01 and * for p<0.05. The figures in bracket are 'n' with N=141 in the control group and N=137 in the intervention group. The figures outside bracket represent the % within the group. Veg=vegetables. CG=Control group. IG=Intervention group.

Table 8.4: Level of involvement of fathers in complementary feeding

Variable	IG % (n) (N=137)	CG%(n) (N=141)	Chi-square	
			χ^2	<i>p</i>
Decision making on complementary feeding				
Decision on time to start complementary feeding	70.1 (96)	23.5 (33)	31.6	0.02*
Frequency of feeding child	80.4 (110)	19.7 (28)	38.7	0.01*
Variety of foods given	78.2 (107)	18.7 (26)	39.1	0.00**
Other forms of support				
Participate in child feeding	51.6 (71)	47.1 (67)	2.05	0.11
Assist in household chores	73.7 (101)	66.3 (94)	1.27	0.32
Provide information about complementary feeding.	79.6 (109)	11.8 (17)	37.6	0.01*
Buying food for the child	93.6 (128)	88.6 (125)	0.90	0.63

*Note level of significance based on chi-square test (χ^2) is *p* value <0.05. **used for *p*<0.01 and * for *p*<0.05. The figures in bracket are 'n' with N=141 in the control group and N=137 in the intervention group. The figures outside bracket represent the % within the group. CG=Control group. IG=Intervention group.*

Table 8.5: Multiple linear regression analysis of variables on father involvement associated with minimum acceptable diet

Variable	B	SE	t	p
The final decision on time to start complementary feeding	7.04	0.73	9.62	0.02*
The decision on frequency of feeding the child	0.63	0.20	-9.51	0.01*
The decision on the variety of foods given to the child	6.18	0.26	-0.24	0.03*
Provision of appropriate information on complementary feeding	0.01	0.01	9.64	0.00*
Parity	0.31	0.40	-0.29	0.72
R ²	0.73			
Adjusted R ²	0.72			
F value	35.03			
F significance	0.01			

*Note level of significance based on multiple regression analysis is p value <0.05. * used for P<0.05; B=Beta, measure of how strongly each predictor variable influences dependent variable, SE=Standard error.*

CHAPTER NINE

GENERAL DISCUSSIONS

9.1 Introduction

Improving infant feeding practices in children 0–12 months of age is critical to improved nutrition, health and development (WHO, 2008). According to Kenya Demographic and Health Survey conducted in 2014, 61% of children were exclusively breastfed for the first 6 months of life (KNBS and ICF Macro, 2014). However, this is still lower than the recommended coverage of 90% (Jones *et al.*, 2003). Complementary feeding practices are largely suboptimal, only 21% children age 6-23 months consume the minimum acceptable diet in terms of frequency and diversity (KNBS and ICF Macro, 2014).

Limited attention has been focused to fathers in the promotion of infant feeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Observational studies point towards a positive correlation between the support of the male partner and the likelihood of continuation of breastfeeding (Abbass-Dick and Dennis, 2017; Bennett *et al.*, 2016). Many of the studies about engaging men in breastfeeding promotion and support were in higher-income countries and are thus of unknown relevance to low and middle income countries (Abbass-Dick and Dennis, 2017; Brown and Davies, 2014; Maycock *et al.*, 2013). There are few studies that have involved fathers directly in infant feeding research in Africa and Kenya in particular. Most studies have focused on the mother (Thuita, 2008) and few have engaged men facilitators to act as agents of change (Martin *et al.*, 2009).

Randomized control studies have been recommended as ideal in determining the effectiveness of interventions which target breastfeeding (Lumbiganon *et al.*, 2011; Mitchell-Box *et al.*, 2013). Interventions targeting the father have consisted of Information-Education-Communication methodologies including; face-to-face discussions, power-point presentations, usage of brochures, usage of models, leaflets, and electronic media. In three studies (Su *et al.*, 2016; Sahip *et al.*, 2007; Raeisi, 2014) the

intervention was done during the antenatal period. In two studies (Özlüses *et al.*, 2014; Maycock *et al.*, 2013) the intervention started in the antenatal period and extended in to the neonatal period. In three studies (Susin and Giugliani, 2008; Pisacane *et al.*, 2005; Abbass-Dick, 2015), the intervention was done in the neonatal period.

To improve infant feeding practices during this critical period of growth and development, fathers' support in infant feeding process should be investigated to provide information necessary for focused and appropriate interventions. The study was a randomized control trial that aimed to assess the effect of father targeted nutrition education on feeding practices, nutritional status and morbidity among infants in Kisumu East Sub County, Kenya. This chapter summarizes the findings and discussions in relation to status of father involvement, beliefs, practices and knowledge on infant feeding; nutrition education strategy employed; the effect of the nutrition education intervention strategy with father involvement on improvement of infant feeding practices; and the effect of father involvement in infant feeding on nutritional status and morbidity among infants 0-12 months.

9.2 The status of father support, beliefs, practices and knowledge on infant feeding in Kisumu East Sub County, Kisumu County.

Fathers' knowledge of breastfeeding was assessed pre and post intervention. Pre-intervention, fathers' knowledge on breastfeeding was low on aspects of exclusive breastfeeding, similar to results of a cross-sectional study done involving 143 fathers at health centers in the region of North Portugal indicating a significant lack of breastfeeding knowledge among fathers during pregnancy (Cardoso *et al.*, 2017). Post-intervention, a chi-square test showed significant differences between knowledge levels on initiation of breastfeeding within an hour of birth, knowledge levels on continuation of breastfeeding for 2 years and beyond and knowledge levels on exclusive breastfeeding between the intervention and control group. Evidence has shown that a simple educational intervention can increase the level of the fathers' knowledge about breastfeeding (Cardoso *et al.*, 2010).

Regarding beliefs about breastfeeding, several studies made note of the concern fathers have about breastfeeding in public, terming it as inappropriate (Henderson *et al.*, 2011; Freed *et al.*, 1992; Shepherd *et al.*, 2000). Breastfeeding in public was also a concern of the fathers involved in this study as evidenced by statements from FGDs conducted in which the fathers felt it was not acceptable for mothers to breastfeed in public as she is exposing her breasts and can invite a curse to the child resulting in poor growth. This can be a pointer on the need to create breastfeeding spaces for mothers in public areas such as market places, workplace and hospitals to ensure there is a supportive environment to support breastfeeding.

On the subject of practices on breastfeeding, fathers in the intervention group stated that most infants are introduced foods early in the community but for them, since they had been taught the importance of exclusive breastfeeding for the first 6 months, they tried to ensure this is done. Furthermore, the fathers supported the mothers by preventing stress so as to ensure she was able to produce enough milk by helping out with household chores and taking care of the older children. The fathers were able to encourage the mother to continue breastfeeding as recommended for the baby to benefit from the breastfeeding process. In the control group, fathers responded that infants are well breastfed in the community up to 3 months of age then they are introduced to other foods. In addition, they reported that breastfeeding continues until one year of age after which it should be stopped as the child is now grown up and can walk.

Fathers' role in the infant feeding process is important. A lack of familial support, particularly from fathers, has been identified as a barrier to breastfeeding (Van Wagengen, 2015). Fathers' provision of practical support for their breastfeeding partners is critical in promoting breastfeeding, supported by findings from the present study as identified by fathers in the FGDs and in other studies (Deave and Johnson, 2008; Sherrif and Hall, 2011; Sherrif *et al.*, 2009). In addition, fathers' role in providing emotional support and encouragement was viewed as valuable in this study, similar to another study done in the United States which proposed that fathers' empathy for their partners during the

breastfeeding experience was critical to success (Avery and Magnus, 2011). In the present study, it was noted that fathers in the intervention group reported more roles that they played in the infant feeding process than fathers in the control group, which could be a pointer on the application of knowledge gained by fathers in the intervention group on infant feeding support.

9.3 To develop and test a father targeted nutrition education program in Kisumu East Sub County, Kisumu County.

A cross-sectional study done in Brazil that assessed paternal breastfeeding knowledge during pregnancy showed a lack of breastfeeding knowledge among the fathers with a specific knowledge deficit on how to manage breastfeeding complications, promote lactation and assure proper latch (Cardoso *et al.*, 2017). This is similar to our study findings on fathers' low knowledge levels on infant feeding based on the pre-test results. The results of our study show an increase in knowledge on infant feeding by fathers in the intervention group based on the nutrition education received prenatally. This could be a pointer that nutrition education strategy involving the father positively impacts on their knowledge levels. The father's education about the benefits of breastfeeding has an impact on the number of mothers choosing to breastfeed with recommendations that this education should take place during the antenatal period and the baby's first quarter (Arora *et al.*, 2000). Indeed, a control trial that assessed father's role in breastfeeding promotion affirmed the need for paternal education (Pisacane *et al.*, 2005).

The nutrition education sessions took place in a classroom setting prenatally with the researcher and trained nutritionists conducting the education sessions within the hospital setting. This is different from another study done in Italy in which nutrition education targeting the father took place postnatal with the use of a midwife within a hospital setting ((Pisacane *et al.*, 2005). However, based on the delivery of information on breastfeeding in the study done in Italy, significant improvements in breastfeeding rates were shown ((Pisacane *et al.*, 2005). This is a pointer to the opportunity that health professionals can utilize within hospital settings to educate the fathers on infant feeding which can be a cost-

effective channel of reaching the fathers. In fact, our study reported that a majority of the fathers reported receiving new information during these visits and they found the information relevant.

9.4 The effect of the father targeted nutrition education intervention strategy on improving infant feeding practices in Kisumu East Sub County, Kisumu County.

Breastfeeding support provided by the father has been shown to have a strong influence on the initiation and duration of breastfeeding. Our study findings indicate that the father plays an important role in breastfeeding outcomes at the early stages, with more mothers in the intervention group practicing early initiation compared to the mothers in the control group. The findings are similar to that of a previous study done in Italy which tested the effectiveness of a 2-hour class delivered to fathers on breastfeeding promotion, where breastfeeding was initiated by 74% of women whose partners attended the intervention class as compared with 41% of women whose partners did not receive the intervention (Susin and Giugliani, 2008). A similar study in the United States also reported an increase in early initiation rate from 71 to 76% to 83% in three months following dissemination of breastfeeding information to the fathers (Schmidt *et al.*, 2000).

In this study, more mothers in the intervention group reported receiving support from the father towards breastfeeding compared to the mothers in the control group. This was consistent with previous studies, which reported that father's supportive actions remove stressors so that the mother is enabled to breastfeed successfully (Arora *et al.*, 2000; Kenosi *et al.*, 2011). In fact, a study in Australia showed that mothers whose husbands received breastfeeding education before the birth, liked breastfeeding the most and were supported the most by their husbands (Tohotoa *et al.*, 2009).

In our study, mothers in the intervention group were able to identify more positive support that they had received from the father compared to the mothers in the control group, possibly as a result of the fathers' having participated in the nutrition education sessions and gaining knowledge on breastfeeding and what role they can play. Similar study in

Brazil has also reported that fathers may provide support to breast-feeding mothers by relating information learned in the intervention to breast-feeding mothers (Susin and Giugliani, 2008).

The fathers in our study who received the nutrition education sessions reported confidence on the support they can provide to the mother during lactation. This was in agreement with a study in Italy that found that the support given to fathers by educating them on the recommended practice of breastfeeding increased breastfeeding rates at six months (25% in the intervention group and 15% in the control group) (Pisacane *et al.*, 2005). Findings also from randomized control trial studies show that targeted educational interventions for fathers can be associated with higher rates of breast feeding (Maycock *et al.*, 2013; Susin and Giugliani, 2008). Indeed our study reported a significant difference in exclusive breastfeeding rates between the intervention and control group.

In our study, father-mother pairs were given nutrition education sessions at the hospital where the mother attends antenatal clinics. This is different from the norm since men as in many parts of Africa, do not generally accompany their partners for antenatal clinic visits as culturally this is seen as a female domain (Kakaire *et al.*, 2011; and August *et al.*, 2016). This is further supported by qualitative findings from this study in which the fathers mentioned that it was hard to participate in antenatal clinic visits as sometimes no attention is paid to them, they are busy with work and they feel culturally it is not suitable for a man to be seen going to the clinic. This indicates the need to make deliberate efforts to reach the fathers during the antenatal clinics so they can be part of the process and can get information to provide a supportive role.

In our study, mothers cited various types of support they received from the fathers. Provision of food for the child was cited as a major support by mothers both in the intervention and control group. These results agree with that of another study done in Kenya which described the key role of fathers in child feeding as provision of food for the family (Thuita *et al.*, 2015). In our study, mothers in both groups reported receiving assistance from the fathers with housework as an important form of support with infant

feeding. These findings are consistent with that of a qualitative study conducted in Australia which sought to identify perceptions of what constitutes paternal support and assistance with housework was identified as one form of support (Maycock *et al.*, 2013).

In our study, fathers in the intervention group were more involved in decision making on when to start complementary foods, frequency and variety of foods to be given, which was contrary to fathers in the control group. These findings could be attributed to the fact that fathers in the intervention group had information that made them more involved while fathers in the control group probably still held on to the cultural norm that child feeding is a mother's responsibility. Another study done in Ethiopia to increase male participation in child feeding (Dewey and Begum, 2011) and an assessment of male's participation in infant and young child feeding in Kenya (Thuita *et al.*, 2015) agree that men participate less in decision-making for child feeding.

Most of the mothers from the intervention group in our study cited motivation and information regarding infant feeding as a key support they received from the father. In addition Minimum acceptable diet achievement was also noted to be more significant among the intervention group. This could be an indicator that nutrition education to the fathers had an influence on infant feeding practice. Findings of positive emotional support by this study is consistent with the findings of a previously conducted qualitative study that described the primary fathering role as that of supporting infant feeding by using their knowledge to encourage and assist mothers in infant feeding (Rempel and Rempel, 2011). Another study reports that mothers with partners who were verbally encouraging of breastfeeding were more compliant to the recommended infant feeding practices (Mannion *et al.*, 2013).

9.5 The effect of father involvement in infant feeding on nutritional status and morbidity among children 0-12 months in Kisumu East Sub County, Kisumu County.

Majority of the infants in the study had a normal weight-for-age, length-for-age and weight-for-length z-scores. Overall, stunting rates were higher than underweight and wasting rates in both groups similar to findings of the Kenya demographic health survey in which more children were stunted than wasted and underweight in Kisumu County (KNBS and ICF Macro, 2014). In our study, under nutrition was observed in the infants as early as at 3 months of age. This was similar to results from a Malawian study which showed that infants that were commenced early on complementary feeds progressively had lower weight for age from as early as 2 months (Kalanda *et al.*, 2006), validating the benefit of exclusive breastfeeding. In the present study, nutritional status was poor in children who had fewer meals and less diverse diets especially at 9-12 months of age. Indeed, it is at this age that significantly more children in the control group were found to be wasted and underweight. Hence the differences in the nutritional status in the intervention and control group could be attributed to the increased knowledge received by the fathers on infant feeding and consequently better involvement in infant feeding. Moreover, the importance of male involvement in health and nutritional matters has been emphasized in other studies (Johansson *et al.*, 2011; Saha *et al.*, 2011).

Based on our study, less children in the intervention group had morbidities such as diarrhea, ARI and fever compared to children in the control group. It appears that nutrition education provided to the fathers in the intervention group could have played a positive role in ensuring children in the intervention group were fed as per WHO recommendations and consequently experienced less episodes of disease. Exclusive breastfeeding rate was also significantly higher in the intervention group than in the control group in our study. Lower morbidity and mortality from diarrhea as a result of exclusive breastfeeding has been reported in various studies too (Bhandari *et al.*, 2003; Jones *et al.*, 2003). In fact non-exclusively breastfed infants had a significantly higher prevalence of diarrhea in our study

compared to exclusively breastfed infants which is in agreement with scientific evidence from Bangladesh which found out that infants exclusively breastfed for six months had a significantly lower 7-day prevalence of diarrhea than infants who were not exclusively breastfed (Seema *et al.*, 2008).

In our study, better infant feeding practices were observed in the intervention group where mothers had reported receiving more paternal support and consequently better nutrition outcomes were observed. Similarly, a study done in South Africa reported children whose fathers did not provide their family with financial support were found to be at higher risk of malnutrition (Madhavan and Townsed, 2007). A Peruvian study reported lower height-for-age Z-scores among children who did not see their fathers regularly during their infancy compared to children who saw their fathers regularly, after adjusting for other contextual factors (Dearden *et al.*, 2013). Furthermore, a sub-Saharan Africa study found higher odds of stunting among children of single mothers compared to children whose mothers were in union (Noimo and Odimegwu, 2014). These studies indeed validate the importance of male involvement in the wellbeing of the child.

9.6 Limitations

There are many other factors that have been identified to influence nutritional status and infant feeding practices which may have been confounding factors in this study. However, the confounders were minimized through randomization of study participants. In addition, baseline characteristics of the study participants' pre and post intervention were similar except one variable, parity. The variable was included in the multiple regression model when assessing for predictors of infant feeding and was found not to contribute significantly to the model. Hence, the positive results obtained on infant feeding may be attributable to the effects of the nutrition education intervention.

The intervention ran for only 12 months. If more time were available, we may have had a greater impact on mothers' practices of feeding their next child. Behavior change strategies take time, attempting to affect these practices in a short period may require more

intensive education and actions involving the wider sphere of influencers. After the initial intervention, there may be a greater impact on a mother's next child.

Though this study draws upon literature from other countries, the analysis does not take into account possible cultural similarities and diversities with regards what constitutes father support. Hence, further research that includes testing an international model of father support relating to infant feeding which could build on and expand the findings reported here, paying particular attention to the cost-benefit analysis to investigate the cost-effectiveness of the classroom based nutrition education strategy and to ascertain the feasibility of implementing it in various circumstances.

9.7 General Conclusion and Recommendations

9.7.1 Conclusions

The fathers had low knowledge levels on infant feeding at baseline. However, with nutrition education to the intervention group there was increase in knowledge gained though with more support required on complementary feeding. The null hypothesis that nutrition education targeting the father incorporating information on male involvement does not significantly increase their knowledge on infant feeding practices was thus rejected. When fathers are provided with knowledge on infant feeding, they are well equipped to play a more supportive role in infant feeding. Breastfeeding in public was regarded as inappropriate by fathers tied with cultural beliefs that exposure of the breast and the child breastfeeding could result to a curse. Perceptions around infant feeding practices changed between the intervention and control group, the fathers in the intervention group reported aligning themselves to the World Health Organization recommended infant feeding practices based on the nutrition education received. The nutrition education strategy was deemed as relevant by the fathers in the intervention group and they cited receiving new knowledge. There was significant increase in the average score following the pre-test and posttest assessments done. The null hypothesis

that father's support, beliefs, practices and knowledge on infant feeding does not significantly improve through nutrition education was thus rejected.

Nutrition education targeting the father helps them to play a more supportive role which positively impacts on breastfeeding practice with significant differences observed on early initiation and exclusive breastfeeding between the intervention and control group. Conducting the nutrition education sessions prenatal contextualized to the local language with practical information on what role fathers could play was able to influence positively on early initiation, exclusive breastfeeding and complementary feeding practices for the intervention group. The null hypothesis that nutrition education targeting fathers has no significant contribution to the improvement of infant and young child feeding practices was thus rejected.

Lower significant values were observed in terms of morbidity and malnutrition rates in the intervention group as compared to the control group. The null hypothesis that nutrition education targeting fathers has no significant contribution to the improvement of nutritional status and morbidity among children 0-12 months was thus rejected. Father support in infant feeding was high in the intervention group compared to the control group. More mothers in the intervention group reported receiving support from the father in terms of motivation and information, practical support with house chores and taking care of older children as well as decision making on infant feeding practices which contributed as success factors to breastfeeding and complementary feeding practices.

9.7.2 Recommendations

- Health education at the health facility level should move beyond a woman-centered approach to engaging key household influencers by providing education and encouraging “doable” actions to improve infant feeding practices. Engaging fathers who are key influencers of mothers’ infant feeding practices can increase support for recommended practices.

- There is need for more focus in education on complementary feeding as children were not being given diverse diets due to lack of know-how on how to modify food for ease of child consumption at different age groups such at 6-8 months and at 9-12 months. Cooking demonstrations can be practical channels to reach the father.
- Breastfeeding in public was reported as not appropriate. Policy on creating of breastfeeding spaces at the workplace and in public areas to support breastfeeding mothers is key.
- Study participants reported that sickness such as HIV can be a barrier to breastfeed. Laws that ensure protection against breast milk substitutes and prosecution when there are violations are necessary to ensure mothers are not communicated to that formula milk is the better option when she is HIV positive. This will ensure mothers are supported to get adequate information that enables them provide the best nutrition for their infants.
- Future studies should use a family-centered approach that engages all key family members (i.e., mothers, fathers, and grandmothers) in tailored activities to practice and support infant feeding recommendations.
- Research that includes testing an international model of what constitutes father support relating to infant feeding with particular attention to the cost-benefit analysis of channels of communication to reach the father.

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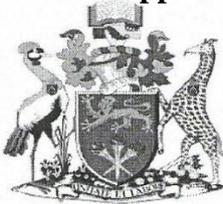
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APPENDICES

Appendix I: Ethical Clearance



UNIVERSITY OF NAIROBI
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Ref: KNH-ERC/A/438

Lynette Aoko Dinga
AG422-6475/2014
Dept. of Food Science, Nutrition and Technology
Faculty of Agriculture
JKUAT

Dear Lynette

Research proposal: Influence of nutrition education on fathers' participation in promoting infant nutrition practices in Kisumu East sub country, Kisumu county (P533/08/2015)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval periods are 28th October 2015 – 27th October 2016.

This approval is subject to compliance with the following requirements:

- Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
- Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
- Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
- Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
- Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

"Protect to Discover"



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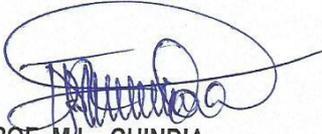
Tel: 726300-9
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Telegrams: MEDSUP, Nairobi

28 October 2015



For more details consult the KNH/UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'M.L. Chindia', enclosed within a large, loopy oval shape.

PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
Supervisors: Dr. Beatrice N. Kiage, Dr. Florence Kyallo

Appendix II: Consent Form

This Informed Consent Form is for men and women who attend clinic at Kisumu County Hospital, and who are invited to participate in research on influence of nutrition education on fathers' support in promoting infant nutrition practices.

(Ma endi en form ma kwayo yie mar mine kod wuone mabiro e ospital mar Kisumu, County, ma okwa mondo ondonjie e nonro mangiyo kaka puonjo mar wuone e weche mar chiemo mar nyathi nyalo konyo mondo nyathi obedi gi ngima maberi).

Name of Principal Investigator: Lynette Aoko Dinga

Name of Institution: Jomo Kenyatta University of Agriculture and Technology

Name of Sponsor: DAAD

This Informed Consent Form has two parts:

Information Sheet (to share information about the research with you)

Certificate of Consent (for signatures if you agree to take part)

You will be given a copy of the full Informed Consent Form *(ibiro miyi kopi mar kwayo mar yie mari)*.

PART I: Information Sheet

Introduction

I am Lynette Aoko Dinga, student at Jomo Kenyatta University of Agriculture and Technology. I am doing research on influence of nutrition education on fathers' support in promoting infant nutrition practices. I am going to give you information and invite you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research. There may be some words that you do not understand. Please ask me to stop

as we go through the information and I will take time to explain. If you have questions later, you can ask them as well.

(An Lynette Aoko Dinga, an japuonjre e mbalarieny mar Jomo Kenyatta University of Agriculture and Technology. A timo nonro e weche mag puonj mar wuone kaka nyithindo onego chiem mondo ngima nyithindo othi maber. Abiro miyi weche ko luore gi nonro ni kendo abiro kwayi ni mondo ibede achiel kuom jok mabiro konyo wa e nonro ni. Ka pok iyie, to inyalo wuoyo gi ngatangata kuom nonro ni. Nitiere weche moko ma samoro ok inyala ngeyo. Inyalo kwaya mondo achungi ka wadhi mbele kod wach kendo abiro kawo thwolo mondo alerni. Ka in kod penjo bange to inyalo mana penjo).

Purpose of the research

Young child feeding practices have been poor in Kenya. Exclusive breastfeeding rates are low for children under 6 months. Few mothers initiate breastfeeding within an hour of giving birth, while many give foods or liquids other than breast milk to their babies at birth. Moreover, introduction to semi-solid and solid foods is done quite early. All these factors lead to children who don't grow well as they should with some being too thin for their height or too short for their age. Most community programs seeking to improve the wellbeing of women and children target mothers and their children. Male involvement with child care is poor in most communities despite them being very influential in decision making at the household level. Therefore, the reason I am doing this study is to find out if men are involved through educating them on good feeding practices for the young child they can play a supportive role in improving young child feeding practices.

(E piny Kenya kae, iyudo ni nyithindo ok mi chiemo kaka oluore. Nyithindo man gi duache ouchiel ka dok chien ok mi cha min kende. Iyudo ni mine matin ema dhodho nyathi bang ndalo matin ka nyathi osenywole. Mine mangeny miyo nyithindo maosenywol chiemo kata pi. Ngeny ma nyithindo matin iyudo ka ichako migi chiemo chon. Magi te miyo nyithindo matin kiko bed gi ngima maber. Nyithindo moko iyudo ni dendgi orumo to moko chiek molo igegi. Kony motenore gi wach ni dingeny imiyo ga mine gi nyithindo to wuone owe e bathe to gimbe ginyalo konyo wachni ahinya. Koro nonro ni dwa ngiyo ni be ka wapuonjo wuone e wach chiemo mar nyathi matin ka onyalo konyo e wach no e dala ne).

Type of Research Intervention

This research will involve: an interview; a workshop where participants will be educated on good young child feeding practices and four follow up visits to assess the progress of the young child. Weight and length measurements will be taken for the young child during the follow up visits.

(Nonro ni wan wantie gi duoko penjo, puonjo mar kaka nyathi matin onego chiem to anwalu kaka ngima mar nyathi dhi. Nyathini wabiropime kilo gi bor ne be. Magi te wan watim dingwen).

Participant selection

You have been selected by chance among other participants to participate in this study. This study is targeting women 6 months pregnant and their husbands who are attending clinic at Kisumu county Hospital.

(Yero mari notimore gi hawi mondo ibed e nonro ni. Nonro ni dware mine mayach ma osehopo duache ouchiel gi wuon nyathi ma dhi e clinic Kisumu County Hospital).

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. You may change your mind later and stop participating even if you agreed earlier.

(Bedo mari e nonro ni en yiero mari. In emaiwacho ka idware bedo e nonro ni koso okidwar. Kaiyie bedo enonro ni kata idagi to onge lokruok moro amora ma birotimore ni kuom yudo konyruok manyocha iyudo e clinic ni. Inyalo wilo pachi bang'e kata ka nise yie mokwongo).

Procedures and Protocol

Because we do not know if giving fathers' information on good infant feeding practices is better than the current practice of giving information to only the mothers, we need to compare the two. To do this, we will put people taking part in this research into two groups. The groups are selected by chance, as if by tossing a coin.

Participants in one group will receive information on good feeding practices in a classroom setting while participants in the other group will not receive the same information in a classroom setting. If there is anything you are concerned about or that is bothering you about the research please talk to me or one of the other researchers).

(Nikech okwangeyo ka miyo wuone wach mo tenore gi chiemo mar nyathi ber molo miyo wachni mine kende wabiro pogo ji ma biro bet e nonro ni diriyo. Koma ngato biro dhie biro bet apoya chal ka gima diro pesa mar chuma. Jo ma biro thi kon machiel wabiro puonjo gi weche chiemo mar nyathi matin. Jo mabiro kon machielo okwabipuonjo. Ka nitie gima chando pachi inyalo loso koda koso ngatomoro ma otenore gi nonro ni).

Description of the Process

During the research:

In the first meeting, you will be asked some questions on your pregnancy, contacts, marital status, intention to breast feed, knowledge on young child feeding practices.

In the second meeting, if you are in the intervention group, you will be invited to participate in classroom training on good feeding practices for the young child together with your husband. If you are not in the intervention group, no meeting will take place.

In the third, fourth, fifth and sixth meeting, follow up will be made through household visit if you are in the intervention group or not. You will be asked some questions on the feeding practices of your young child and any illness experienced. Weight and height measurements will be taken of your young child. The third meeting will occur within 3 weeks of giving birth, the fourth meeting will occur within 2 weeks of your child turning 3 months, the fifth meeting will occur within 2 weeks of your child turning 6 months and the sixth meeting will occur within 2 weeks of your child turning 9 months.

In the sixth meeting in which your child will have turned 9 months, you shall be done an exit interview which will also be the last meeting and end of your participation in the study.

(E romo mokwongo, anepenji ka in mayach, namba mar simu, konywomi, ka ibiro dhodho nyathini gi gima ingeyo e wach chiemo mar nyathi matin. E romo mar a rio ka ine kon ma ji biro puonj anelwongi ibie puonj in gi jaodi. Ka intie kon ma ji okyudi puonj onge romo marario mabiro timore. E romo mar a dek, angwen, abich gi auchiel, lime biro timo re e dala ni kuom ji te to ane penji penjo motenore gi chiemo mar nyathi matin to be ka nitie touché moro mora ma nyathini oyudo. kilo gi bor nyathi anakau. Romo mar adek biro timore wige adek bang nywol nyathi, romo mar angwen biro timore bang wige ario ka nyathi osechopo duache adek, romo mar abich biro timore wige ario bang nyathi kosechopo duache auchiel to romo magik biro timore wige ario ka nyathi osechopo duache ouchiko. E romo mar auchiel anewa penji penjo moko esto mano biro tieko wachni gi nonro ni).

Risks

There are no anticipated risks with being part of this study. *(ok ne rach mora mora ma ibiro yudo kuom tenori gi nonro ni).*

Benefits

There may not be any benefit for you but your participation is likely to help us find the answer to the research question. There may not be any benefit to the society at this stage of the research, but future generations are likely to benefit.

(Tenori gi nonro ni biro konyo wa yudo duoko mar penjo motenore gi nonro ni. Onge ber minyalo neno sani to nyithindo mabiro e igni mabiro biro neno ber mo ae nonro ni).

Reimbursements

You will be given kshs 500 per household to pay for your travel to the clinic on the day of the classroom training for those in the intervention group. You will not be given any other money or gifts to take part in this research.

(Wabiro miyi mia abich dala ka dala mondo ichul fare ni nyaka clinic mondo iyud puonj ka ine kon ma jo mabiro yudo puonj. Onge pesa kata gimoro kendo mane miyi mondo ibede nonro ni).

Confidentiality

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no-one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and will lock that information up with a lock and key.

(Wache mo tenore gi nonro ni wanakan maber to okwana ful ne ngato ni in ema iwacho weche gi. Nyingi okwabiro kawo mana namba ma omiyi to onge ngama biro ngeyo ni namba ni en mar nga).

Sharing the Results

The knowledge that we get from doing this research will be shared with you through community meetings before it is made widely available to the public. Confidential information will not be shared. There will be small meetings in the community and these will be announced. After these meetings, we will publish the results in order that other interested people may learn from our research.

(Weche ma wabiro yudo e nonro ni wabirongisi ka waromo e chokrwok mabiro timore e gweng ni ka pok wangiso jomoko. eche moluwore gi weche mainkendi ema inngeyo okwabifulo e chokruok no. Weche mawayudo wbiro keto e buge mondo joma dware puonjore gi wach ni nyalo puonjore).

Who to Contact

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact the nutrition officer at Kisumu County Hospital or the Medical superintendent office.

(Ka in gi penjo inyalo penjo sani kata seche moko ka nonro osechakore. Ki dwaro penjo penjo moro to inyalo loso gi jatich ma nutrition mantie Kisumu County Hospital kata ofis mar Medical superintendent).

This proposal has been reviewed and approved by the Ethics Review Committee KNH/UoN-ERC, which is a committee whose task it is to make sure that research participants are protected from harm. You can contact them through phone: (254-020) 2726300 Ext 44355 or 726300-9 email: uonknh_erc@uonbi.ac.ke

(Nonro ni ongi gi jo Ethics Review Committee KNH/UoN-ERC, ma tij gi en ngiyo ni jomaobede nonro mora mora ok hinyore e yo mora mora. Inyalo gocho ne gi koso oro ne gi barua e (254-020) 2726300 Ext 44355 or 726300-9 uonknh_erc@uonbi.ac.ke).

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

(Asomo weche maondik kae kata osomna go. Abedo kod thuolo mar penjo penjo kendo penjo ma apenjo oduoka e yoo mowinjore kendo moromo. Ayie bedo e nonro ni kuom dwaro mara)

Name of Participant (*nyingi*) _____

Signature of Participant _____

Date _____ Day/month/year

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

(An janeno ni ni weche ma otenore gi nonro ni osomne ng'at ma nigi thuolo mar bedo e nonro ni, kendo ng'at ni obedo gi thuolo mar penjo penjo ma ne engo. En adier ni ng'at ni oyie kende mondo obed enonro ni).

Name of witness _____ AND Thumb print of participant

Signature of witness _____



Date _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands what will be done.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Name of Researcher/person taking the consent _____

Signature of Researcher /person taking the consent _____

Date _____

Day/month/year

Appendix III: Baseline Questionnaire

Household Profile

<p>To be administered to the mothers and fathers in the study groups during enrolment into the study. The mothers should be 23-27 weeks pregnant (verify from clinic card)</p> <p>Questionnaire ID NO _____ Treatment group _____</p> <p>Interviewer code: _____ Date of Interview _____</p> <p>Respondent ref. no. _____ Respondent's spouse ref no. _____</p> <p>Village code _____</p>	
1.0	Age of mother in completed years (<i>mama ni gi igni adi?</i>) _____
1.1	Age of father in completed years (<i>baba ni gi igni adi</i>) _____
2.0	<p>What is the highest level of education attained by the mother? (<i>mama nochopo gi sombe kanye?</i>)</p> <p>1=None 2=Adult education 3=Primary level 4=Secondary level 5=College/University level</p>
2.1	<p>What is the highest level of education attained by the father? (<i>baba nochopo gi sombe kanye?</i>)</p> <p>1=None 2=Adult education 3=Primary level 4=Secondary level 5=College/University level</p>
3.0	<p>How many people including children currently live in your household? (<i>ji adi emaodak to chiemo e odu ni?</i>).....</p> <p>Definition of household People who eat from the same pot</p>
4.0	<p>What is the occupation of the mother? (<i>mama timo tich mane?</i>)</p> <p>1=Salary employment 2=Wage/casual labour 3=Livestock herding, 4=Farmer 5=Small business/ Petty trade 6=Other (Specify) _____</p>

4.1	What is the occupation of the father ? (<i>baba timo tich mane?</i>)	1=Salary employment 2=Wage/casual labor 3=Livestock herding, 4=Farmer 5=Small business/ Petty trade 6=Other (Specify)_____
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History of pregnancy

1.0 How many children have you given birth to? (*isenywolo nyithindo adi?*)

1.1 How many of them are still alive? (*gite gintiere?*) _____

1.2 Age of pregnancy in completed weeks? _____ (check from card date of last monthly period [LMP] and expected date of delivery [EDD])

Date of last LMP _____; Date of EDD _____

1.3 At what age of pregnancy did you start attending clinic (ANC) (*nichako thi e clinic ka in gi duache adi?*)? _____ (enter age of pregnancy in weeks)

1.4 How many times have you attended the clinic during this pregnancy (*isedhi clinic didi nyaka ichak bedo mayach?*)

1=Once

2=Twice

3=Thrice

4=Other (specify) _____

Knowledge on IYCF

1	At what age should solid/semi-solid foods be introduced to children (<i>nyathi ichako miyo chiemo mopogore gi dhoth ka en gi ndalo/duache/igni adi?</i>)DaysWeeks MonthsYears
---	--	---

2	For how long should a child be breastfed (<i>nyathi onego mi dhuno nyaka ochop iga/duache/ndalo adi</i>)?MonthsYears
3	Can a baby survive on breast milk alone without even water (<i>be nyathi nyalo dak gi cha min kende ma onge kata pi</i>)?	1= YES 0= NO 8= DON'T KNOW
4	If YES, for how long (<i>ki ye to ndalo/duache/iga adi</i>)?HOURSDAYSWEEKSMONTHS
5	How soon after birth should a baby be put to the breast if the delivery is normal and the baby and mother are well (<i>nyathi onego kete e thuno ka ose onywole bang seche/ndalo adi ka min gi kod nyathi ngima to mama be onywolo maonge pala</i>)?	Number of hours..... Number of days..... DNK
6	What should be given to the baby immediately after birth (<i>nyathi onego mi ango bang kosenywole</i>)?	1= Breast milk 2= Animal milk 3= Plain boiled water 4= Sugar and salt solution 5= Ghee 6= Other (specify).....
7	What in your opinion are the benefits of exclusive breastfeeding to the baby (if any) (<i>kwom pachi ber mane mantie ka nyathi dhoth kende ma onge chiemo duache auchiel mokwongo</i>)?	1= Protects the baby's health 2=Ensures relationship between mother and baby 3= Perfect food for the baby 4= makes baby happy 5= helps child to grow 6=DNK

		7= Others (Specify).....
8	What are the sources on information on child feeding in this community (<i>ere kuonde ma uyudo weche motenore kod chiemo mar nyithindo e gweny ni</i>)?	1= No where 2=Health facility 3=Community Health worker 4=TBA 5=Relatives/friends/neighbours 6=Mother/mother in law 7=Spouse/father of child 8=Other (specify)..... Multiple Responses
9	From where have you received information on child feeding (<i>ere kama iseyudo e weche mag chiemo mar nyithindo matindo</i>)?	1= No where 2=Health facility 3=Community Health worker 4=TBA 5=Relatives/friends/neighbours 6=Mother/mother in law 7=Spouse/father of child 8=Other (specify)..... Multiple Responses
10	Who makes the decision on how your child should be fed (<i>ere ngama ngado wach kuom gima nyathi chamo e od ni</i>)?	1= Myself 2= Spouse 3=Mother in law 4=Grandmother 5= TBA 6=Other (specify)..... Multiple Responses

Appendix IV: Questionnaire for First Interview

(To be administered to all the mothers in the study groups the first month post-partum)

Questionnaire ID NO _____ Treatment group _____

Interviewer code: _____ Date of Interview _____

Respondent ref. no. _____ Respondent's spouse ref no. _____

Village code _____

Baby Bio-data

a. Sex of baby (*nyathi ni en woi koso nyako*)? 1=Male 2=Female

b. Date of birth _____ (check card)

c. Age of baby in days (*nyathini en gi ndalo adi*)? _____

d. Birth weight (check card if available, if home delivery indicate so) (*nonywole gi kilo adi*)? _____

e. Position of the baby in the family (*mae nyathini mar adi*) (1st, 2nd born etc.) _____

Feeding questions			
N	Questions and filters	CIRCLE RESPONSES	Skip
1	Did you ever breastfeed your child (<i>be isemiyo nyathini thuno</i>)?	1= YES 0= NO	If NO, go to 7
2	How long after birth did you first put your child to the breast (<i>ka osenywole, ni keto nyathini e thuno bang seche adi</i>)? IF LESS THAN 1 HOUR, RECORD '00' HOURS. IF LESS	HOURS _ _ DAYS _ _	1 2

	THAN 24 HOURS, RECORD THE NUMBER OF HOURS. OTHERWISE, RECORD THE NUMBER OF DAYS.		
3	During the first three days after delivery, did you give your child the liquid that came from your breasts (<i>ndalo madek mokwongo bang nywolo nyathe tini, nimiye pi ma aye thuno</i>)?	1= YES 0= NO 8= DON'T KNOW	
4	In the first three days after delivery, was your child given anything to drink other than breast milk (<i>ndalo madek mokwongo bang nywolo nyathini, no omiye gimoro ma pogre gi chak min</i>)?	1= YES 0= NO 8= DON'T KNOW	If NO or DON'T KNOW, go to 6
5	What was the child given to drink (<i>ne nyathi omi ango mondo mathi</i>)? Anything else (<i>moro kendo</i>)? DO NOT READ THE LIST RECORD ALL MENTIONED BY CIRCLING LETTER FOR EACH ONE MENTIONED	1=Milk other than breast milk 2=Plain water 3=Sugar or glucose water 4=Sugar-salt-water solution 5=Fruit juice 6=Infant formula 7=Tea / infusions 8=Other (specify) _____	
6	Are you still breastfeeding your child (<i>pod ithotho nyathini</i>)?	1=YES 0= NO 8=DO NOT KNOW	

7	Now I would like to ask you about liquids or foods your child had yesterday during the day or at night (<i>koro adwaro penji gi ma nyathi no chamo kata no matho nyoro godiochieng nyaka otieno</i>). Did your child drink/eat (no <i>chamo kata omatho</i>): READ OUT THE FOODS/ LIQUIDS AND CIRCLE THE RESPONSES		
A	Breast milk? (<i>cha thuno</i>)	1= YES 0= NO	
B	Plain water? (<i>pi</i>)	1= YES 0= NO	
C	Commercially produced infant formula? (<i>Mamex, Nan, S26</i>) (<i>chak mantie mkembe</i>)	1= YES 0= NO	
D	Other milks: animal milk, reconstituted powdered milk (<i>chak moro mar dhiang, diel</i>)	1= YES 0= NO	
E	Sweetened flavoured juices	1=YES 0=NO	
F	ORS	1=YES 0=NO	
G	Tea/Coffee (<i>chae</i>)	1=YES 0=NO	
H	Porridge (<i>nyuka</i>)	1=YES 0=NO	
8	Did your child drink anything from a bottle with a nipple yesterday or last night (<i>nyathini ne omatho gimoramora ko ae chupa</i>)?	1= YES 0= NO 8= DON'T KNOW	
9	Can a baby survive on breast milk alone without even water (<i>nyathi be nyalo dak gi cha min gi kende</i>)? IF NO, END INTERVIEW	1= YES 0= NO 8= DON'T KNOW	

9 b	If YES, for how long (<i>onyalo dak ndalo/dueche/igni adi</i>)?HOURS	
	DAYS	
	WEEKS	
	MONTHS	

Fathers support

<p>Now I would like to ask you about support you received from the child's father towards breastfeeding after delivery(<i>koro adwaro penji ka entie kony mora mora mane iyudo kwom won nyathi bang nywol</i>)</p> <p>In the past 7 days, did you feel supported by the father of the child to breastfeed? 1=Yes 0=No</p> <p><i>Read out the options and circle the responses (score 0 is given when either item receives negative response, whilst score 1 only when all items received positive responses within category)</i></p>		
a.	<p>Household chores and responsibilities</p> <p>Laundry</p> <p>Bill pay</p> <p>Helps with cleaning</p> <p>Cooking</p> <p>Home maintenance</p> <p>Shopping</p> <p>Other (specify) _____</p>	1=Yes 0=No
b.	<p>Caring for the baby</p> <p>Helps change baby diapers</p> <p>Playing with the baby</p> <p>Putting the baby to sleep</p> <p>Soothing the baby</p> <p>Bathing the baby</p> <p>Other (specify) _____</p>	1=Yes 0=No

c.	Feeding the baby Involved in breastfeeding process Helps with positioning and latching Helps with burping and swaddling baby Other (specify) _____	1=Yes 0=No
d.	Caring for the mother Allows mother time to sleep rest, do other things, Allows mother break from baby, Helps with massages to increase milk flow, Buys or prepares healthy foods to support or increase milk production. Other (specify) _____	1=Yes 0=No
e.	Encouragement and motivation (one response qualify yes) Offers words of encouragement and motivation such as “you can do it”, “keep going”, “I’m proud of you” and practical support with breastfeeding challenges.	1=Yes 0=No
f.	Being in agreement (one response qualify for yes) Feels breastfeeding is a joint responsibility, agrees on breastfeeding method and decision	1=Yes 0=No
g.	Favourable environment (one response qualify for yes) Creates a relaxed and/or stress free environment for mother to breastfeed, keeps things positive and/or has a positive attitude about breastfeeding	1=Yes 0=No

Appendix V: Questionnaire for Second to Fourth Interviews

Questionnaire ID NO _____ Treatment group _____

Interviewer code: _____ Date of Interview _____

Respondent ref. no. _____ Respondent's spouse ref no. _____

Village code _____

Baby Bio-data

a. Sex of baby (*nyathini en nyako koso woi*) 1=Male 2=Female

b. Date of birth _____ (check card)

c. Age of baby in months (*nyathini en gi duache adi*) _____

Baby's anthropometric measurements (measured using digital bathroom scale and height board)

Weight (to the nearest 0.01Kg) _____ Length (to nearest 0.01 cm) _____

Feeding questions			
No	Questions	Responses	Skip pattern
1	Did you ever breastfeed your child (<i>be isemiyo nyathini thuno</i>)?	1= YES 0= NO	If NO, go to 3
2	Are you still breastfeeding your child (<i>pod idhotho nyathini</i>)	1= YES 0= NO	
3	Now I would like to ask about other liquids or foods that your child ate yesterday during the day and at night. I am interested in whether your child ate the item even if it was combined with other foods (<i>koro</i>)		Ask date of introduction of other liquids or foods as record here

	<p><i>adwaro penji gima nyathini no chamo kata omatho nyoro godiochieng nyaka otieno)</i></p> <p>DO NOT READ LIST (PROBE)</p>		
A	Breast milk (<i>cha min</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
B	Commercially produced infant formula(Nan, Mamex, S26) (<i>chak mantie mkebe</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
C	Other milks: animal milk, reconstituted powdered milk (<i>chak moro ka madhiang, diel</i>))	1= YES ; 0= NO; 8= DON'T KNOW	
D	Sugar and sweetened juices	1= YES ; 0= NO; 8= DON'T KNOW	
E	Eggs (<i>tong</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
F	Porridge made from CSB/UNIMIX or other flours (<i>Famila, white oats, millet</i>) (<i>nyuka</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
G	Flesh meats (meat soup, chicken, beef, goat, kidney, liver, fish (<i>ringo mar gweno, dhiang, diel, rech</i>))	1= YES ; 0= NO; 8= DON'T KNOW	

H	Legumes and nuts (<i>oganda, njugu, olayo</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
I	Dairy products (chak, mo moleny, yoghurt)	1= YES ; 0= NO; 8= DON'T KNOW	
J	Grains, roots and tubers (<i>pancake, pasta, mchele,</i> <i>kuon, nyoyo, makati,</i> <i>chapat, mandas</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
K	Vitamin A-rich fruits and vegetables (<i>apoyo,</i> <i>sukumawiki, carrots,</i> <i>spinach, avocado.</i> <i>maembe</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
L	Other fruits and vegetables (<i>kitungu,</i> <i>nyanya, kabich,</i> <i>machunga, rabolo,</i> <i>olemo moti e bungu</i>)	1= YES ; 0= NO; 8= DON'T KNOW	
M	Oils and fats (mafuta)	1= YES ; 0= NO; 8= DON'T KNOW	
N	Herbs and spices	1= YES ; 0= NO; 8= DON'T KNOW	
4	Yesterday (during the day and at night), How many times did you feed your child solid and semi-solid foods? (<i>nyoro godiochiend</i> <i>nyaka otieno nyathini no</i> <i>chiemo didi</i>)	Number of times.....	

	<i>Number of times child was given food to make it full</i>		
5	At what age should solid/semi-solid foods be introduced to children?(<i>igi adi ma nyathi obedo ni imiyo chiemo ma opogore gi cha min</i>)Months	
6	For how long should a child be breastfed? (<i>nyathi anego mi thuno nyaka ochop igni/duache adi</i>)MonthsYears Do not know..... Other (specify).....	

CHILD ILLNESS/IMCI

No	Question	Responses
1	Sometimes children get sick and need to receive care or treatment for illnesses. What are the signs of illness that would indicate your child needs treatment? (<i>seche moko nyathi yudo touché kendo oduaro thieth.ere gi ma ngisi ni nyathi tuo to onego yud thieth</i>)	1=Do not know 2=Looks unwell or not playing normally 3=Not eating or drinking 4=Lethargic or difficult to wake 5=High fever 6=Fast or difficult breathing 7=Vomits everything 8=Convulsions 9=Diarrhoea 10=Other
	RECORD ALL MENTIONED	

	PROBE FOR ALL RESPONSES DO NOT READ LIST	
2	Did your child experience any of the following in the past two weeks? (<i>be nyathini no yudo touché achiel kuom touché gi</i>) READ LIST CIRCLE ALL THAT APPLY	1=Diarrhoea (<i>diep</i>) 2=Blood in stool (<i>remo e oko</i>) 3=Cold, cough, difficult breathing, fast breathing or short, quick breaths (<i>ahonda gi yueyo ma pio</i>) 4=Fever (<i>liet mangeny</i>) 5= Malaria 6=Convulsions (<i>rieruok</i>) 7=Child NOT sick
	IF 1 OR 2: ADMINISTER QUESTIONNAIRE for DIARRHEA; IF 3: ADMINISTER QUESTIONNAIRE for ARI; IF 4, 5 OR 6: ADMINISTER QUESTIONNAIRE FOR MALARIA	
	MORE THAN ONE QUESTIONNAIRE MAY APPLY. ADMINISTER ALL THAT ARE APPLICABLE.	<u>CHECK WHICH QUESTIONNAIRES APPLY</u> QUESTIONNAIRE G (DIARRHEA) <input type="checkbox"/> QUESTIONNAIRE H (ARI) <input type="checkbox"/> QUESTIONNAIRE I (MALARIA) <input type="checkbox"/>

Diarrhea

Question No	Question	Responses
1	Has your child had diarrhoea in the last 2 weeks? (<i>be nyathini osebet gi diep wige ario mokalo</i>)	1=YES 0=NO

		8=DON'T KNOW
2	<p>What was given to treat the diarrhoea? (<i>ne omiyo ango kaka thieth</i>)</p> <p>Anything else? PROBE RECORD ALL MENTIONED</p>	<p>1=NOTHING 2=FLUID FROM ORS PACKET 3=SALT AND SUGAR SOLUTION 4=ZINC SUPPLEMENT 5=PILL OR SYRUP 6=INJECTION 7=INTRAVENOUS 8=HOME REMEDIES 9=OTHER (Specify)</p>
3	<p>When your child had diarrhoea, did you breastfeed him/her less than usual, about the same amount, or more than usual? (<i>seche ma nyathini ne tuo be nimiye thuno mageny, matin koso kaka pile</i>)</p>	<p>1=LESS 2=SAME 3=MORE 4=CHILD NOT BREASTFED 5=DON'T KNOW</p>
4	<p>Was child offered less than usual to eat, about the same amount, or more than usual to eat? (<i>ne imiyo nyathi chiemo mageny, matin koso kaka pile</i>)</p>	<p>1=LESS 2=SAME 3=MORE 4=NOTHING TO EAT 5=DON'T KNOW</p>
5	<p>Did you seek advice or treatment from someone outside of the home for child's diarrhoea? (<i>ne idwaro ne nyathi thieth</i>)</p>	<p>1=YES 0=NO IF NO, END INTERVIEW</p>

6	<p>Where did you FIRST go for advice or treatment? (<i>ne ithi kanyo yudo thieth</i>)</p> <p>ONLY ONE RESPONSE</p>	<p>1=HEALTH FACILITY 2=CHW 3=TRADITIONAL PRACTITIONER 4=RELIGIOUS LEADER 5=RELATIVE 6=PHARMACY 7=OTHER (Specify) </p>
7	<p>How long after you noticed child's diarrhoea did you seek treatment from that person/place? (<i>bang ndalo/dueche adi emane idwaro ne nyathini thieth</i>)</p>	<p>1=SAME DAY 2=NEXT DAY 3=TWO DAYS 4=THREE OR MORE DAYS 5=1 WEEK 6=2 WEEKS 7=OTHER (Specify).....</p>

ARI

Question No	Question	Responses
1	<p>Has your child had an illness with cough, fast or difficult breathing in the last 2 weeks? (<i>nyathini be osebet gi ahonda gi yueyo ma piyo e wige ario mokalo</i>)</p>	<p>1=YES 0=NO 8=DON'T KNOW</p>
2	<p>Did you seek advice or treatment for the cough/fast breathing? (<i>ne idwaro ne nyathi thieth</i>)</p> <p>IF YES, PROCEED TO QUESTION 3</p>	<p>1=YES 0=NO</p>

	IF NO, END THE INTERVIEW	
3	Where did you FIRST go for advice or treatment? (<i>ni tero nyathi kanye yudo thieth</i>) ONLY ONE RESPONSE	1=HEALTH FACILITY 2=CHW 3=TRADITIONAL PRACTITIONER 4=RELIGIOUS LEADER 5=RELATIVE 6=PHARMACY 7=OTHER (Specify)
4	How long after you noticed child's cough, difficult or fast breathing did you seek treatment from that person/place? (<i>bang ndaloadi ma nidwaro ne nyathi thieth</i>)	1=SAME DAY 2=NEXT DAY 3=TWO DAYS 4=THREE OR MORE DAYS 5=1 WEEK 6=OTHER (Specify).....

Malaria

Question No	Question	Responses
1	Has your child had a fever in the last 2 weeks? (<i>nyathini ne oyudo liet mangeny wige ario mokalo</i>)	1=YES 0=NO 8=DON'T KNOW
2	Did you seek advice or treatment for the fever? (<i>ne idwaro ne nyathi thieth</i>) IF YES, PROCEED TO QUESTION 3 IF NO, END THE INTERVIEW	1=YES 0=NO

3	Where did you FIRST go for advice or treatment? (<i>ne ithi dware ne nyathi thieth kanye</i>) ONLY ONE RESPONSE	1=HEALTH FACILITY 2=CHW 3=TRADITIONAL PRACTITIONER 4=RELIGIOUS LEADER 5=RELATIVE 6=PHARMACY 7=OTHER (Specify)...
4	How long after you noticed the child's fever did you seek treatment from that person/place? (<i>bang ndalo adi ema ne idware ne nyathini thietth</i>)	1=SAME DAY 2=NEXT DAY 3=TWO DAYS 4=THREE OR MORE DAYS 5=1 WEEK 6=OTHER (Specify)

Father Support

<p>Now I would like to ask you about support you received from the child's father towards breastfeeding after delivery(<i>koro adware penji ka entie kony mora mora mane iyudo kwom won nyathi bang nywol</i>)</p> <p>In the past 7 days, did you feel supported by the father of the child to breastfeed? 1=Yes)=No</p> <p><i>Read out the options and circle the responses (score 0 is given when either item receives negative response, whilst score 1 only when all items received positive responses within category)</i></p>		
a.	<p>Household chores and responsibilities</p> <p>Laundry</p> <p>Bill pay</p> <p>Helps with cleaning</p>	1=Yes 0=No

	Cooking Home maintenance Shopping Other (specify) _____	
b.	Caring for the baby Helps change baby diapers Playing with the baby Putting the baby to sleep Soothing the baby Bathing the baby Other (specify) _____	1=Yes 0=No
c.	Feeding the baby Involved in breastfeeding process Helps with positioning and latching Helps with burping and swaddling baby Other (specify) _____	1=Yes 0=No
d.	Caring for the mother Allows mother time to sleep rest, do other things,pump Allows mother break from baby, Helps with massages to increase milk flow, Buys or prepares healthy foods to support or increase milk production. Other (specify) _____	1=Yes 0=No
e.	Encouragement and motivation (one response qualify yes) Offers words of encouragement and motivation such as “you can do it”, “keep going”, “I’m proud of you” and practical support with breastfeeding challenges.	1=Yes 0=No
f.	Being in agreement (one response qualify for yes)	1=Yes 0=No

	Feels breastfeeding is a joint responsibility, agrees on breastfeeding method and decision	
g.	Favourable environment (one response qualify for yes) Creates a relaxed and/or stress free environment for mother to breastfeed, keeps things positive and/or has a positive attitude about breastfeeding	1=Yes 0=No
h.	Decision making on complementary feeding (one response qualify for yes in each category)	
	Final decision on Introduction CF	1=Yes 0=No
	Frequency of feeding child	1=Yes 0=No
	Variety of foods given	1=Yes 0=No
	Participate in child feeding	1=Yes 0=No
	Provide info about CF	1=Yes 0=No
	Buying food for the child	1=Yes 0=No

Appendix VI: Focus Group Discussion Guidelines

Instructions: This FGD will be conducted with 6 to 8 fathers and mothers who were engaged in the study. There will be 8 FGDs, 4 engaging control group and intervention group participants who followed recommended infant feeding practices and 2 engaging control group and intervention group participants who did not follow the recommended infant feeding practices.

Introduction: Thank you for the opportunity to speak with you. We are a research team interested in learning more about infant feeding practices in this area. We assure you that all the information that you provide to us will be used exclusively for our research and analysis. We will record the session but all responses will appear anonymously. This is not a test, and there is no right or wrong answers. The most important thing is that you should feel comfortable and contribute as much as you can. You can express opinions and discuss issues freely. Let's start by going around the circle and having each person introduce herself. (Members of the research team should also introduce themselves and describe each of their roles.)

FGD GUIDE FOR FATHERS

A. FGD guide - Fathers

Ice Breaker question
How are children growing in this community? Why are children growing this way?
Main Questions
1. What are your views regarding mothers breast milk/ breastfeeding? <ul style="list-style-type: none">○ General views on breast milk/breastfeeding○ Benefits of breastfeeding to the child, mother and family○ Disadvantages of breastfeeding to the child, mother, family
2. How do women breastfeed their children in this community? Please tell me more about ;

<ul style="list-style-type: none"> ○ Breastfeeding their children with breast milk alone without any other foods or liquids ○ Age of introducing other foods in addition to breast milk; Can you tell us what foods are good / appropriate to give children 6-12 months? And why? Is there any difference between what you would give to children 6-8 months old and what you would give to children 9-12 months old? What foods are NOT good/appropriate for child/ children 6-12 months? And why? How do you support the mother to feed her child? ○ Duration of breastfeeding and reasons for stopping? ○ Challenges that the mothers face in breastfeeding their children <p>3. What beliefs about breastfeeding/ breast milk exist in this community/ family</p> <p>Probe :</p> <ul style="list-style-type: none"> ○ Cultural beliefs? ○ Religious? ○ Health? ○ Social?
Father's support
<p>4. What role do men play in infant feeding practices in this community? PROBE for emotional, nutritional and socioeconomic support/advice. (What activities do you do to support mothers to breastfeed?)</p> <p>5. What role do you think men/fathers could play in improving infant feeding practices in the community?</p>
Other
<p>6. What else would you like to tell me about the issues that we have discussed/recommendations on father involvement?</p>
<p>7. Do you have any questions regarding what we have just discussed</p>

B. FGD guide - Mothers

Ice Breaker question
<p>How are children growing in this community?</p> <p>Why are children growing this way?</p>

Main Questions

1. What are your views regarding mothers breast milk/ breastfeeding?
 - General views on breast milk/breastfeeding
 - Benefits of breastfeeding to the child, mother and family
 - Disadvantages of breastfeeding to the child, mother, family
2. How do women breastfeed their children in this community?

Please tell me more about;

- Initiation of breastfeeding? (after delivery can a mother produce enough milk for child? / if not, what is done? /what was the experience? / How long after birth can the mother produce enough breastmilk to adequately feed the child? Why? In your opinion, what can be done to enable mothers to give only breastmilk to the child immediately after birth and on the first day?)
 - Feeding colostrum to the baby
 - Age of introducing other foods or liquids other than breast milk; Can you tell us what foods are good / appropriate to give children 6-12 months? And why? Is there any difference between what you would give to children 6-8 months old and what you would give to children 9-12 months old? What foods are NOT good/appropriate for child/ children 6-12 months? And why?
 - Reasons for introducing other foods or drinks; It is recommended that women exclusively breastfeed (i.e. give only breastmilk) for six months, do you think mothers are able to do this? Why/Why not, what are the challenges?
 - Duration of breastfeeding and for stopping
3. What beliefs about breastfeeding/ breast milk exist in this community/ family?

Probe;

 - Cultural beliefs on breastfeeding
 - Religious beliefs
 - Social?
 - Health?
 - How do they affect breastfeeding in this community?

Father's support
4. What role do men play in infant feeding practices in this community? PROBE for emotional, nutritional and socioeconomic support/advice.
5. What role do you think men/fathers could play in improving infant feeding practices in the community?
Other
6. What else would you like to tell me about the issues that we have discussed?
7. Do you have any questions regarding what we have just discussed?

Thank you for your participation!

Appendix VII: Test of Knowledge on IYCF

Pre-test and Post-test Assessment

#		Yes	No	Don't Know
1.	To produce enough milk, a mother should breastfeed frequently, day and night.	x		
2.	At 4 months, infants need water and other drinks in addition to breast milk.		X	
3.	A baby from 9 – 11 months needs complementary foods 4 times a day.	X		
4.	The newborn baby's chin touching the mother's breast is a sign of good attachment.	X		
5.	Breastfeeding benefits the baby, but not the mother.		X	
6.	Even though a mother thinks she does not have enough milk, she can successfully breastfeed her baby.	X		
7.	A mother can prevent sore and cracked nipples by correctly attaching her baby to the breast.	x		
8.	When a mother begins to give foods to a baby, she needs to start with thin porridge.		X	
9.	A 7–8 month old baby needs to eat 3 times a day.	X		
10.	When feeding a child, the mother or the caregiver should be patient and interact actively with the child.	X		
11.	The mother should wait until the sick child is healthy before giving him/her more food.		X	
12.	Breastfeeding is the same as the Lactational Amenorrhoea Method (LAM) of child spacing.		X	

Participant's form for evaluating course sessions

Date:

Place:

Session Title:

1. The time allotted to the session was: [] Too short [] About right [] Too long

2. Relevance of the content in assisting participants in practicing recommended infant feeding practices: Extremely relevant Some what relevant Not very relevant Not at all relevant

Suggestions for improving the relevance of the session:

3. The quality of the teaching was: Very high Some what high Some what low Very low

Suggestions for improving the quality of the teaching:

4. Other comments and suggestions for improving the session:

5. The teaching methods used in the session were: Appropriate Need adjustment

Suggestions for adjusting/improving the teaching methods:

6. The interest level of the participants in the session was: Very high somewhat high somewhat low Very low

Suggestions for increasing the interest level:

7. The success of the session (in your opinion) in motivating and convincing the participants of the need for change: Very high somewhat high somewhat low Very low

Suggestions for improving the success of the session in motivating and convincing participants of the need for change:

8. Suggestions for improving the session before the next time the course is given:

Appendix VIII: Training of Research Assistants

Objectives of the training:

1. To explain the objectives and the research methodology.
2. To impart knowledge on breastfeeding and complementary feeding to the research assistants.
3. To train the research assistants on adult learning skills.

Duration of training

The training took three days. The researcher who is a qualified nutritionist (MSc in Applied Human Nutrition) conducted the training.

Mode of training

The research assistants' knowledge on breastfeeding and complementary feeding was pre-tested prior to the training to establish the level and the gaps in knowledge. The training was conducted through use of the following techniques:

- Lectures
- Discussions
- Brainstorming
- Role-Plays
- Demonstrations
- Practice. The educators were exposed to practical sessions during pilot testing.

Standardization of research assistants' performance:

The research assistants' knowledge and skills were tested to ensure their capability to undertake the counseling exercise. The following techniques were used:

1. Knowledge on breastfeeding and complementary feeding was tested through two written tests during the training; a pre-and post-tests.
2. Teaching skills were tested through role-plays and practice sessions with fathers and mothers during pilot study.

Appendix IX: Nutrition Education Training Content

1. Benefits of breastfeeding with special emphasis on exclusive breastfeeding
2. The composition of breast milk vs other types of milk
3. Psychological aspects of breastfeeding
4. Initiation and management of breast feeding
5. Management of common breast feeding problems
6. Breast feeding in special circumstances
7. Complementary feeding
8. Infant feeding and HIV/AIDs
9. Men, women and care giving
10. Men's role in health promotion

The Content of the training content is based on the following references:

- UNICEF Integrated infant and young child feeding counselling, a training course released in 2012
- Infant and young Child Feeding and Gender manual prepared by the Infant & Young Child Nutrition (IYCN) Project for the men's groups activities being implemented through the AIDS, Population and Health Integrated Assistance II (APHIA II) Western project by PATH in Western Province, Kenya (Martin *et al.*, 2009).

Appendix X: Results of the Pilot Study

Study participant's enrollment into the study

A total of 45 father-mother pairs were screened, 35 met the selection criteria. Of the participants meeting the selection criteria, 30 agreed to participate and were recruited into the study. Of the 5 declining to participate in the study, 3 (60%) indicated that they work away from home and will not be present at the study site for the duration of the study and 2(40%) did not give any reason for unwillingness to participate in the study. Pre-testing of the questionnaire on feeding practices, nutritional status and morbidity patterns was done for 30 infants. Questionnaire on knowledge of infant feeding was also pretested on 30 fathers. In addition, baseline information was gathered from 30 father-mother pairs and 15 of them were taken through the training material to get their feedback on the training content for adjustments before the main study (Figure 1).

Baseline comparison of study groups

Baseline comparisons of the study groups on key socio-economic and demographic factors and pregnancy related factors showed that the randomization was successful because the groups were similar in all aspects (Table 1).

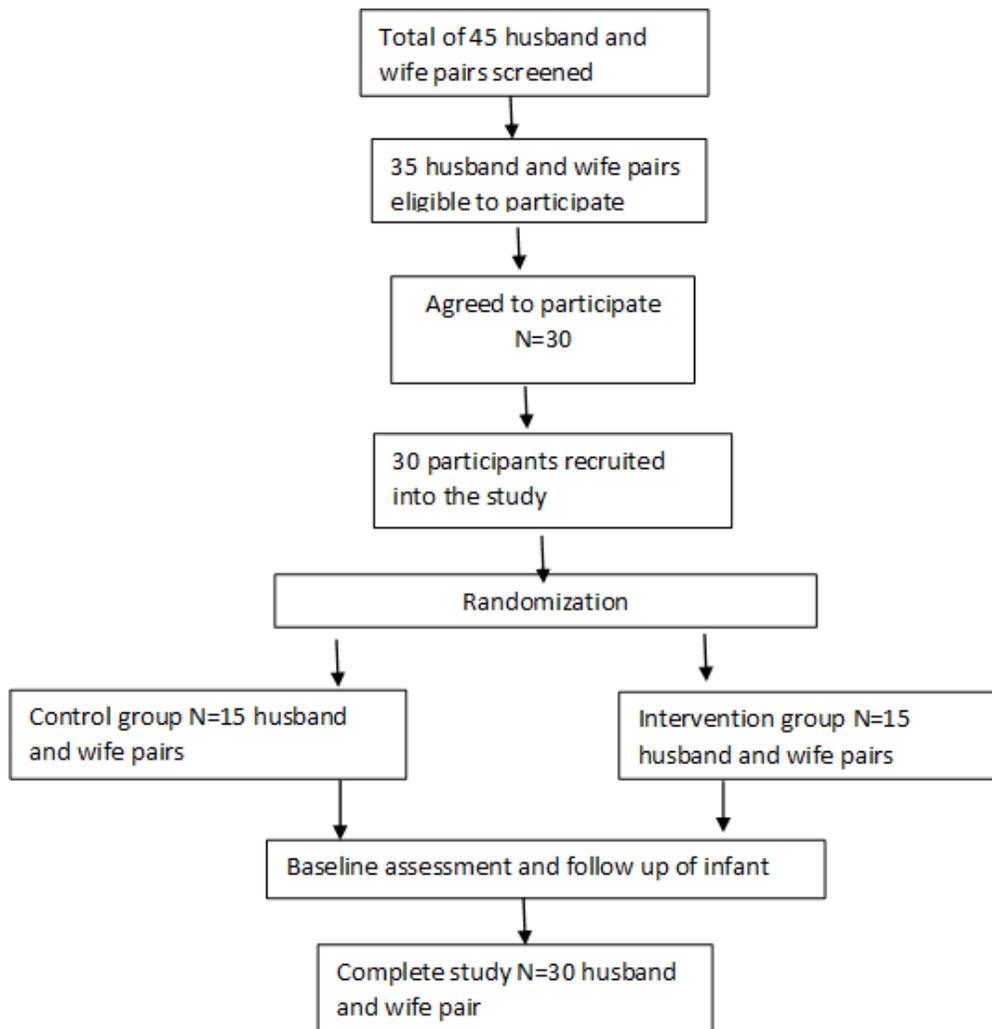


Figure 1: Schematic representation of the recruitment process for study participants

Key findings

It was feasible to do joint recruitment of the father-mother pairs at a later date after initial discussions with the mother at the health facility. The time taken to take each respondent through the consent form and administer the baseline questionnaire took about 20 minutes. This timing was adequate time to recruit 10 father-mother pairs per day during the main study. During administration of the follow up questionnaire, it was noted that the convenient time to visit the caregivers was morning hours. All the questions asked were

clearly understood by the respondents who used the local language to administer the questionnaire. The two nutrition education sessions took 2 hours each and the study participants gave feedback that they would be comfortable to be given information for 4 hours continuously. The men especially reported that they have many commitments and would prefer to set aside just one day for the nutrition education session. It was reported that the nutrition education sessions would be ideal to start in the morning and end by midday.

The fathers were very interested in the nutrition education session and reported back that they had learnt a lot of useful information which they are will to put into practice. The requested for more information on breast feeding in the context of HIV/AIDs and nutrition during pregnancy. An observation was made that the men were able to score highly when the pre-test results were compared to the post test results. The training was also conducted in the local language which was found to be effective thus will be the language used in the main study (Figure 2).

Table 1: Summary table on key findings

Variable	CG (N=15)	IG (N=15)	Chi-square; <i>p</i>
Feeding practices			
Initiated breast feeding within 1 hr.	83.3% (10)	100% (15)	0.203
Exclusively breast fed	53.3% (8)	60% (9)	0.371
Timely introduced CF	83.3% (10)	85.7% (12)	1.000
Feeding infant from requisite food groups	13.3% (2)	20.3% (3)	0.921
Continued breast feeding	33.3% (5)	40% (6)	0.904
Nutritional status			
Wasting	6.7% (1)	0.0% (0)	0.203
Stunting	21.4% (3)	13.3% (2)	0.225

Morbidity patterns

Diarrhea	8.3% (1)	7.1% (1)	1.000
Malaria	8.3% (1)	6.7% (1)	1.000
ARI	33.3% (4)	28.6% (4)	1.000

Knowledge of fathers on

Age of introduction of CF	50% (6)	78.6 (11)	0.187
Duration of breastfeeding	78.6% (12)	91.7% (14)	0.79
Exclusive breast feeding	42.1% (8)	57.9% (11)	0.665
Initiation of breastfeeding	66.7% (8)	85.7% (12)	0.365

Note CG=Control Group; IG=Intervention Group. CF = complementary feeding. Level of significance based on chi-square test (x2) is p value <0.05. The figures in bracket are 'n' with N=15 in the control group and N=15 in the intervention group. The figures outside bracket represent the % within the group.

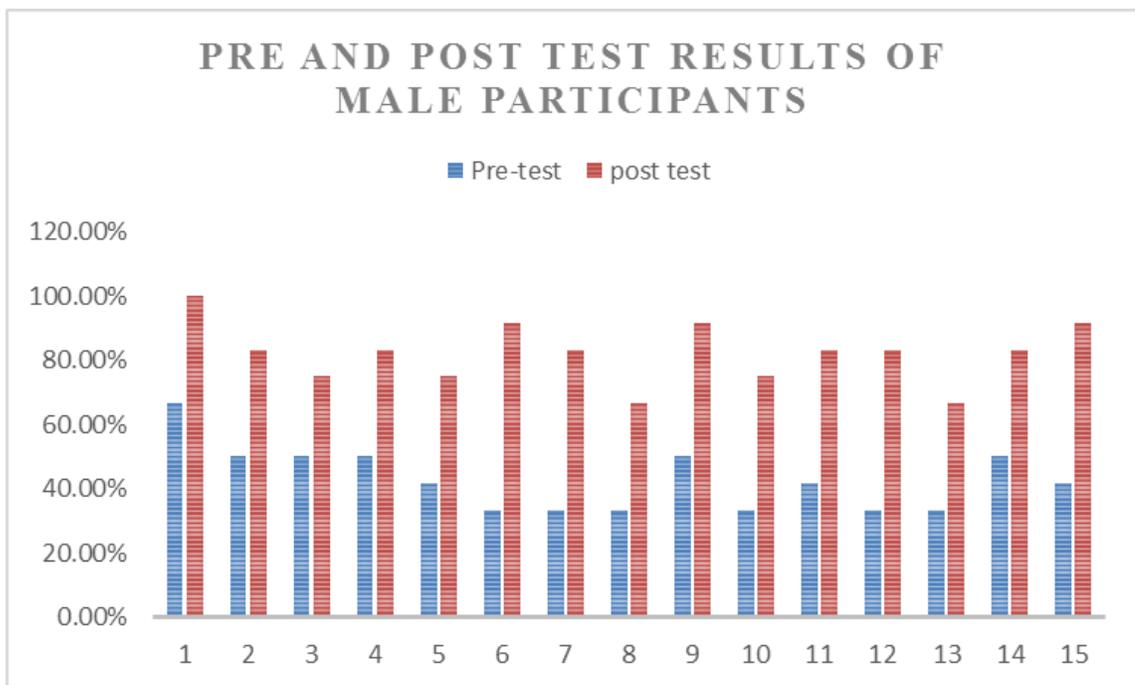


Figure 2: Pre and post test results of fathers in the intervention group

Qualitative data

FGD findings with the respondents can be summarized as follows: upon being asked the benefits of exclusive breast feeding, majority of the respondents stated breast feeding conferred health benefits to the child, they also mentioned convenience and it required no preparation. Majority also reported that it was the mother who decides what the infant should eat but the father provides what is to be eaten by the whole family. Majority of the mothers had initiated breast feeding within an hour of birth but exclusive breast feeding was rarely practiced because of the perception that breast milk alone is not enough for a child under six months. Further, there were commitments that force a mother to leave other foods to be given to the infant when she is away from home.

Information on infant feeding was sourced during visits to Obambo health facility and from a community health worker. However, the information sharing was felt not to be adequate as it only targeted mothers. The fathers who received nutrition education felt that they could help in infant feeding by helping with household chores, by helping in feeding the baby, by taking care of the other children to allow mother to breast feed, by ensuring the mother and infant consume balanced food from the various food groups and by providing information to the mother on infant feeding and motivating her to follow the recommended practices.

Suggested changes to the study

Suggestions to changes in the implementation of the main study were minimal and made as follows:

- Questionnaires: No questions were removed but few questions were reworded and questions on support from fathers received by mothers on infant feeding were added.
- Training: instead of two training sessions, one training session was seen as feasible and since the men were busy earning livelihood and with other commitments, it was felt its best to combine all the information into one session.

- Content of the training material; since Kisumu County has a high prevalence of HIV/AIDs, a lot of interest was raised on breast feeding in the context of HIV/AIDs. More information on the same will be added to the main training content. Information on nutrition during pregnancy and lactation will also be added to the main training material.

Appendix XI: Baseline Survey Report and additional findings

A. Enrolment of study participants and baseline study

A total of 340 father-mother pairs visiting Kisumu County hospital for ANC, during the January 2016 to June 2016 recruitment period, met the selection criteria and were invited to participate in the study. Of the potential 340 participants, 290 (85.3%) consented to participate and were therefore enrolled into the study. Most (N=40) of the 50 eligible father-mother pair refusing to participate in the study did not reveal the reasons for this decision and a minority (N=10) cited work commitments by the father that will not allow time to participate in nutrition education sessions with the mother. The 290 study participants were randomized into the two study groups of 145 father-mother pair for the control group and 145 father-mother pair for the intervention group (Figure 1).

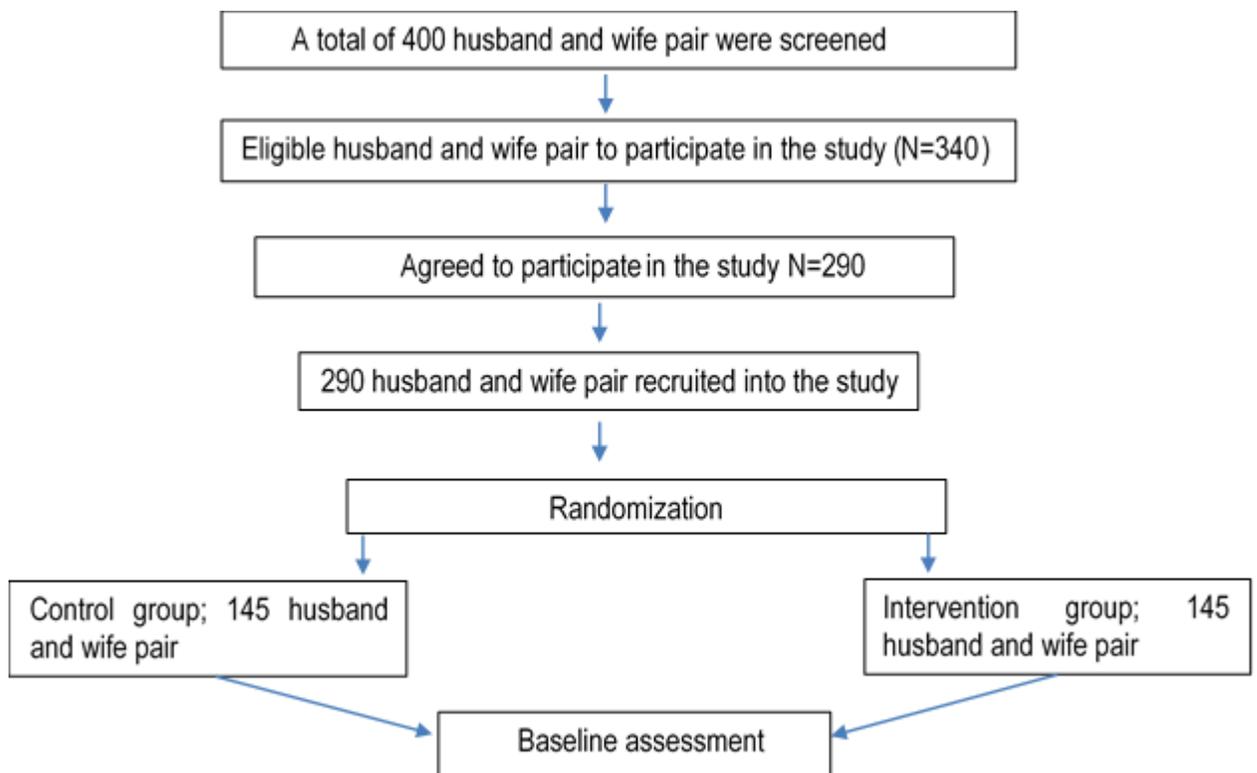


Figure 1: Schematic representation of the recruitment process for participants included in the study

B. Demographic, socio-economic, knowledge traits and perinatal characteristics of the study population pre-intervention

Data collected at baseline shows that the intervention group and control group were similar in all aspects with the exception of one variable, namely parity ($p=0.000$) (Table 1 and Table 2).

Table 1: Baseline Comparison of key demographic, socio-economic and knowledge traits for the study groups pre-intervention (N=290)

Characteristic		CG (N=145)	IG (N=145)	Chi-square χ^2	<i>p</i>
Education	Father			2.34	0.31
	Primary level	39.3 (57)	37.2 (54)		
	Secondary level	47.6 (69)	54.5 (79)		
	College level	13.1 (19)	8.3 (12)		
	Mother			4.29	0.12
	Primary level	42.1 (61)	53.8 (78)		
	Secondary level	48.3 (70)	40 (58)		
	College level	9.7 (14)	6.2 (9)		
Occupation	Father			7.50	0.11
	Self-employment	31.8 (46)	33.7 (49)		
	Formal employment	20 (29)	25.5 (37)		
	Casual employment	48.3 (70)	40.7 (59)		
	Mother			2.39	0.67
	Housewife	44.1 (64)	48.3 (70)		
	Self-employment	37.9 (55)	33.1 (48)		
	Formal employment	6.2 (9)	9 (13)		
	Casual employment	11.7 (17)	9.7 (14)		
	Household size			3.58	0.17
	1-3	49.7 (72)	59.3 (86)		
	4-6	46.2 (67)	38.6 (56)		
7 and above	4.1 (6)	2.1 (3)			

Maternal knowledge about breastfeeding.					
Mothers milk first feed	97.9 (142)	94.5 (137)	2.03	0.36	
Start BF within 1hr	59.3 (86)	63.4 (92)	2.57	0.17	
BF for 2 years	57.2 (83)	61.4 (89)	3.28	0.55	
EBF for 6 months	43.4 (63)	42.3 (58)	1.17	0.56	

Note CG=Control Group; IG=Intervention Group. BF = breastfeeding; EBF = exclusive breastfeeding. Level of significance based on chi-square test (χ^2) is p value <0.05 . The figures in bracket are 'n' with $N=145$ in the control group and $N=145$ in the intervention group. The figures outside bracket represent the % within the group.

Table 2: Baseline Comparison of age and perinatal traits for the study groups pre-intervention (N=290)

Characteristic	CG	IG	Independent t test	
	n=145 M(SD)	n=145 M(SD)	t	p
Age				
Father	29.45 (5.7)	30.74 (6.6)	1.79	0.26
Mother	24.57 (4.7)	24.6 (4.3)	0.10	0.38
Perinatal-related characteristics				
Gestational age	4.51 (1.5)	4.19 (1.5)	-1.82	0.68
1st ANC visit				
No. of ANC visits	1.93 (0.83)	1.96 (0.85)	0.28	0.93
Parity	1.16 (1.12)	1.75 (1.49)	3.82	0.003**

*Note CG=Control Group; IG=Intervention Group. Level of significance based on t- test (t) is p value <0.05 . **used for values p value <0.01 . The figures in bracket are standard deviation (SD) with $N=145$ in the control group & $N=145$ in the intervention group. The figures outside bracket represent the mean within the group.*

C. Demographic, socio-economic and perinatal characteristics of the study population post-intervention

Post intervention, comparisons were made on key demographic, socio-economic, and characteristics of the intervention and control groups. This would determine homogeneity of the groups and attribute the differences realized to the intervention. Nine months post intervention, the groups were similar in all these aspects with the exception of parity ($p=0.004$) which was controlled for during data analysis. Hence, the positive effect on infant feeding observed in this study can be attributed to the intervention.

Table 3: End line comparison of key demographic and socio-economic characteristics for the study groups nine months post-intervention (N=278)

Characteristic		CG (N=141)	IG (N=137)	Chi-square	
				x^2	p
Education	Father			2.24	0.35
	Primary level	37.5 (55)	38.2 (51)		
	Secondary level	49.4 (68)	54.2 (76)		
	College level	14.0 (18)	8.6 (10)		
	Mother			4.17	0.16
	Primary level	41.3 (59)	52.5 (75)		
	Secondary level	47.7 (69)	39.9 (55)		
	College level	9.5 (13)	7.0 (7)		
Occupation	Father			7.81	0.12
	Self-employment	30.8 (44)	32.8 (46)		
	Formal employment	20.4 (28)	24.4 (34)		
	Casual employment	45.9 (69)	40.9 (57)		
	Mother			2.54	0.72
	Housewife	44.0 (62)	47.3 (73)		
	Self-employment	37.5 (51)	32.7 (43)		
	Formal employment	6.28 (9)	9.1 (13)		

	Casual employment	10.8 (11)	9.9 (12)		
Household size				3.56	0.18
	1-3	49.3 (70)	59.2 (83)		
	4-6	46.7 (61)	37.5 (53)		
	7 and above	3.9 (5)	2.7 (1)		

Note CG=Control Group; IG=Intervention Group. BF = breastfeeding; EBF = exclusive breastfeeding. Level of significance based on chi-square test (χ^2) is p value <0.05 . The figures in bracket are 'n' with $N=141$ in the control group and $N=137$ in the intervention group. The figures outside bracket represent the % within the group.

Table 4: End line Comparison of age and perinatal traits for the study groups post-intervention ($N=278$)

Characteristic	CG n=141	M(SD)	IG n=137	M(SD)	Independent t test	
					t	p
Age						
Father	29.75	(5.4)	31.74	(6.9)	1.57	0.29
Mother	23.25	(4.3)	24.12	(4.5)	0.14	0.33
Perinatal-related characteristics						
Gestational age	4.6	(1.3)	4.09	(1.4)	-0.97	0.86
1st ANC visit						
No. of ANC visits	1.76	(0.77)	1.99	(0.92)	0.22	1.01
Parity	1.18	(1.21)	1.80	(1.38)	3.86	0.004**

*Note CG=Control Group; IG=Intervention Group. Level of significance based on t- test (t) is p value <0.05 . **used for values p value < 0.01 . The figures in bracket are standard deviation (SD) with $N=141$ in the control group & $N=137$ in the intervention group. The figures outside bracket represent the mean within the group.*

D. Additional findings related to infant feeding and fathers knowledge and support

Table 5: Odds ratio of early initiation of breastfeeding practice and fathers knowledge on early initiation

Mother practiced early initiation				
Father knowledgeable on early initiation	Yes % (n)	No % (n)	Odds ratio (95% CI)	p
Yes	71.8 (201)	3.57 (10)	1.72 (1.13-2.59)	0.01
No	3.92(11)	20.7 (58)		

Table 6: Odds ratio of exclusive breastfeeding practice and fathers knowledge on exclusive breastfeeding

Mother practiced exclusive breastfeeding at 6 months				
Father knowledgeable on exclusive breastfeeding	Yes % (n)	No % (n)	Odds ratio (95% CI)	p
Yes	75.4 (211)	12.5 (35)	1.67 (1.02-2.46)	0.02
No	3.21(9)	16.1 (45)		

Table 7: Fathers' knowledge about complementary feeding practices at baseline

Characteristic	Control (N=145)	Intervention (N=145)	x²	p
Knowledge about complementary feeding				
Timely introduction of CF	39.8 (57)	37.2 (54)	5.19	0.77
Frequency of feeding at 6 months	27.6 (40)	28.2 (41)	9.06	0.92
Frequency of feeding at 7-8 months	24.1 (35)	22.8 (33)	7.68	0.81
Frequency of feeding at 9-12 months	21.4 (31)	23.4 (34)	6.23	0.79
Amount to feed at 6 months	27.3 (40)	28.5 (41)	9.01	0.95

Amount to feed at 7-8 months	24.6 (35)	23.2 (33)	7.58	0.84
Amount to feed at 9-12 months	22.4 (31)	24.4 (34)	6.30	0.80
Mentions at least 4 food groups	24.8 (36)	28.5 (41)	5.43	0.62

Note level of significance based on chi-square test (χ^2) is p value <0.05 . The figures in bracket are 'n' with $N=145$ per group (control and intervention group) and figures outside bracket represent the percentage within the groups. CF=complementary foods.

Table 8: Fathers' knowledge about complementary feeding practices 6 months post-intervention

Characteristic	Control (N=141)	Intervention (N=130)	χ^2	p
Knowledge about complementary feeding				
Timely introduction of CF	41.1 (58)	75.4 (98)	3.56	0.03**
Frequency of feeding at 6 months	28.3 (40)	66.9 (87)	2.78	0.01**
Frequency of feeding at 7-8 months	24.8 (35)	65.4 (85)	1.11	0.02**
Frequency of feeding at 9-12 months	21.9 (31)	68.5 (89)	4.01	0.02**
Amount to feed at 6 months	28.4 (40)	76.1 (99)	1.65	0.01**
Amount to feed at 7-8 months	24.1 (34)	62.3 (81)	2.81	0.04**
Amount to feed at 9-12 months	21.9 (31)	66.1 (86)	3.22	0.03**
Mentions at least 4 food groups	22.7(32)	70.7(92)	2.53	0.02**

*Note level of significance based on chi-square test (χ^2) is p value <0.05 indicated with **. The figures in bracket are 'n' with $N=141$ in the control group and $N=130$ in the intervention group. The figures outside bracket represent the percentage within the group. CF=complementary foods.*

Table 9: Odds ratio of father support influence on early initiation and exclusive breastfeeding practice

Father support	Early initiation of BF OR (95%CI)	EBF (6 months) OR (95% CI)
Household responsibilities	1.23 (0.83-1.82)	1.05 (0.76-1.45)
Caring for the baby	1.44 (1.02-2.04)	1.39 (1.04-1.87)
Feeding the baby	1.94 (1.31-2.88)	1.23 (0.98-1.67)
Caring for the mother	0.89 (0.65-1.25)	0.93 (0.74-1.33)
Encouragement/motivation	1.37 (0.98-1.92)	1.36 (1.05-1.75)
Being in agreement	1.73 (0.84-3.55)	1.57 (1.01-2.47)
Favourable environment	1.54 (1.10-2.16)	1.29 (0.99-1.67)

Appendix XII: Summary of findings from the focus group discussions (FGDs)

Table 1: Summary of findings from the FGDs conducted with the fathers involved in the study pre and post intervention

Theme	Focus group	Discussion findings (pre-intervention)	Discussion findings (post-intervention)
General views on breast milk/breastfeeding	Fathers (IG)	<ul style="list-style-type: none"> • Breast milk is what continues to build the child. • A child who is breastfed is usually strong. • It reaches a point breast milk disappears due to feeding habits of the mother. • Breast milk gives the child good health. 	<ul style="list-style-type: none"> • Breast milk is good because it has energy, the child will not be falling sick often. • A mother's milk is good because it contains antibodies that boost a child's immunity • Breastfeeding strengthens bond between mother and child. • Ability of a mother to produce breast milk is pegged on the mental state of the mother i.e. when a mother is stressed she is unable to produce breast milk,

therefore there is need for men to give support to the mothers.

	<p>Fathers (CG)</p> <ul style="list-style-type: none"> • Breast milk is enough, satisfies the child and helps the child to be healthy. • Breast milk is very important to the child as it gives them nutrients and improves their health. 	<ul style="list-style-type: none"> • Mother's milk has a lot of energy and when the child breast feeds she/he has a lot of strength compared to the one given cow's milk or not breastfeeding. • A breastfed child is not affected by many small illnesses.
<p>BF in the community/how they fed their own</p>	<p>Fathers (IG)</p> <ul style="list-style-type: none"> • Infants in the community are breastfed and given cow milk when they reach 3 months of age. • Mostly when the child is one year old, the mothers stop breastfeeding them since the child is regarded as grown up when they start walking. • At one year, the mother is sometimes expecting another child thus has to stop breastfeeding. 	<ul style="list-style-type: none"> • Our infants were put to the breast immediately after birth • Our infants are breastfed whenever they show signals of hunger such as crying or sticking the tongue out. • We ensured the child was given only breast milk till they turned 6

		<ul style="list-style-type: none"> • Most babies are introduced to foods at 3 months of age when the mother returns back to work or to do ‘kibarua’ (odd jobs). 	<p>months based on the teachings received.</p> <ul style="list-style-type: none"> • Our infants were well breastfed as we would support the mother and she had less stress and more milk would flow.
Fathers (CG)		<ul style="list-style-type: none"> • Infants are given water and sugar solution after delivery then the mother breastfeeds after showering and resting. • Infants are breastfeed mostly in the first 3 months in addition to being given water to prevent thirst. 	<ul style="list-style-type: none"> • After delivery, our infants were given some sugar and water solution or at times herbs to help with the stomach. • Our infants were mostly breastfed until around 3 months when we started giving them porridge.
CF in the community/ how they fed their own	Fathers (IG)	<ul style="list-style-type: none"> • Children should be given light foods like tea and porridge which will not choke them. They can start on hard foods like meat when they are above one year. 	<ul style="list-style-type: none"> • At 6 months of age, it is good to start with porridge and it should be thick to provide enough nutrients. It is not good to use flour mixed with so many things like beans.

- There are no differences in feeding of a child at 6 months and at 12 months of age.
- Most children do not have appetite thus you have to aggressively feed them.
- Foods should be varied and include even fruits and vegetables to ensure adequate nutrient intake and easy digestion and defecation.
- When the child is starting on solid foods, they should be mashed and the older child at 9 months can eat without being mashed.

Fathers
(CG)

- Most babies are introduced to foods at 4 months of age in which they are given porridge.
- At 6 months of age, babies are given other normal family foods in small quantities.
- A child can be fed juice extracted from fruits and other milk such as cow's milk at 4 months of age.
- Our infants were well breastfed up to 3 months of age when they were given other foods but breastfeeding continued.
- Our children are mostly fed porridge since they are still young and should not be given heavy foods.
- Most times we have to force the child to eat.

		<ul style="list-style-type: none"> • The child can take a little porridge and tea until one year when they can feed on normal family foods. 	<ul style="list-style-type: none"> • We give the child soup from the main meal cooked, for example omena soup and ugali.
Beliefs around infant feeding	Fathers (IG)	<ul style="list-style-type: none"> • When the baby has hiccups, it is believed that water should be given to remove the hiccups. • When the baby cries a lot, the baby is hungry and needs to be given food. • HIV positive mothers cannot breastfeed. 	<ul style="list-style-type: none"> • To some, breastfeeding in public is not readily accepted. A mother should cover her breast and to some extent not breastfeed at all in public. • People now believe in the benefits brought about by exclusive breastfeeding such as less illnesses. • It is possible for a mother to express her milk and leave for the baby.
	Fathers (CG)	<ul style="list-style-type: none"> • When a mother is HIV positive, she is not recommended to breastfeed unless the doctor approves it. 	<ul style="list-style-type: none"> • Mothers who practice exclusive breastfeeding from 0 - 6 months are HIV positive.

		<ul style="list-style-type: none"> • A child is also not supposed to be breastfed outside in the public where there are many people. 	<ul style="list-style-type: none"> • Breastfeeding in public is not acceptable by the mother as it could invite a curse.
Perceptions on role of fathers in infant feeding	Fathers (IG)	<ul style="list-style-type: none"> • Ensuring there is adequate food in the house for the mother to feed well and produce enough milk. 	<ul style="list-style-type: none"> • Providing food for the family, helping in feeding the baby, supporting and encouraging the mother to ensure information shared on infant feeding is followed on.
		<ul style="list-style-type: none"> • Buying the food the baby needs when the baby starts feeding on other foods apart from breastfeeding. 	<ul style="list-style-type: none"> • Helping the mother with household chores and taking care of the other children to reduce stress for the mother especially during the 14 days provided for fathers as paternity leave.
	Fathers (CG)	<ul style="list-style-type: none"> • Buying for the mother food so she can have enough milk. 	<ul style="list-style-type: none"> • Buying appropriate foods for the child.

- Helping with household chores like cooking and washing clothes.
- Help in giving the child food.

Note IG=Intervention group, CG=control group, BF=breastfeeding, CF=complementary feeding.

Table 2: Summary of findings from the FGDs conducted with the mothers involved in the study pre and post intervention

Theme	Focus group	Discussion findings (pre-intervention)	Discussion findings (post-intervention)
General views on breast milk/breastfeeding	Mothers (IG)	<ul style="list-style-type: none"> • Mother’s milk is good for the baby. • When the baby is breastfed they are strong and healthy. • A breastfed child does not fall ill easily. 	<ul style="list-style-type: none"> • Exclusive breastfeeding should be practiced for 6 months with continuation of breastfeeding up to 2 years. • A breastfeeding mother has increased food intake to meet the demand. • Breastfeeding promotes good health of the child, provides the child with energy, prevents the child from getting diseases,

reduces breast engorgement for the mother and reduces size of uterus.

	<p>Mothers (CG)</p> <ul style="list-style-type: none"> • Breast milk is good for the child and it is important for a mother to breastfeed. • Breast milk protects the child from illnesses. 	<ul style="list-style-type: none"> • Breast milk is the best and it is important that it be given on demand. • Breastfeeding ensures good growth and development of the child.
<p>BF in the community/how they fed their own</p>	<p>Mothers (IG)</p> <ul style="list-style-type: none"> • Most babies are introduced to foods at 3 months of age when the mother has to do odd jobs or petty trade to supplement family income. • Since the mother may be gone for a long time, she leave cow's milk to be given to the baby while she is away. • Going to work limits time with the baby to breastfeed and reduces milk production. 	<ul style="list-style-type: none"> • Our infants were put to the breast immediately after birth our spouses were around to support. • The fathers were very supportive ensuring there was adequate hot fluids to help milk flow and for some gave back massage to help milk flow in the beginning. • We ensured the child was given only breast milk till they turned 6

		<ul style="list-style-type: none"> • Poor eating habits of the mother due to poverty thus cannot afford to eat adequately. 	<p>months based on the teachings received.</p> <ul style="list-style-type: none"> • Some expressed breast milk and left for the baby to be fed when away from home.
Mothers (CG)		<ul style="list-style-type: none"> • Mothers introduce other foods depending with gender of the baby, for boys mixed feeding starts at 2 months while for girls at 3 months as it is believed the baby's stomach should not be empty and breast milk is too light to sustain the baby. • Women in the community who give birth at home give babies water and sugar solution when milk has not 'come in'. 	<ul style="list-style-type: none"> • In the hospital, we were encouraged to put the baby to the breast few minutes after delivery. Some were encouraged to give formula if milk did not 'come in'. • Our infants were mostly breastfed until around 3 months when we started giving them porridge.
CF in the community/ how they fed their own	Mothers (IG)	<ul style="list-style-type: none"> • At 6 months, a child can be started on light porridge and other milks to avoid choking the child. 	<ul style="list-style-type: none"> • At 6-8 months, our children were given soft/mashed foods starting with porridge.

		<ul style="list-style-type: none"> • At 8 months, the child can be given other types of food apart from porridge which have to be mashed like avocado, ripe bananas and pawpaw. • The child should be given tea in the morning, porridge at lunch time, mashed fruits in the evening and a little porridge before they sleep. 	<ul style="list-style-type: none"> • At 9-12 months, our children were learning to eat alone and were given solid foods and the frequency of feeding increased. • Our children were fed from different food groups ensuring they take fruits, vegetables and not giving only soups.
	Mothers (CG)	<ul style="list-style-type: none"> • Most babies are introduced to foods at 2 months or 3 months of age in which they are given porridge. • Children should be started on light foods because they cannot chew properly thus should be given foods that are as light as soups, cow's milk, very light porridge. 	<ul style="list-style-type: none"> • Our children are mostly fed porridge since they are still young and are also fussy eaters. • We eat with our children in the same bowl after 6 months mainly giving them soups from the main dish prepared.
Beliefs around infant feeding	Mothers (IG)	<ul style="list-style-type: none"> • When a mother gets another child while still breastfeeding, she should 	<ul style="list-style-type: none"> • When a mother exclusively breastfeeds, she can use this as a form of family planning.

		stop or the other child will get diarrhoea.	
		<ul style="list-style-type: none"> Expressing breast milk is something foreign and milking is only for cows. 	<ul style="list-style-type: none"> A mother can express breast milk and leave for the baby when away.
	Mothers (CG)	<ul style="list-style-type: none"> When the baby is fed on eggs, there will be delays in speech development. When a child starts walking, they should stop breastfeeding thus limiting duration the child is breastfed. 	<ul style="list-style-type: none"> When the baby is fed on eggs, there will be delays in speech development. Breastfeeding in public is not acceptable by the mother as it could invite a curse.
Perceptions on role of fathers in infant feeding	Mothers (IG)	<ul style="list-style-type: none"> Providing for the family. Providing emotional support so that the mother is not stressed and can produce enough milk. Help in taking care of the older children to allow time to breastfeed. 	<ul style="list-style-type: none"> Providing food to the mother and basic needs to the mother and child. Helping to feed the child and also with household chores to give mother time to breastfeed. Holding the baby and providing encouragement to the mother when

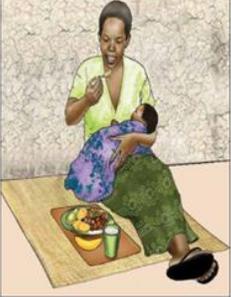
she is breastfeeding since some fathers once the baby starts crying they pressurize the mother to introduce food early.

Mothers (CG)	<ul style="list-style-type: none">• Buying food for the mother and baby.• Holding the baby when preparing food for the family.	<ul style="list-style-type: none">• Buying food for the family and providing basic needs.• Help in taking care of the older children.
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Note IG=Intervention group, CG=control group, BF=breastfeeding, CF=complementary feeding.

Appendix XIII: Nutrition Education Training Material

(English version)

<p style="text-align: center;">Maternal and Infant feeding practices</p> 	<p style="text-align: center;">Nutrition for pregnant woman</p>  <ul style="list-style-type: none"> • During pregnancy, eat one extra small meal or "snack" each day to provide energy and nutrition for you and your growing baby. • Eat food from all the food groups. • Taking tea or coffee with meals can interfere with your body's use of the foods. • Take iron and folic acid tablets to prevent anemia during pregnancy and for at least 3 months after your baby's birth. • Use iodized salt to help your baby's brain and body develop well. • Adolescent mothers: you need extra care, more food and more rest than an older mother. You need to nourish your own body, which is still growing, as well as your growing baby's. 	<p style="text-align: center;">Nutrition for breast feeding woman</p>  <ul style="list-style-type: none"> • During breastfeeding, eat two extra small meals or "snacks" (extra food between meals) each day to provide energy and nutrition for you and your growing baby. • Drink plenty of liquids. • Take vitamin A tablets immediately after delivery or within 6 weeks so that your baby receives the vitamin A in your breast milk to help prevent illness.
<p style="text-align: center;">Immediate breast feeding after birth</p>  <ul style="list-style-type: none"> • Hold your newborn skin-to-skin immediately after birth. • Begin BF within the 1st hr of birth. Helps reduce your bleeding. • Colostrum, the thick yellowish milk, is good for your baby. • Colostrum helps protect baby from illness and helps baby pass his/her first dark stool. • BF frequently to help your breast milk 'come in' and to ensure plenty of breast milk. • Do not give water or other liquids or fluids to your baby during the first days after birth. • During first few days after birth, baby only needs colostrum. Baby's stomach is very small. • BM provides all the food and water that your baby needs during the first 6 months of life. 	<p style="text-align: center;">During the first 6 months give only breast milk</p> 	<p style="text-align: center;">Benefits of breastfeeding</p> <p>To the infant:</p> <ul style="list-style-type: none"> • Saves infants' lives. • Is a whole food for the infant, and covers all babies' needs for the first 6 months. • Promotes adequate growth and development. • Is always clean, ready and at the right temperature. • Has antibodies that protect against diseases, (diarrhoea and ARI). • Is easy to digest. Nutrients are well absorbed. • Contains enough water for the baby's needs. • Breastfed children perform better on intelligence tests. Helps jaw and teeth development; suckling develops facial and jaw structure. • Frequent skin-to-skin contact leads to bonding, better psychomotor, affective and social development of the infant. • Long-term benefits - reduced risk of obesity and diabetes

Importance of breastfeeding for the mother

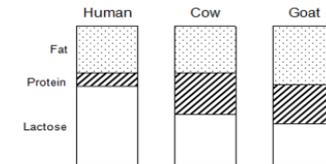
- >98% effective contraceptive during the first 6 months if mother is EBF, day and night and if her menses/period has not returned.
- Facilitates the expulsion of placenta, baby's suckling stimulates uterine contractions.
- Breastfeeding reduces the risk of bleeding after delivery.
- Immediate breastfeeding after birth stimulates breast milk production.
- Immediate and frequent suckling prevents engorgement.
- Breastfeeding reduces the mother's workload (in going to buy the formula, boiling water, gathering fuel, or preparing formula).
- Breast milk is available at anytime and anywhere, is always clean, nutritious and at the right temperature.
- Breastfeeding is economical: formula costs a lot of money, non-breastfed or mixed-fed baby is sick more often, increases costs for health care.
- Breastfeeding stimulates a close bond between mother and baby.
- Breastfeeding reduces risks of breast and ovarian cancer.

Importance of breastfeeding for the family

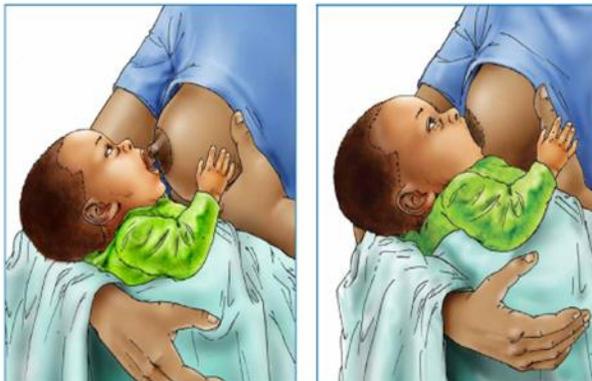
- Mothers and their children are healthier.
- No medical expenses due to sickness that other milks could cause.
- There are no expenses involved in buying other milks, firewood or other fuel to boil water.
- Births are spaced if the mother is EBF in the first 6 months, day and night, and if her menses/period has not returned.
- Time is saved, in purchasing and preparing other milks, collecting water and firewood, less illness-required trips for medical treatment.

The composition of breast milk vs other types of milk

Nutrients in human and animal milks ^{2/3}



Good attachment is important



Good attachment

- The more your baby suckles (with good attachment), the more breast milk you will produce.
- Good attachment helps to prevent sore and cracked nipples.
- Breastfeeding should not be painful.

There are 4 signs of good attachment:

1. Baby's mouth is wide open.
2. You can see more of the darker skin (areola) above the baby's mouth than below.
3. Baby's lower lip is turned outwards.
4. Baby's chin is touching mother's breast.



The signs of effective suckling are:

- a. The baby takes slow deep suckles, sometimes pausing.
- b. You may be able to see or hear your baby swallowing after one or two suckles.
- c. Suckling is comfortable and pain free for you.
- d. Your baby finishes the feed, releases the breast and looks contented and relaxed.
- e. The breast is softer after the feed.

Breastfeed the baby on demand, both day and night

- Do not wait until your baby cries to BF. Crying is a late sign of hunger.
- Early signs that your baby wants to BF include:
 - Restlessness
 - Opening mouth and turning head from side-to-side
 - Putting tongue in and out
 - Suckling on fingers and fists
- Crying is not necessarily a sign of hunger or sickness. Do not give your baby herbs, infant formula, other milks or teas. If your baby is crying, maybe she needs your attention or is uncomfortable.
- Let your baby finish one breast before offering the other. This helps the baby get both the 'fore milk' and the 'hind milk'. The 'fore milk' has more water and satisfies the baby's thirst. The 'hind milk' has more fat and satisfies your baby's hunger.
- If your baby is ill or sleepy, you may need to wake him or her to offer the breast often. Babies need to breastfeed often, **every 2 to 3 hours**. Take time, sit down to breastfeed, and pay attention to your baby.
- Keep your baby close to you, day and night.
- When giving expressed breast milk, do NOT use bottles, teats or spoons. They are difficult to clean and can cause your baby to become sick.

Management of common breast feeding problems

- Not enough milk: baby may be getting enough than mother thinks. Reliable weight gain of <500gm per month or less frequent urine/very concentrate times).
- Crying: could be due to various reasons including
 - **Allergies:** allergic to the protein in some foods in their mother's diet (cow's milk, soy, egg, and peanuts).
 - **Drugs the mother takes:** Caffeine in coffee, tea, and colas can pass into breastmilk and upset a baby.
 - If someone in the family smokes, that also can affect the baby.
- Breast refusal: could be due to
 - **Illness:** The baby may attach to the breast, but suckles less than before;
 - **Pain:** Pressure on a bruise from forceps or vacuum extraction.
 - **Blocked nose, Sore mouth** (Candida infection [thrush]), an older baby teething);
 - **Sedation:** A baby may be sleepy because of: drugs that his mother was given during labor
 - **Breastfeeding technique:** possibly because of not getting much milk, because of poor attachment or engorgement,
 - Babies have strong feelings, and when they are upset, they may refuse to breastfeed common when a baby is aged 3-12 months.

Breast feeding in special circumstances

- The best milk for a low birth weight infant or ill infant, including babies born prematurely, is the breast milk from the baby's own mother.
- Breastfeed frequently to get baby used to the breast and to keep the milk flow going.
- Long slow feeds are fine. It is important to keep the baby at the breast.
- If the baby sleeps for long periods of time, you may need to unwrap the baby to take off some of his or her clothes to help waken him or her for the feed.
- Do not wait until your baby cries to breastfeed. Observe early signs of hunger.
- Feeding directly from the breast may not be possible for several days or weeks. Mothers can express BM and feed the BM to the infant using a cup or spoon.
- Kangaroo mother care provides skin-to-skin contact, warmth and closeness to the mother's breast.
- Kangaroo mother care encourages early and exclusive breastfeeding, either by direct feeding or using expressed breast milk given by cup or spoon.
- Different caregivers can also share in the care of the baby using the same Kangaroo method position.



How to express breast milk by hand

Mother should:

- Wash her hands thoroughly.
- Sit or stand comfortably, and hold the container near her breast.
- Put her thumb on her breast ABOVE the nipple and areola, and her first finger on the breast BELOW the nipple and areola, opposite the thumb. She should support the breast with her other fingers.
- Press her thumb and first finger slightly inward toward the chest wall. She should avoid pressing too far or she may block the milk ducts.
- Press her breast behind the nipple and areola between her finger and thumb. Press and release, press and release. This should not hurt; if it hurts, the technique is wrong.
- At first, no milk may come, but after pressing a few times, milk starts to flow. It may flow in streams if the oxytocin reflex is active.
- Express one breast for at least 3-5 minutes until the flow slows; then express the other side; and then repeat both sides for 20-30 minutes.



Tips

- Learn to express your breast milk soon after your baby is born.
- Express and store breast milk before you leave your home so your baby's caregiver can feed your baby while you are away.
- Express breast milk while you are away from your baby. This keeps the milk flowing and prevents breast swelling.
- Teach your baby's caregiver how to use a clean open cup to your baby while you are away.
- Breast milk can be stored in a clean, covered container. Expressed breast milk can be stored 6 to 8 hours in a cool place, up to 24 hours in the back of the refrigerator, and up to 3-6 months in a deep freezer (-20°C).
- Increase the number of feeds while you are with the baby. This means increasing night and weekend feedings.
- If possible, carry the baby with you to your work place or convince someone to bring the baby to you to breastfeed when you have a break.
- Get extra support from family members in caring for your baby, other children, and for doing household chores.

Complementary feeding

- Start complementary feeding at 6 months and continue breastfeeding. Breast milk is important. It supplies (1/2) baby's energy needs from 6-12 months.
- Always give your baby breast milk first before giving other foods.
- When giving complementary foods, think about: Frequency, Amount, Thickness and Variety.
- Active/responsive feeding: Be patient, actively encourage baby to eat, do not force feed. Use separate plate to feed baby to ensure all the food is eaten.
- Hygiene: Good hygiene (cleanliness) is important to avoid diarrhea and other illnesses.
 - Use clean utensils to give foods or liquids to your baby.
 - Store the foods given to your baby in a safe hygienic place.
 - Wash your hands with soap and clean running water before preparing food and feeding your baby.
 - Bottles, teats and spouted cups are unsafe to use because they are difficult to wash and can be easily contaminated.
- After 6 months of age, children should receive Vit A supplements twice a year and de-worming medicine twice a year, starting at 12 months.

Start complementary feeding at 6 months



Complementary feeding 6-9 months



Complementary feeding 9-12 months



Complementary feeding 12-24 months



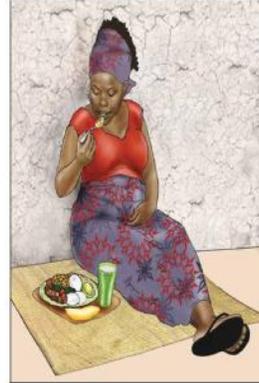
<p style="text-align: center;"><i>Tips</i></p> <ul style="list-style-type: none"> • Continue to breastfeed (for at least 2 years) and try to feed a variety of each meal to your young child. For example: • Animal-source foods (meat, chicken, fish, liver), and eggs and dairy • Staples (maize, wheat, rice, millet and sorghum); roots and tubers (c potatoes) • Legumes (beans, lentils, peas, groundnuts) and seeds (sesame) • Vitamin A-rich fruits and vegetables (mango, papaya, passion fruit, c dark-green leaves, carrots, yellow sweet potato and pumpkin), and o and vegetables (banana, pineapple, watermelon, tomatoes, avocado, and cabbage) • Introduce animal source foods early to babies and young children a them as often as possible. • Cook them well and chop them finely. • Additional nutritious snacks (extra food between meals) such as piec mango, papaya, banana, avocado, other fruits and vegetables, boiled sweet potato and fresh and fried bread products can be offered once per day. • Use iodized salt. 	<p style="text-align: center;">Infant feeding and HIV/AIDS</p> <ul style="list-style-type: none"> • Exclusively breastfeed and take ARVs. • EBF (giving ONLY BM) for the first 6 months together with ARVs for t and baby greatly reduces the chance of HIV passing from an HIV-infect her baby. • When an HIV-infected mother exclusively breastfeeds, her baby receives benefits of breastfeeding including protection from diarrhea and other i • All breastfeeding babies who test HIV positive at 6 weeks should breastf exclusively until 6 months, and then continue to breastfeed for up to tw longer. <ul style="list-style-type: none"> – Complementary foods should be introduced at 6 months, as recom • All breastfeeding babies who test negative at 6 weeks should continue to breastfeed until 6 months, and continue to breastfeed until 18 months. • Breastfeeding should stop gradually, over a one month period, beginnin baby is 17 months old. The mother should make sure that she continue ARVs for at least 1 week after breastfeeding has completely ceased. • All babies born to HIV-positive mothers, whether on life-long ARV treat ARV prophylaxis, should receive daily NVP from birth to 6 weeks. • HIV-positive mothers should exclusively breastfeed during the first 6 mo there is not always access to ARVs. 	<p style="text-align: center;">Exclusively breast feed and take ARVs</p> 
<p style="text-align: center;">Supporting good infant feeding practices</p> <ul style="list-style-type: none"> • As fathers, you can help support women to exclusively breastfeed their b the first six months. • There are many myths about how to feed our children that can contribut poor infant feeding practices, which make our children fall sick, do poor school, and die. • Correcting these myths and providing support are important first steps t improving our children's health. • It is important for you to support good infant feeding practices in your f and community. Examples of ways men can support women to exclusivel breastfeed for the first six months include: <ul style="list-style-type: none"> – Helping her with her other responsibilities so she has time to breastf – Being supportive and encouraging to her so she does not feel stresse • It is common for women to be responsible for the tasks of caring for peo animals, and plants, as well as daily housework. On the other hand, men often viewed as being responsible for caring for objects. • Lack of male involvement in care giving often means that women carry a burden and that men miss out on many of the pleasures involved in carin children. • It is important for you to start in the home and think about how you a start to participate more in care giving tasks in your family. 	<p style="text-align: center;">Men's role in health promotion</p> <p>Men can help contribute by promoting and supporting the following:</p> <p>At any age, women should:</p> <ol style="list-style-type: none"> a. Eat more food if underweight to protect health and establish reserves f pregnancy and lactation. b. Eat a variety of foods to get all of the vitamins and nutrients needed. c. Eat more fruits and vegetables daily. d. Eat animal products as often as possible. e. Use iodized salt. <p>During adolescence and before pregnancy, women should:</p> <ol style="list-style-type: none"> a. Eat more food for the adolescent "growth spurt" and for energy reserv pregnancy and lactation. b. Delay the first pregnancy until after age 18 to help ensure full growth a nutrient stores. <p>During pregnancy, women should:</p> <ol style="list-style-type: none"> a. Eat an extra meal a day for adequate weight gain to support fetal growt future lactation. b. Take iron/folic acid tablets daily. c. Rest during the day. 	<p style="text-align: center; color: blue; font-size: 24px;">Thank you!</p> 

(Luo version)

Yore mag chiemo mar nyathi kod ngat ma miyo ma pod pek

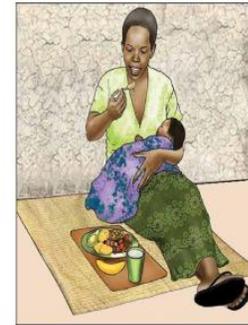


yore mag pith ma miyo ma pek onego olu



- Ndalo ma ipek, ka opogore gi seche ma ic onego imed chamo chiemo ma moko ka r dichiel pile ka pile mondo iyud teko moro kendo moromo nyathini ma nitie e ich.
- Chiemo ma ichamo onego oyudre e thuo chiemo madongo ma ong'ere.
- Madho chae kata kahawa kanyo achiel gi nyalo njawo kaka dendi tiyo gi kit chiemo
- Muony yedhe kata yiende ma medo remo kik dendi lal remo kuom ndalo ma ipek, kuom ndalo ma ok tin ne dweche adek ba nyuolo nyathini.
- Tii gi chumbi ma omedne iodine mondo dongruok mar obuongo to kod dend nyat
- Ne mine ma pod tindo kendo pod dongo arita ma omedore, chiemo ma omedore k yueyo ma ng'eny ma ohingo mine ma ose kendo osetegno, nikech udwaro chiemo n dongore go, to kendo nyathi bende dong

Yore chiemo ne miyo madhodho



- Kuom ndalo ma idhodho, ka opogore gi seche ni mag chiemo ma pile, med adhiya ni mar chiemo ma ok tin ne nyadiriyo pile mondo omedi teko, kendo omed teko ne nyathini ma idhodho.
- Med adhiya gi mag modho
- Muony yedhe mag vitamin A ma piyo bang nyuol kata ka pok okalo jumble auchiel mondo nyathini oyud vitamin A kokalo e yor dhoth.

Chako dhoth ma piyo bang nyuol



- Ket nyahini kuomi ka dende omulore gi dend ma piyo bang nyuole
- Chak dhodho nyathi ka pok thuolo mar saa achiel oromo. Mae konyo duoko chien wito remo eyor remo ma chuer.
- Colostrum, chak ma opoto ma kwongo wuok thuno bang nyuol ber kod ngima mar nyathini
- Colostrum konyo dend nyathini geng'o tuoc kendo konye e golo oko mare mokuongo ma rateng.
- Dhodh nyathi adhiya mang'eny mondo chak obed mang'eny.
- Kik imii nyathi pii mar modho kata math mor amora kuom ndalo machuok mokuongo bang nyuolne. Kuom ndalo gi, nyathi dwaro mana colostrum, nikech iye pod tin.
- dhodho miyo nyathi kit chiemo duto maddo kuom dweche auchiel mokwongo

Chak mar min nyathi oromo chiwo kit chiemo tee ma nyathi dwaro kwom dweche auchiel mokwongo



Ber mag dhodho

- Ne nyathi
- Reso ngima nyathi
 - Chiwo kit chiemo duto ma nyathi dwaro kuom dweche auchiel mokwongo
 - Ler kendo yudore e yor no ma odwarore
 - Jiwo dend nyathi kendo geng'o kute ma kelo twoche matindo kaka homa g
 - Miyo dend nyathi dongo kaka dwarore kendo e yor no ma kare.
 - Yot mondo dend nyathi otii kode kendo odonjo e dend nyathi e yor no ma
 - Oting'o pii ma dend nyathi dwaro
- Nyithindo ma odhodho timo maber e paro. Cha min miyo gig dho nyathi e yor no ma kare
 - Osiep losore gi e seche ma dend nyathi gi dend min romo, konyo nyathi e yor no ma kare
 - Konyo nyathi kik bed gi del mang'eny ahinya ka omedongo kendo duoko ch yudo tuo mar sukari .

ber dhodho ne min nyathi

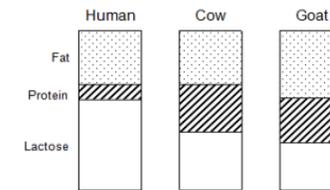
- En kaka yor no mar komo nyuol gi ata malo ma ohingo nyathi dhodho ma ok okiko ne nyathi chiemo.
- Konyo e wuok mar bang nyuol.
- Duoko chien wito remo bang nyuol
- Dhodho ma piyo bang nyuol miyo chak losore moromo
- Dhodho ma piyo bang nyuol kendo seche tee geng'o thi remo.
- Dhodho reso min nyathi kuom manyo kendo loso chien inyiewo ne nyathi e duka.
- Cha min ler, yudore seche duto, kendo yudore e yor no
- Dhodho miyo min nyathi nyalo kano pesa ma di ne otiy chiemb nyathi. Nyithindo ma ok odhodho tuore seche t mano miyo pesa tiyo mang'eny e yor thieth.
- Dhodho gero osiep maber e kind min nyathi kod nyathi
- Dhodho duoko chien yore mag dongruok mar cancer ma dag nyuol.

ber dhodho ne jo ot duto

- Miyo kod nyithinde dak gi ngima ma tin gi tuoche.
- Pes maditii e yor chiedo tuoche ma chak mamoko kelo ok bed mang'eny.
- Pes maditii e yor ng'iewo chiemb nyathi kod muro pii ok bed mang'eny.
- en yor no mar komo nyuol ka miyo odhodho kuom dueche auchiel ma ok okiko chiemo, k kuom ndalo ma pok ochako neno remo.
- Onge seche madilal e kinde mag manyo kendo loso chiemb nyathi mong'iew e duka.

kit chiemo ma yudore ei chak mar min nyathi ka opim gi chege ma moko

Nutrients in human and animal milks ^{2/3}



miyo nyathi dhoth e yor no maber



Keto nyathi mondo odhodh maber

- Kaka nyathi medo dhoth e yor ni maber, e kaka chak r yudore moromo
- Dhodho maber geng'o thuno ma barore kendo ma bec
- Dhodho nyathi ok onego omi min rem moro amora.

Ranyisi ang'wen mag dhodho maber;

1. Dho nyathi yawore maduong moromo
2. Kar thuno ma rateng(areola) nenore gi malo mar dho nyathi mohingo gi piny
3. Dho nyathi ma piny olokore gi iye
4. Tik nyathi mulo thuno mar min gi.



ranyisi mag dodho maber gin:

- a. Nyathi yuayo chak mos o yor no motegno.
- b. Min nyathi nyalo neno kendo winjo ka nyathi muonyo chak.
- c. Min nyathi ok winj rem moro amora seche ma
- d. Nyathini tieko dhoth ka oneno maoyieng kendo kwee.
- e. Thuno bedo ma yom

dhodh nyathini seche tee ka odwaro dhoth, got kod odiochieng

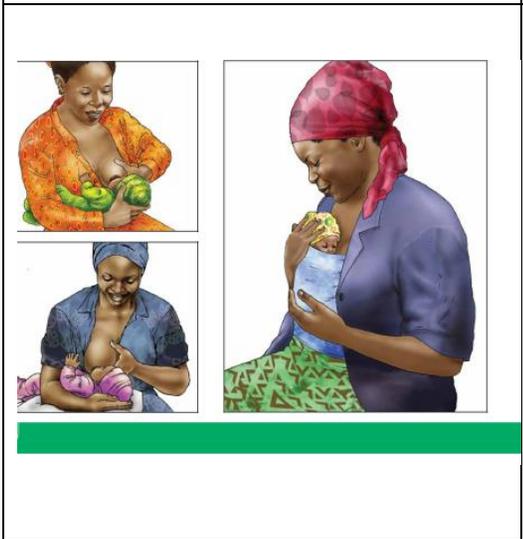
- Kik irit nyaka nyathini chak yuak eka idhodhe. Yuak en ranyisi ni ile kendo nyathi winjo kech ahinya.
- Ranyisi go makwongo nyiso ni nyathi dwaro dhodho gin kaka:
 - Nyathi chal ma onge gi kwee
 - Nyathi yawo dhoge kendo oloko wiye koni gi koni
 - Odiro lewe oko seche tee
 - Ochako dhodho kata chamo lwetene
- Ywak seche tee ok en ranyisi ni nyathi odenyo kata ni otuo. Kik imii yedhe mag nyaluo, chak mar mikebe, chak ma moko kata mana chae moko nyathi nyalo yuak nikech odwaro mana ni mondo ihoe, kata ni gimoro machande mopogore.
- Rit nyathi otiek dhodho thuno achiel, mondo eka imiye thuno machiel konyo nyathi mondo oyud chak motelo to kod chak ma achien. Chak nitie gi pii mang'eny kendo nego ne nyathi riyo. Chak ma achien nit mang'eny ma nego ne nyathi kech
- Ka dipoo ni nyathini tuo kata onindo, samoro ber ka ichiewe mondo mondo. Nyithindo onego odhodhi seche tee, **beng seche ariyo kata s adek, kinde ka kinde**. Los thulo, bed piny mondo idhodh nyathini imiye pachi moromo.
- Nyathi obed machiegni kodi. Kik itii gi chupa e miyo nyathi chak ma nikech chupa luoko tek kendo nyalo miyo nyathi yud tuoche.

yore geng'o midhiero mayudore e yor dhoth.

- Chak matin e thuno: samoro nyathi yudo chak moromo. rang ka nyathi kilo ma ok tin ne ½ kilo dwee ka dwee, kata lach ma ok seche tee to opa matin ne nyathiuchel pile
- Yuak mar nyathi nyalo bedo ranyisi mar gik mang'eny, ma moko kwom
 - **Yamo mag del** kaluwore gi kit chiamo moko ma min chamo kaka (chae soy, tong, gi njugu).
 - **Yedhe/viende ma min tivogo**, kaka kahawa, chae tea, kata soda mar nyalo chando nyathi kokalo e chae min nyathi e yor dhoth.
 - Samoro moko kuom jo ot tiyo gi ndawa.
- Nyathi kotamore dhoth mano dibed ranyisi mar:
 - **Tuo:** nyathi nyalo keto dhoge e thuno e yor no ma kare, mak mana ni ditame nikech tuo.
 - **Rem:** P dibed ni samoro dho nyati ni gi kuonde ma ogwarore kendo lit
 - **Um modinore kata dhog nani gi adhonde** (yamo nyalo mako dhog nyalo ka gig dho nyathi chako losore ahinya kuom nyithindo ma bit otegnio.
 - **Yedhe/viende ma min ne otivogo kinde nyuol**, magi nyalo miyo nyathi nindo
 - **Yor no ma min nyathi tiag'o nyathi kodhodhe:** nyathi ok yud chak ma chopi e thuno e yor no ma kare, kata thuno bedo malit ka min dhodho
 - Nyithindo nyalo bedo gi ich dwaro mopogore, kendo ich wang miyo ok dhoth; ahinya kuom nyithindo mani e kindi higni 3-12.

Dhodho e seche moko ma opogore

- Chagno ma ber mogik ne nyathi ma onyuol gi kilo ma tin, kata ma tuo, kar achiel gi nyithindo monyuol ka ndalo gi pok oromo, en chagno ma owuok kuom min.
- Dhodh nyathi adhiya mangeny mondo omii chak obed mangeny seche tee.
- Onge makosa ka nyathi yuyo chak mos mos. Med mana kete e thuno.
- Ka dipoo ni nyathi nindo dwa nindo kuom seche nmang'eny, inyalo gonyone lewni moko mondo ochiew kae odhodhi.
- Kik irit nyaka nyathi yuagi mondo eke idhodhe. Tem somo ranyisi ge mag kech chon.
- Dhodho samoro ok nyalre kuom ndalo ma bit odhuro. Ka mae timore to onego min ochir chak mondo omii nyathi kotiyogi gi kijiko kata okombe.
- Rito nyathi e yor arita mar kangaroo kelo liet moromo kendo kelo nyathi machiegni gi thuno mar min.
- Rito nyathi e yor kangaroo siro dhoth mapiyogi kendo siro dhodho ma ok okik gi chiamo ka pok nyathi oromo dueche auchiel



achiel ka achiel mitiyogo e chiro chak

Miyo onego:

- Oluok lwetene maler.
- Ochung kata obed piny maber mondo omak okombe mar chiro chak t gi thuno.
- Oket lwete mathuon e wi thuno machiegni gi alama ma rateng, to lwete mathuon oket gi piny mar thuno gi loka mar lwedo mathuon, lwetene mondo osir godo thuno.
- Obi thuno kotiyogi gi lwete mathuon to gi lwete mokuongo. Otang sana ahinya ma olor yore ma chak wuok go. Obiyo to weyo...kamano dinuoy onego omiye rem, to ka owinjo rem mano tiende ni ok otime makare.
- Chak ok bii wuok ma piyo, en mana ni bang biyo kuom kinde machud bironchako chirore.
- ochir thuno achiel kuom muda ma dirom dakika 3-5 nyaka chwer mar piny; kae ochir thuno mchielo mane odong; kae onwo chiro gi tee kud mar dakika 20-30.



Tips

- Puonjri chiro chak ma piyo bang nyuolo nyathini.
- Chir chak mondo ikane maber ka pok iwuok dala mond rito nyathi ka ionge nyalo miyo nyathi chagno.
- Ka diponi in mabor gi nyathi, chir chak oko. Mae miyo chuer kendo geng'o kuot mar thuno.
- Puonj jarit nyathini kaka onego orit nyathi ka omiye chal okombe.
- Chak mochir inyalo kan e okombe maler ka oume.chak inyalo kan kuom seche 6-8 e kama ngich, kuom seche 2 kendo kuom dueche 3-6 ei deep freezer.
- Med adhiya gi mag pidho nyathi seche ma ichiegni kode tiendeni inyalo pidhe mang'eny gotieno gi giko mag jum.
- Dhii gi nyathi e kari mar tich ka nyalore kata k ngato nya nyathi mondo idhodh seche ni mag yueyo bende inyalo kamano.
- Kwa kony koa kuom joodu moko e wi arita mar nyathini nyithindi moko, nyaka e loso gigi mag ot.

pith mar nyathi chakre dweche auchi

- Chak miyo nyathi chiemo ma moko ewi dhodho ka ochopo dweche au Dhodho pod ber nitech okelo nus mar chiemo ma dend nyathi dwaro dweche 6-12. kuong idhodh nyathi eka mondo imiye chiemo ma moko.
- Seche ma imiyo nyathi chiemo, par ewi adhiya mar pith, romo mare, te kod kit chiemo manitie e chiemo no..
- Bed gi kwee, sir nyathi mondo ochiem. Kik ichun nyathi gi chiemo. Pid san mopogore gi san ma ichiemo go.
- Rit ler e seche ma ipidho nyathi mondo igeng' diep to kod tuoche mok
 - Tii gi sende maler e pith kata e chiwo math.
 - Kan chiemo ma imiyo nyathi e kama ler.
 - Luok lweti gi pii maler machuer ka pok iloso kata pidho nyathi.
 - Chupa kata okombe ma wiye chalo thuno ok ber nitech luoko gi te kendo nyalo gamo chilo ma piyo.
- Bang chopo jo dueche auchiel, nyithindo onego omii yedhe mag vitami e higa, kendo yudo yedhe mag njofni diriyo e higa ka chakre dweche ap

Chak miyo nyathi chiemo ma moko e wi dhoth ka ochopo dweche auchiel



Pith mar dweche 6-9



Pith mar dweche 9-12



Pith mar dweche 12-24



achiel ka achiel mar pith

- Dhii mbele gi dhodho nyaka nyathi chopi ka tin to higni ariyo, kendo item miyo nyathi kit chiemo ma opogore opogore seche mag chiemo. Moko kuom chiemo gi gin
- Chiemo moa kuom le (ring'o, gweno, reh, adundo), gi tong kod chiemo mag chak.
- Chiemo ma ji ohero (oduma, ngano, mi kod kal) kaa chiel gi omuogo gi rabuton.
- oganda, olayo, njugu
- Chiemo motin'go vitamin A(maembe, apoyo, matunda fruit, machunga, alote, karat, rabuond lodha to kod budho), kaa chiel gi olemo gi alote (trabolo, mananas, nas, nyanya, abakado, kabich)
- Chak chon miyo nyathi chiemo ma oa kuom lee, kendo imiye nyading'eny.
- Ted gi maber kendo ing'ad gi mayom.
- Mi nyathi chiemo e seche ma moko ka opogore gi seche ma ong'er mag chiemo, kaka maembe, apoyo, machunga, rabuon mochwaki, sweet potatokata makate nyadichiel kata diriyo pile
- Tii gi chumbi mojiw gi iodine.

Pith mar nyithindo koluwore gi kute mag ayaki

- Dhodh nyathini ma ok ikuko ne chiemo, kendo itii gi yedhe mag kute mag ayaki.
- Dhodho ma ok ikiko chiemo kuom dueche auchiel ka in kod nyathini tiyo gi yedhe mag kute mag ayaki duoko piny yore mag kiko rembi gi mar nyathi.
- Seche ma miyo ma ni gi kute mag ayaki odhodho ma ok okiko chiemo ne nyathi kuom dueche auchiel, nyathi yudo ber mar geng'o dhodh kendo geng'o tuoche kaka diep.
- Nyithindo m oyudore gi kute mag ayaki bang jumbe auchiel onego odhodh kuom dueche auchiel ma ok okiknegi chiemo, gichak chiemo ka gichopo dueche auchiel kendo gidhodh nyaka gichopi higni ariyo.
- Nyithindo tee madhodho to ofwenyore ni onge gi kute mag ayaki bang chopo jumbe auchiel onego odhi mbele gi dhodh ma ok okiknegi chemo kuom dueche auchiel, gichak chiemo gi dueche auchiel kendo gidhodh nyaka gichopi higa auchiel gi mus.
- Dhodho onego orum mos mos, kuom thuolo mar dwe achiel, chakre ka nyathi ochopo higa auchiel gi dueche abich. Min onego one ni odhi mbele gi muonyo yedhe ge mag kute mag ayaki kuom ndalo ma ok tin ne abiryo bang loro dhodho.
- Nyithindo te ma onyuol gi mine ma ni gi kute mag ayaki, kata bed ni gisebedo ka gitiyo gi yedhe mag kute mag ayaki kata gin e tem mar thieth mar geng'o kute ma ayeaki onego omi yath mar nevirapin pile chakre nyuolgi nyaka gichop jumbe auchiel.
- Mine mani gi kute mag ayaki onego odhodh nyithindo kuom dueche auchiel ma ok okiko chiemo kata ka dibed ni yedhe mag kute mag ayaki onge.

Dhodh nyathini ma ok imiye chiemo moro amora, kendo imuony yedhe mag kute mag ayaki



Yore ma wuone nyalo konyo e pith maber mar nyithindo

- Kaka wuone, unyalo konyo mine mondo gidhodh nyithindo kuom dueche auchiel ma ok gikiko ne nyithindo chiemo.
- Nitie kweche maricho mangeny ewi pith mar nyithindo ma nyalo ketho pith mar nyithindo ma miyo nyithiwa yudo tuoche miyo nyithiwa timo marach e skol kata tho.
- Loko kweche maricho gi kendo siro pith mar nyithindo gin yore madongo e loso pith mar nyithindo
- Ber mondo usir pith maber mar nyithindo ei uteu kata anyuondeu. Moko kuom yore ma unyalo siro dhodho mar nyithindo kuom dueche auchiel ma ok okiknegi chiemo gin:
 - Konyo min nyathi timo tije ma moko mondo oyud thuolo mar dhodh.
 - Siro min nyathi kendo geng'o gigo ma dimiye achiedhnade.
- Mine nenore jogo ma nyalo rito jowetegi, lee, to gi yiende ka achiel gi gik ot ma pile, to jogo ma chwo nenore jorit mag gik moko
- Koso mar chuo donjore e rit mar nyithindo nyiso ni mine ting'o pek mang'eny mar rito nyithindo kendo chuo wito ber ma digiyudi e rit mar nyithindgi.
- En gima ber ka wuone chako arita mar nyithindo kendo neno ni gidonjore ahinya e chiwo arita gi hera ne joutegi.

Kar wuone e gero yore thieth.

Wuone nyalo konyo gero yore thieth koluwo siro:

- Mine mond gicham chiemo kma kare ma gero ngima kendo kano chiemo e del matityo e rito nyathi mani e ich knyaka dhothne ka osenyuole
 - Mine mondo ocham kit chiemo mopogore mondo giyud vitamins makare. .
 - Mine mondo gicham matunda kod alote pile
 - Mine mondo gicham kit chiemo m yudore kuom lee.
 - Mine mondo gitii gi chumbe motegi gi iodine.
- E kinde ma pok mine obedo ma pek kendo ka pod gidongo, mine onego:
- Ocham chiemo mang'eny mag dongruok mar del kaa achiel gi dongruok mar ich kendo dhodho ka nyathi osenyuol.
 - ogeng' weche mag yudo nyathi nyaka gichop higni apar gi aboro ka dendgi osedongo moromo.
- Kinde ma mine pek, onego:
- Gicham chiemo e seche mamoko mopogore gi seche ma gichiemo ga
 - Gimuony yedhe mamedo remo ma giyud e osiptal
 - Giyud yueyo moromo seche mag odiechieng.

Ero kamano!!!

