UNIVERSITY OF NAIROBI

PATTERNS OF INFANT FEEDING PRACTICES AND ASSOCIATED FACTORS IN MATHARE NORTH HEALTH CENTER, NAIROBI COUNTY

BY

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REG NO: H58/81514/2015

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF DEGREE MASTERS OF MEDICINE IN PAEDIATRICS AND CHILD HEALTH OF UNIVERSITY OF NAIROBI

NOVEMBER 2021

DECLARATION

This dissertation proposal is my original work and has not been presented for a degree in any other university.

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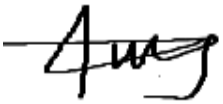
Signed.....  .Date 15/11/2021..... .....

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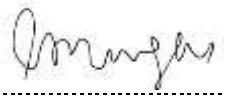
Signed  Date.....15/11/2021.....

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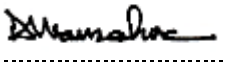
Signed  Date……15/11/2021…….....

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ANC	Antenatal Care
ART	Antiretroviral therapy
COR	Crude Ratios
HAZ	Height-for-Age z-scores
WAZ	Weight-for-Age z scores
HWZ	Height-for-Weight z scores
CWC	Child Wellness Clinics
IYCF	Infant Young Child feeding programs.
KDHS	Kenya Demographic and Health Survey
KEPI	Kenya Pediatric Immunization
KNH	Kenya National Hospital
MTCV	Mother-to-child virome
MUAC	mid-upper arm circumference
OR	Odd ratio
REDCap	Research Electronic Data Capture
SD Card	Secure Digital Card
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WLHIV	Women Living with HIV

OPERATIONAL DEFINITIONS

Exclusive breastfeeding: is defined by the WHO as no other food or drink, not even water, except breast milk (including milk expressed or from a wet nurse) for six months of life, but allows the infant to receive ORS, drops, and syrups (vitamins, minerals, and medicines).

Complementary feeding: is defined by the WHO as the process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk

Minimum dietary diversity: Proportion of children 6–23 months of age who receive foods from 4 or more food groups.

Societal Factors: are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks

ABSTRACT

Background

Good child feeding practice is a crucial determinant of infants optimal growth, development, and good health status. Appropriate nutrition within the first two years of a child's life decreases morbidity and mortality in infants and lowers the risk of chronic diseases. This encourages better child overall growth and development. Good breastfeeding practices combined with appropriate complementary feeding practices improve child development and thus reduce healthcare costs arising from frequent preventable childhood illness. Hence, there is a need to understand the patterns of infant feeding practices and associated factors that will help health practitioners prevent and address barriers to attaining exclusive breastfeeding mothers, including those living with HIV.

Broad Objective

To describe proportions of women who meet WHO recommendations for exclusive breastfeeding and minimum infant dietary diversity among women in the MTCV study in Mathare North Health Center

Study design

Secondary data analysis of a prospective longitudinal study-the mother to infant/Child virome transmission study (MTCV)

Study setting

The longitudinal study was conducted at Mathare North health center in Nairobi, Kenya

Methodology

This study was nested within the larger MTCV study. Data on maternal and child-related characteristics and infant feeding practices were abstracted from the master dataset of the more extensive MTCV study database and analyzed for this study. The abstracted data included;

breastfeeding initiation, duration of exclusive breastfeeding, and timing of introduction of complementary feeding. Other information collected during the clinic and home follow-up visits included illnesses episodes, hospitalizations, medications, infant nutrition, infant feeding practice and initiation of complementary feeding.

The MTCV study collected information from 240 pregnant women age 18-40 years attending the antenatal care clinic at Mathare Health center. For HIV-positive women, only those that were on ART for at least six months were included. A total of 164 women were eligible for this analysis after adjusting for clients for exits and lost to follow-ups.

Data management and analysis

Data collection was done using Research Electronic Data Capture (REDCap), which was securely stored on an online server. A data abstraction tool was developed that was used to extract data from the MTCV database. Only participants unique numbers were obtained alongside other related information required. Patient identifiable information was not collected to limit the amount of sensitive information extracted and protect participant confidentiality.

The results were recorded and stored in hardcopy books, on report forms, and in the Microsoft Excel workbook, protected by a password. Statistical data analysis was done using SATA software version 15.1. The descriptive statistics were presented as tables and figures. Association between the categorical variables was done using cross-tabulation and Chi-squire test.

Results

The median age of all participants was 28 years, and women living with HIV were older (median age 30years). Among WLHIV, the majority (90%) were on ART. Slightly over half (51%) of the women had secondary education or higher. Nearly all mothers (99%) initiated breastfeeding by day 4 following delivery. The rate of exclusive breastfeeding for 6 months was 84.8% with

WLHIV versus 62.4 % in women without HIV. Exclusive breastfeeding was 36% higher in WLWHIV (p=0.001). Married women were 30% less likely to report minimum dietary diversity at 9 months (p=0.001). Overall, growth measures at 15 months were similar between groups, however, lower mean HAZ was reported in women reporting exclusive breastfeeding at 6 months (P=0.003). When stratified by HIV infection, this association was retained only in HIV unexposed infants (p=0.091).

Conclusion

This study found that majority of mothers (99%) initiated breastfeeding by the fourth day following delivery. Women living with HIV were more likely to achieve exclusive breastfeeding at six months than their HIV-negative counterparts. At nine months, a high proportion of women had reported minimum dietary diversity, and by 12 months, the proportion was increased in both WLHIV and HIV-negative women. There was no noticeable difference in growth outcomes at 15 months between the two groups. Although growth measures at 15 months were similar between the groups, a lower mean HAZ was reported among women achieving exclusive breastfeeding for six months; this difference was noticed only among HIV unexposed infants when stratified by HIV infection. This could be due to other confounding factors like food supplements, biological differences, etc.

CHAPTER ONE

INTRODUCTION

1.1 Background

Globally, inadequate breastfeeding practice in combination with high levels of diseases results in more than 10 million deaths among children under five years of age, of which 41% occur in sub-Saharan Africa [1]

Over one million HIVexposed children are born worldwide every year [2] .

Evidence suggests that these children are at a higher risk of morbidity and mortality [3]

Feeding practices play a significant role in determining optimal growth, development, and health of infants. During the first two years of a child's life, appropriate nutrition decreases morbidity and mortality, the Risk of chronic diseases and encourages better overall development [4]

Exclusive breastfeeding within the first six months is only 40% globally.Adequate nutrition and appropriate complementary feeding are only actualized in just a few infants. Inadequate breastfeeding and infant feeding practices can impact children's health and nutritional outcomes, affecting their cognitive and physical development [2, 4, 5]. Infant optimal growth, exclusive breastfeeding for at least six months should be emphasized, and complementary feeding should be initiated not earlier than the 5^{th} month and no later than the 7^{th} month [6]. The two interventions may be essential for the infant's nutritional well-being, growth, and development in the first two years of life. However, several studies have reported poor adherence to the recommended practice guidelines [2, 7-9].

There is a need to explore appropriate and effective strategies to reverse the trend to improve infant feeding practices. One such approach is regular attendance of Child Wellness Clinics(CWC) and

ANC visits and some occasional home visits of mothers by healthcare workers to provide health and counselling support. Regular clinic visits by mothers and health worker home visit intervention were associated with increased timely breastfeeding initiation, exclusive breastfeeding, and rapid introduction of other foods to the infants [10-12].

Supplementary feeding remains sub-optimal in Kenya. The complementary diets for young children were reported as limited in quantity and quality and did not meet a growing child's nutritional needs. Introduction of other solid foods and liquids to children started as early as the 1st months, with many infants been initiated into complementary foods by 2-5 months. Unfortunately, these complementary foods used as breast milk substitutes were low in energy and micronutrients [13]. Only 22% of children aged 6-23 months are fed on proper diets with the required food nutrients [13]. A failure worsens poor performances on breastfeeding and complementary feeding indicators in Kenya to scale-up evidence-based interventions and strategies, incomplete understanding of cultural and economic barriers, and incorrect assumptions on poor child feeding practices [14].. Therefore, we seek to explore the patterns of infant feeding practices and associated factors among women attending Mathare North, Nairobi county

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Only 61% of children aged 0-6 months are exclusively breastfed during the first six months [13]. Complementary foods were generally initiated at the age of 6 months, while 81% of breastfeeding children aged six to nine months are undertaken to complementary foods in the last 24 hours before the survey [13]. The reviewed literature suggests that poor performance of infant and child feeding indicators is widespread. And there is also limited data on the patterns of infant and child feeding practices and the lack of data on the effects of health professional home visits on the promotion of exclusive breastfeeding and complementary feeding practices among infants aged 0-9 months

2.2. Patterns in Exclusive breastfeeding practices

Public health authorities widely recommend that infants and children be breastfed exclusively for the first six months of life because the health benefits of proper breastfeeding far much outweigh its disadvantages. The health-promoting and disease prevention benefits of breastfeeding for mothers and infants cannot be overemphasized [15-17]. The World Health Organization (WHO) has further recommended and emphasized the importance of exclusive breastfeeding of children in the first six months of life than infants before being introduced to complementary foods. Breastfeeding should continue after that until the child is two years old [18]. Exclusive breastfeeding is an ideal feeding practice recommended to attain infants' growth and development and is an intervention for improving children's nutritional status and growth [19]. Other long-term benefits of exclusive breastfeeding include enhanced cognitive development, lower rates of

obesity, reduction in chronic diseases such as diabetes (type 1 and 2), hyperlipidemia, hypertension, cardiovascular diseases, and some types of cancer [15].

Various definitions have been used to evaluate breastfeeding patterns, including defining practices in terms of exclusivity, predominance, or partial breastfeeding at four days, one month, and three months of age [20]. However, what is essential is to assess breastfeeding exclusivity, what infants and young children are fed, and ultimately, what and how they are weaned [21].

A study was done in Brazil among birth cohorts (n=233) revealed that; 65 of the children were exclusively breastfed within the first month of life and only 5 in the 6^{th} month. Unfortunately, complementary feeding was introduced as early as the first month, with 29% of the infants being given water, 15 of the infant formulas, 13 other milk, and 9·4 percent grain-based foods. At six months, children who had met the required threshold for dietary diversity and minimum acceptable diet were 47 percent, which increased to 69% at eight months [8]. A prospective cohort study was carried out in Uganda to assess complementary feeding practices [9]. only 6% of children aged 2-23 months received adequate feeding; of these, 23.9 percent were sufficiently fed while only 2.3 percent met the required adapted minimum acceptable diet.

Chuan Yu et al., a study to document the type of solid food introduced to infants before six months, found that 94% of the infants were given semi-solid or solid foods before six months while 10% were initiated on solids by four months [7]. A community-based cross-sectional study conducted in two local government areas in Lagos State found that 59.2% of the mothers initiated breastfeeding within 1 hour of delivery; 82% reported exclusive breastfeeding of the infants, and 59.2% continued up to 6 months [22]. A longitudinal study conducted in two urban slums in Nairobi [23] revealed that there was universal (99%)breastfeeding amongst all the children within the first hour after birth. In contrast, 37% were not initiated on breastfeeding. Within three days

after delivery, 10% received mixed feeding; 85% of the children continued breastfeeding up to the 11th month, while exclusive breastfeeding for six months was accounted for only 2%. This study provided insights into the infant feeding practices, proportions, and factors associated with exclusive breastfeeding for six months minimum diet diversity for 9 and 12 months.

1.3. Patterns in Appropriate complementary feeding practices

It has been observed that inappropriate child feeding practices have contributed to negative growth trends and deaths, as observed in many developing countries [24]. There is evidence that programs encouraging the implementation of recommended appropriate complementary feeding practices have reduced the incidence of stunting and improved health and growth outcomes [25]. The nutrient requirements for the growing infant are no longer adequately provided for by breastmilk alone. According to health authorities, it is recommended that appropriate complementary foods be introduced promptly and begin at six months [26].

The timely introduction of complementary feeding to children is vital for the eight infant and young child feeding (IYCF) indicators. The others are the minimum dietary diversity, minimum meal frequency, minimum acceptable diet, and iron-rich or iron-fortified foods [27]. It has been realized that the timely initiation of children to complementary feeding is critical in developing and developed countries because the early or late introduction of complementary feeding may result in malnutrition, low growth, and obesity in children [26]. This study will be providing some evidence on the patterns of complementary feeding of infants and children in the first nine months of a child's life in the Mathare North area of Nairobi County.

1.4. Maternal factors associated with infants and child feeding practices.

Co-parenting Breastfeeding Support

It has been shown that the attitudes fathers have towards breastfeeding and the lack of support they provide to breastfeeding partners negatively affect breastfeeding outcomes [28]. There are few breastfeeding interventions targeting fathers provided by health care professionals and where these interventions have been provided,positive outcomes have been noted in terms of increasing breastfeeding exclusivity, paternal breastfeeding confidence, and increased feeding duration [28].

Maternal age and health status

A study in Nigeria found out that a mothers' health status was likely to influence their children's feeding patterns [29]. Mothers who are ill were less likely to breastfeed their children and instead offer complementary foods even when their children were not at the right age to introduce complimentary meals. During their illness, mothers believed that their children were not getting satisfied with breast milk. On the other hand, the mother's mental health status exhibited through depression did not significantly influence the child's feeding practices or nutritional status [30]. A study in China found that the minimum dietary diversity was significantly associated with maternal age [31]. In this study, infants with mothers younger than 24 years old were less likely to consume diverse diets than those whose mothers were older than 30 years old. In the same study, the maternal age group didn't impact minimal meal frequency. Likewise, a minimum acceptable diet was significantly associated with maternal age group with an infant whose mothers were younger than 24 years old having 30% fewer odds of consuming proper diet than those whose mothers were older than 30 years old

Maternal education and occupation

Mothers with a lower level of education were more likely to initiate complementary foods earlier. In addition, they didn't introduce complementary feeds concurrently with breastfeeding, and their children were exposed to fewer foods by the age of 12 months [32]. In Tanzania, higher levels of maternal education were associated with minimum dietary diversity, minimum acceptable diet, and minimum meal frequency [33]. Similar findings were reported in Nigeria in which a higher maternal education level was more likely associated with meeting the minimum dietary diversity [29]. Mothers who returned to work early were most likely to breastfeed for a shorter duration and introduce complementary foods earlier compared to those who did not have to return to work [34]. However, a study in Uganda found no evidence of an association between breastfeeding and the mother's occupation [35]. In Kenya, the minimum acceptable diet was positively associated with the mother's education level [36].

Marital status and place of residence.

A multilevel study done in Sub-Saharan Africa found mother's marital status influenced breastfeeding decisions. Being a single mother was associated with higher odds of achieving exclusive breastfeeding [37]. Similarly, in Vietnam, a mother's breastfeeding status was related to occupation [38]. A mother's place of residence was more likely to influence breastfeeding awareness, as evidenced amongst slum mothers attending antenatal clinics [39].

Religion

Among slum mothers attending antenatal clinics, religion showed a crucial association with breastfeeding awareness [39]. In India, a study showed an association between Knowledge regarding breastfeeding and belief [40]. Studies in Nepal and Nigeria did not reveal any significant association between initiating breastfeeding and beliefs [41]. Further, religion was considered

alongside other factors such as parity, occupation, family type, education, marital status, age, and family size. They jointly accounted for close to one-third of the changes observed in mothers' attitudes toward exclusive breastfeeding [42].

Wealth quintiles

In Tanzania, higher wealth quintiles among mothers were associated with minimum dietary diversity and minimum acceptable diet, and minimum meal frequency. Wealth quintiles were associated with parents' ability to buy diversified food products, coupled with the provision of highly processed animal proteins [33]. Similar findings were reported in a study that evaluated complementary feeding practices in mothers and children's nutritional status in Nigeria [29]

Cultural practices

Some cultural practices and beliefs lead to shorter durations of breastfeeding, such as was evident among Iraqi-born and Somali-born mothers [43]. Cultural variations of growth perceptions in children were also reported among Turkish and Dutch women [44]. Turkish women perceived a chubby baby as prettier and healthier, which motivated them to exclusively breastfeed their infants and young children up to 6 months before introducing complementary foods. They exclusively breastfed their children and only introduced complementary feeds at six months of age as they were more concerned with their growth and maintaining their children's appearances. In Tanzania, the existing cultural norms and beliefs in some societies related to child breastfeeding and complementary feeding were associated with poor infant and young child feeding practices [45]. There was an early introduction of complementary foods, especially plain maize porridge, with minimal milk consumption.

1.4.1. Knowledge, attitudes, and practices towards infant feeding practices

Mothers who had previous experience with breastfeeding were more likely to breastfeed their children again [46]. Most mothers have good Knowledge about breastfeeding and complementary feeding practices [47]. Mothers who perceived that their friends breastfed their children were also most likely to breastfeed their children [34]. Depending on wealth status, i.e. education and place of residence, mothers may fail to differentiate between various formula feeds with breastmilk, and some could assume that one substitutes another (46). Mothers also tend to have varying perceptions of complementary medicinal products and their benefits in supporting lactation and breastfeeding. The majority of women perceive complementary medicinal products to be beneficial [48].

Postnatal care utilization

A study done in Ethiopia found that maternal postnatal care visits were a predictor of the timely introduction of complementary foods [49]. Similarly, lack of postnatal visits is associated with sub-optimal complementary feeding practices [50]. Mothers who had postnatal care were more likely to continue with breastfeeding than those who did not. The efficacy of postnatal care on breastfeeding increased through individualized plans and options [51].

1.4.2 Child factors associated with infant and young child feeding practices

Gender, health status, and place of delivery

A study in Sudan found that mothers with male children delayed breastfeeding[52]. The findings have been confirmed in a meta-analysis that showed mothers with male newborns had a higher chance of initiating breastfeeding within the first one hour of delivery and breastfed them on breast milk only for the first six months compared to their counterparts with female newborns [53]. In Ghana, a study showed that children born in the hospitals were more likely to be exclusively

breastfed and had better growth and nutritional outcomes than those not born in health centers, dispensaries, or assisted by skilled birth attendants [54]. Mothers who deliver at health facilities spend more time with health workers who counsel them on exclusive breastfeeding and the introduction of appropriate complementary foods at the appropriate time. Children born out of health facilities do not enjoy similar advantages. They are most likely to suffer from delayed breastfeeding initiation or are breastfed for shorter durations and are also introduced to complementary feeding before the right age. A study in Nigeria found out that child's health status was likely to influence their feeding patterns [54]. Children who are ill were likely to be fed complementary feedings even when they were not at the right age to introduce complimentary meals. Ill mothers believe that they never had enough breastmilk for their children. Similarly, mothers with low health status delayed breastfeeding their babies [52]. Likewise, there has been evidence of a significant positive relationship between the infant health status and the mother's attitude towards breastfeeding [46].

Effects of home visitation on infants and child feeding practices

A randomized clinical trial in Guatemala found no significant differences in children's nutritional status who had monthly home visitations compared to those on standard health care and follow-up from health facilities [55]. However, in the Guatemala study, children who were visited at home by community health workers had an improved variety in terms of dietary supplements and their minimum acceptable diets compared to those on standard care from health facilities. A study in Kenya also found similar results, evaluating community-based baby-friendly interventions, including home visitations [56].

2.1 Problem Statement

For the child's optimal growth and nutritional well-being, it is recommended that infants are exclusively breastfed until at least six months, and complementary feeding is initiated not earlier than the 5th month and no later than the 7th month. Several studies have evaluated whether there is adherence to these recommendations. However, they have reported a dismal performance on the indicators of these two interventions. The reasons why mothers do not achieve exclusively breastfeeding for their children or lack appropriate time for complimentary food includes mothers' busy schedules and lack of enough breast milk. There is also some cultural justification for the earlier introduction of infants to other foods. The use of clinic visits to support mothers on proper feeding practices has not improved much of the sub-optimal infant and child feeding indicators such as breastfeeding initiation rate, exclusive breastfeeding duration, breastfeeding rate, and timely initiation of complementary feeding. WHO/UNICEF has recommended providing supportive health services with infant and child feeding counselling during contact with the child and the mother during ANC, and Child Wellness Clinics (CWC) visits to improve optimal feeding practices among caregivers.

Additionally, they suggest that community engagements through support groups and health promotion campaigns should be carried out to encourage breastfeeding mothers to attain acceptable feeding practices. However, due to logistical and financial challenges, health worker home visits are not happening even though studies have revealed that mothers breastfeeding rates can be increased by using home-based interventions with support from a health professional. Our study described the proportions and prevalence of women who meet WHO recommendations for exclusive breastfeeding and minimum infant dietary diversity among women in the MTCV study

in Mathare North Health Center. Additionally, we looked at factors associated with exclusive breastfeeding for six months and diet diversity for nine and twelve months.

2.2 Study justification

Improving infant and child feeding practices has essential benefits to a child, mother, and society. Few children receive nutritionally adequate and safe complementary foods. In many countries, especially in Sub-Saharan Africa, exclusive breastfeeding rates still stand very low; less than a fourth of infants 6–23 months of age meet the criteria of dietary diversity and feeding frequency that are appropriate for their age.

Improving infant and young child feeding practice through breastfeeding and appropriate complementary feeding result in lowering health costs for individual families and at the national level. The Kenya Demographic survey reported that only 61% of infants are exclusively breastfed. Provision of supportive health services with infant and child feeding counselling during all contact hours with the child and the mother can be a sure way to improve infant feeding practices among caregivers. This study will help to determine the prevalence of exclusive breastfeeding in this community and determine gaps that need to be addressed.

2.3 Research questions

1. What is the overall proportion of women achieving exclusive breastfeeding in the MTCV cohort and specifically proportion of HIV positive and HIV negative women who continue exclusive breastfeeding for 6 months?
2. What is the proportion of HIV positive and HIV negative reporting their infant meets criteria for minimum dietary diversity (4 food categories) at 9 and 12 months of age?

3. What are the health (HIV) and sociodemographic factors associated with attaining exclusive breastfeeding for 6 months and minimum dietary diversity at 9 and 12 months?

2.4 Objectives

2.5.1 Broad objective

To describe proportion of women who meet WHO recommendations for exclusive breastfeeding and minimum dietary diversity among women in the MTCV study in Mathare North Health Center.

2.5.2 Primary objective

To determine the prevalence of HIV positive and HIV negative women who continue exclusive breastfeeding for 6 months.

2.5.3 Secondary objectives

1. To determine the proportion of HIV positive and HIV negative reporting their infant meets criteria for minimum dietary diversity (4 food categories) at 9 and 12 months of age.
2. To define health (HIV) and sociodemographic factors associated with attaining exclusive breastfeeding for 6 months and minimum dietary diversity at 9 and 12 months

CHAPTER THREE

METHODOLOGY

3.1. Study design

This study was nested within the larger MTCV study. Data on maternal and child-related characteristics and infant feeding practices were abstracted from the master dataset of the more extensive MTCV study database and analyzed for this study. The abstracted data included; breastfeeding initiation, duration of exclusive breastfeeding, and timing of introduction of complementary feeding. Other information collected during the clinic and home follow-up visits included illnesses episodes, hospitalizations, medications, infant nutrition, infant feeding practice and initiation of complementary feeding.

3.2. About the Linda Kizazi (MTCV) study

The Linda Kizazi study was a longitudinal study characterizing the determinants of mother-to-child virome (MTCV) transmission and how components of the virome affect infant health. Mother-infant pairs were followed for 2 years postpartum, including additional home visit follow-ups for women who elected the home visit group.

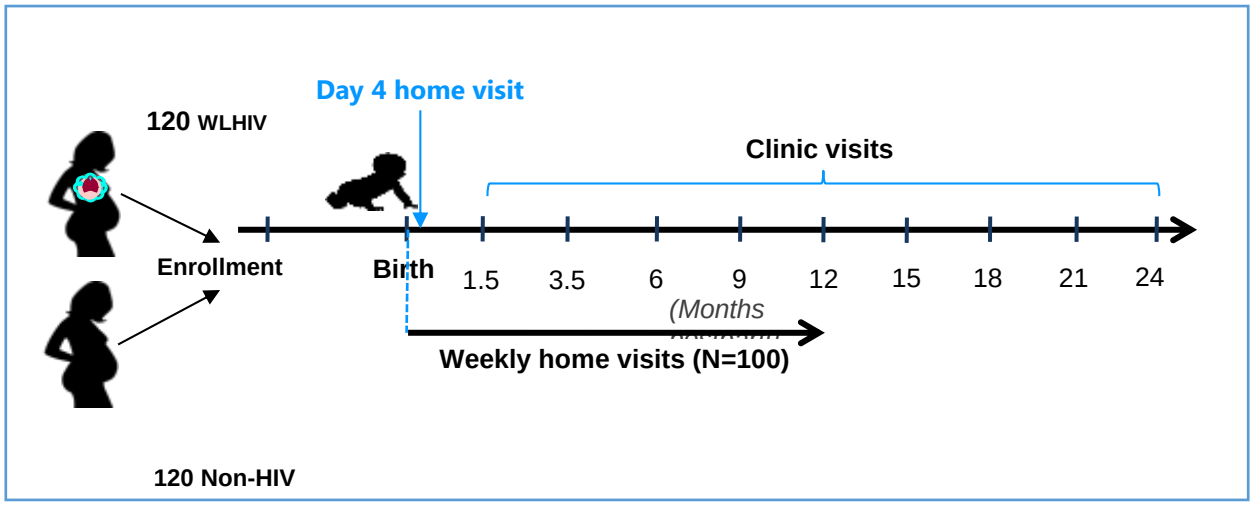

Figure 1: Flow chart showing the Linda Kizazi study design

The study enrolled 120-HIV-infected and 120-HIV-non-infected pregnant women attending antenatal visits at Mathare North health center. Women within the gestation age of at least 28 weeks and not more than 42 weeks were eligible to join the study. Follow-up was initiated at 28 weeks gestation after enrollment and continued through to labor, delivery, and for two years postpartum. Additional home visits were also conducted for those participants selecting home visits arm. The study had two sub-groups; clinic group and home visit group. Those in the clinic group were women selecting clinic visits only while those women who chose additional home visits were included in the home visit group. In all the follow-up visits, infant anthropometric measures were taken. Maternal sociodemographic were collected at enrollment. Information on infants, including age, feeding patterns, and characteristics, were also collected.

A data abstraction tool was developed that was used to extract data from the Linda Kizazi study database. Only participants' unique numbers were obtained alongside other related information required. Patient identifiable information was not collected to limit the amount of sensitive information extracted and also to protect participant confidentiality

3.2. Study area description

This study utilized the data that was collected from the Linda Kizazi study that was conducted at the Mathare North Health Center which serves the catchment population of Mathare North hospital. Mathare North is part of the larger Mathare informal settlement situated in the northern part of Nairobi city. The informal settlement has approximately half a million, with a community of women (50.3%) being higher than men (49.7%).

Also, nearly 80% of the population is younger than 35 years. Mathare North health Centre is a public health facility managed by the city-county government. It has four cots and a 24-bed capacity maternity wing. It offers only vaginal delivery services, and any complications requiring emergency cesarean section are referred to Pumwani Maternity or Kenyatta National Referral hospital. The facility provides comprehensive Care services offering antiretroviral therapy and counselling, Family planning, community outreach services, inpatient maternity services, and outpatient pharmacy. Emergency cases are referred to as higher-level health facilities such as Pumwani and KNH.

3.3 Study population

The study population was drawn from the larger MTCV study and included mother-infant pairs from birth up to 12 months

3.3.1 Inclusion Criteria

To participate in this study, mother-infant pairs infants meet all of the following criteria:

- Mothers with infants aged between birth to 12 months

- Mother had given consent for participation in the MTCV study
- Participants consenting for information to be used for other related studies

3.3.2 Exclusion Criteria.

- Women who exited the study before 6 or 12 months of follow-up

3.4. Sample size calculation.

The larger Linda Kizazi Study was powered for the primary goal of comparing the diversity of the infant virome between HIV-exposed uninfected and HIV-unexposed infants. The sample size was designed to provide 80-90% power at α=0.05 to detect a 0.5-1 difference in the Shannon Diversity Index in infant plasma and stool viromes between the HIV exposed and unexposed infants assuming a standard deviation of 1-1.5.

For our nested analysis, we calculated the statistical power to detect the difference in our primary outcome. We used the priori approach of power calculation to detect whether we had enough power to detect an association in exclusive breastfeeding at six months between WLHIV and those without HIV. Given our sample size of 85 HIV-negative women and 79 women living with HIV, and the proportions of exclusive breastfeeding we found at 6 months were (63.4% and 84.8%), we had 87% power to detect a significant difference between the groups at the alpha=0.05 level. Therefore, our analysis was adequately powered to detect a difference between our exposure groups by exclusive breastfeeding at six months.

3.5. Sampling Procedure.

A data abstraction tool was prepared and used to obtain data from the Linda Kizazi master database. The total sample of women who met the inclusion criteria was 146 mother-infant pairs after adjusting for participant exits, drop-outs, and those who had not achieve their month 12 follow-up.

3.6. Recruitment and Consenting Procedures

For this nested analysis, there was no new recruitment and consenting of participants as the data that was used for this analysis was already collected in the MTCV study (for which participants had already consented to participate and allowed their data to be used for related studies, see appendix for MTCV approved consent). In the Linda Kizazi study, data collection procedures were strictly followed. Study research staff identified eligible women and informed them about the study. Those women who showed Interest were then referred to a trained study nurse/counselor who conducted a brief structured interview to assess eligibility and obtained written informed consent for both the mother and the child before the enrollment. Women then completed a baseline interview at their enrollment visit to record sociodemographic information and comprehensive medical and obstetric history, including physical examination.

3.7. Sample data collection

3.7.1. Follow-up Visits.

Clinic Visits

All study participants attended study clinic visits at the following time points 6 weeks,10weeks, 24weeks (6 months), 36weeks (9 months), and at months 12,15, 18, 21, and 24. Their clinic visits

for the duration were aligned with the Kenya Pediatric Immunization (KEPI) schedule to maximize attendance and minimize inconvenience for participants. At each clinic visit, women and infants were given a standardized wellness review where they were interviewed regarding illnesses, hospitalizations, medications, infant nutrition (infant feeding practice and initiation of complementary feeding), and received physical examination. In addition, anthropometry measurements for infants were taken, including infant weight, length, head circumference, and mid-upper arm circumference (MUAC). Weight-for-age, weight-for-height, and height-for-age standards deviations were all monitored.

Home Visits

The study staff conducted weekly visits at the participants' homes for one year postpartum, after which clinic visits continued for an additional year. At each home visit, the study nurses or peer counselors/ administered a questionnaire that collected data similar to the clinic data regarding infant and young child diet, maternal/infant health, and assessed infant development. The mothers were also interviewed regarding illnesses, hospitalizations, medications, infant nutrition (infant feeding practice and initiation of complementary feeding)

3.8. Data Management

3.8.2. Data Abstraction, Storage and Security

The standardized data abstraction tool was used to obtain data from the Linda Kizazi master REDCap database. All data in the Linda Kizazi (MTCV) study was collected using an electronic Research Electronic Data Capture (REDCap) tool that was installed on tablets for offline data collection. The MTCV study database was password protected and only permitted a limited

number of study staff. The MTCV data manager assisted with the data abstraction following approval and permissions from the study principal investigators. The abstracted data was then transferred to an excel file before being imported to STATA software version 15.1 for data transformation and analysis. Figure 2.0 shows a summary of the data abstraction tools and including information extracted for the primary objective.

Objective	**Data abstracted**
To determine the prevalence of HIV positive and HIV negative women who continue exclusive breastfeeding for 6 months.	The total number of mother-infant pair Age of infants breastfeeding practices (age at initiation, frequency, and duration) Complementary feeding: age at initiation, rate.
Factors associated with exclusive breastfeeding /Minimum diet diversity	Maternal socioeconomic variables; age, education, income, parity, marital status, employment characteristics, maternal height, ART regimen for WLWHIV) Infant; age, gender, mode of delivery, birth weight, gestation age)

Figure 2: A summarizy of the abstracted data that were analyzed to meet the study objectives.

3.8.3. Data Analysis.

The patient sociodemographic and infant characteristics were obtained using a structured data abstraction tool. Statistical data analysis of the results was done using STATA software version 415.1. Descriptive statistics were computed for both continuous and categorical variables. For continuous variables having normal distribution, the mean and SD were computed The descriptive statistics were presented as tables and figures in the form of bar graphs and pie charts. Relative Risk was used to compare rates of these 3 indicators in women living with HIV and women without HIV. Association between the categorical variables (exclusive breastfeeding, minimum diet diversity at 9 and 12 months with growth outcomes at 15 months (WAZ, HAZ, WHZ) was examined using cross-tabulation, Chi-square tests and student t-test. A P-value of < 0.05 was considered statistically significant.

3.8.4. analysis of the primary objective

Under this objective, the primary outcome variable was exclusive breastfeeding at six months. The primary outcome variables were computed by calculating the proportion of women who achieved 6 months exclusive breast feeding (n) overall and then within both sub groups of women living with HIV and HIV negative and expressed this as percentages of the of the total number of women (N) who met eligibility criteria for this study.

Analysis of secondary objectives:

Mother and child-related characteristics were used as independent variables in the regression analysis to establish the associations. A bivariate analysis was first conducted to explore the mother-child-related characteristics on the primary outcome. Minimum diet diversity was used as a proxy to complementary feeding practices and was used as the outcome variable in the secondary

objectives. Minimum Dietary Diversity is the consumption of four or more food groups from the seven food groups for higher dietary quality and to meet daily energy and nutrient requirements of the seven recommended food groups.

3.9 Ethical Consideration

The Linda Kizazi study was approved by both the Kenyatta National Hospital /UON ERC and the University of Washington (UW) Institutional Review Board (IRB). This nested study received ethical approval from the Kenyatta National Hospital/University of Nairobi Ethics Review Committee. Permission to conduct this study was sought from the principal investigators of the MTCV study. Participation in the MTCV study was voluntary, and written consent was obtained from mothers for the mother-infant pairs. The mothers during consent allowed for their samples and data collected to be used in other future studies. The consent form was available in English and Kiswahili. Only participants who were conversant in either English or Kiswahili were enrolled. It was explained to the mothers that their enrollment in the study was not obligatory, and they were free to leave the study at any time of their choice. They were informed that decision not to participate in the study would not affect the services they were receiving from their scheduled follow-up clinics or other departments at the Mathare North Health center or any other public/government health facility.

3.9.1 Confidentiality

All key personnel involved in the MTCV study were trained on the Protection of Human participants before they began working on the study. The study staff took every precaution to protect participants' confidentiality. Data regarding all personal information of the participants

were deidentified and personal information was not used as identifiers. A link log was used to link the participant study Identifier to their personal information. The password/key to this link log was stored in a REDCap database separate from the database that holds the coded study data (questionnaires). Two-step validation with Duo was used for added security. Only staff who needed to abstract patient identifiers for clinical purposes, link medical record numbers or conduct home visits had access to this link-log database.

CHAPTER FOUR

4.0 RESULTS

4.1. Sociodemographic characteristics of the participants

A total of 164 participants met the inclusion criteria for this study. Women living with HIV were 48% (n=79), and almost all of them (90%) were on ART 1st line regimen. The overall median age was 28 years, while WLHIV was older (median age 30 years). The majority of the women were married (90%), while half (51.2%) of the participants had secondary education or higher. 44% of the women were employed. Among this study cohort, 36 % of mothers consented to receive weekly home visits by health workers and peer counsellors in addition to the clinic visits. The overall median height was 161cm, with no difference in women's height between the two groups. WLWHIV recorded at least two previous live births compared to HUV negative women recoding only one previous live birth (p=0.027).

Table 1 shows the characteristics of the study population.

Table 1: Distribution of maternal sociodemographic characteristics of the participants

	Overall		HIV-negative Mothers		Mothers Living with HIV		
	N	Median (IQR) or n (%)	N	Median (IQR) or n (%)	N	Median (IQR) or n (%)	p-value
Maternal characteristics							
Age at enrollment (years)	164	28 (24-32)	85	26 (23-31)	79	30 (26-33)	<0.001
Married	164	148 (90.2)	85	80 (94.1)	79	68 (86.1)	0.083
Mother employed	164	73 (44.5)	85	35 (41.2)	79	38 (48.1)	0.37
Education level	164		85		79		0.02
Secondary education or higher		84 (51.2)		51 (60.0)		33 (41.8)	
Primary education or less		80 (48.8)		34 (40.0)		46 (58.2)	
Height (cm)	164	161 (156-166)	85	161 (156-165)	79	161 (158-166)	0.74
Previous live births[1]	146	2 (1-3)	70	1 (1-2)	76	2 (1-3)	0.027
Enrollment subgroup	164		85		79		0.11
Home visits		60 (36.6)		36 (42.4)		24 (30.4)	
Clinic visits only		104 (63.4)		49 (57.7)		55 (69.6)	
ART regimen[2]					79		n/a
TDF/3TC/EVF						71 (89.9)	
Other[3]						8 (10.1)	

4.2. Participants characteristics: Infants

There was no difference in infant characteristics between the two groups. There were slightly more male infants 54% (n=90). A total of 53.2% of them were sero-exposed. The majority of deliveries were vaginal (88.9). The mean birth weight was 3.3 kgs. Overall, only 5.2% of infants were preterm delivery (4.9 % in sero-exposed infants vs 5.4% in HIV non-exposed. Only 5.6% of infants experienced difficulty breastfeeding four days after delivery.

Table 2: Distribution of infant characteristics

Infant characteristics		Overall		HIV-negative Mothers		Mothers Living with HIV	
Infant gender	164		85		79		0.67
Male		90 (54.9)		48 (56.5)		42 (53.2)	
Female		74 (45.1)		37 (43.5)		37 (46.8)	
Mode of delivery	135		74		61		0.5
Vaginal		120 (88.9)		67 (90.5)		53 (86.9)	
Cesarean section		15 (11.1)		7 (9.5)		8 (13.1)	
Infant birthweight (kg)	133	3.3 (3.0-3.5)	73	3.3 (3.0-3.6)	60	3.3 (3.0-3.5)	0.62
Low birthweight (<2.5 kg)	133	1 (0.75)	73	1 (1.4)	60	0 (0.0)	0.36
Preterm birth (<37 weeks gestation)	135	7 (5.2)	74	4 (5.4)	61	3 (4.9)	0.9
The infant received ARV prophylaxis by Day 4 visit					56	56 (100.0)	n/a
The mother reported difficulty nursing at Day 4 visit	125	7 (5.6)	69	6 (8.7)	56	1 (1.8)	0.095

4.3. Proportions of participants achieving the 4 study outcomes, overall and stratified by HIV infection.

Almost all mothers (99%) initiated breastfeeding within the first four days postpartum. Although overall, 73.2% of women achieved exclusive breastfeeding at six months, women living with HIV were more likely to achieve exclusive breastfeeding for six months (84.8%) compared to HIV-

negative women (62.4%), p= 0.001. At 9 months, half of the women had reported minimum diet diversity (51.2%), and the proportion was high at month 12 (~74%) in both WLHIV and HIV-negative women.

Table 3: Proportions of participants achieving the 4 study outcomes, overall and stratified by HIV infection.

		Overall	HIV-negative Mothers		Mothers Living with HIV	
	N	Median (IQR) or n (%)	N	Median (IQR) or n (%)	N	Median (IQR) or n (%)
1. Initiated breastfeeding by Day 4 visit[1]	1262		70		56	
Yes		**125 (99.2)**		69 (98.6)		56 (100.0)
No		1 (0.8)		1 (1.4)		0 (0.0)
2. Exclusive breastfeeding for 6 months	164		85		79	
Yes		120 (73.2)		**53 (62.4)**		**67 (84.8)**
No		44 (26.8)		32 (37.7)		12 (15.2)
3. Dietary diversity at 9 months	164		85		79	
Yes		**84 (51.2)**		40 (47.1)		44 (55.7)
No		80 (48.8)		45 (52.9)		35 (44.3)
4. Dietary diversity at 12 months	164		85		79	
Yes		**122 (74.4)**		63 (74.1)		59 (74.7)
No		42 (25.6)		22 (25.9)		20 (25.3)

4.4. Correlates of exclusive breastfeeding for 6 months

Women living with HIV were 36% more likely to achieve exclusive breastfeeding at 6 months (RR 1.36 [1.13 – 1.64] P=0.01). Other sociodemographic characteristics assessed did not show

association with exclusive breastfeeding at 6 months. However, there was a trend of association for maternal education with women having secondary education or higher were 16% more likely to achieve exclusive breastfeeding at six months compared to women with primary education and below (1.16 [0.964, 1.41], p=0.115).

Table 4: Correlates of exclusive breastfeeding at six months

		Exclusive BF 6 months
Cofactor (exposures)	N	RR (95%CI), p value
Age at enrollment greater than median age[1]	164	1.12 (0.932, 1.35), p=0.223
Living with HIV	164	1.36 (1.13, 1.64), p=0.001
Married	164	1.19 (0.804, 1.56), p=0.385
Employed		1.05 (0.877, 1.27), p=0.571
Secondary education or more	164	1.16 (0.964, 1.41), p=0.115
≥1 previous live birth	164	0.971 (0.766, 1.23), p=0.805
Received Weekly Home visits	164	1.04 (0.861, 1.26), p=0.684
Caesarean section	135	1.06 (0.764, 1.47), p=0.726
Infant female	164	0.962 (0.797, 1.16), p=0.686
Infant low birthweight	133	--
Infant preterm	135	1.03 (0.634, 1.66), p=0.913

4.5. Correlates of reporting minimum dietary diversity at 9 and 12 months.

Married women were 30% less likely to report minimum diet diversity at 12 months (0.703 [0.637 - 0.777], p<0.001). There was no significant association between other indicators and reporting minimum diet diversity at 9 and 12 months.

Table 5: Correlates of reporting minimum dietary diversity at 9 and 12 months.

		Minimum DD 9 months	Minimum DD 12 months
Cofactor (exposures)	N	RR (95%CI), p-value	RR (95%CI), p value
Age at enrollment greater than median age[1]	164	1.16 (0.856, 1.56), p=0.345	1.02 (0.849, 1.22), p=0.861
Living with HIV	164	1.18 (0.877, 1.60), p=0.270	1.01 (0.842, 1.21), p=0.934
Married	164	0.901 (0.568, 1.43), p=0.657	0.703 (0.637, 0.777), p<0.001 *
Employed		0.890 (0.656, 1.21), p=0.456	0.990 (0.826, 1.19), p=0.913
Secondary education or more	164	0.999 (0.741, 1.35), p=0.994	1.05 (0.878, 1.26), p=0.589
≥1 previous live birth	164	1.37 (0.840, 2.22), p=0.208	1.27 (0.931, 1.74) p=0.131
Received Weekly Home visits	164	1.18 (0.875, 1.59), p=0.280	1.09 (0.908, 1.30), p=0.365
Caesarean section	135	0.800 (0.420, 1.52), p=0.498	1.07 (0.912, 1.40), p=0.643
Infant female	164	1.00 (0.744, 1.36), p=0.976	0.934 (0.778, 1.12), p=0.466
Infant low birthweight	133	--	--
Infant preterm	135	0.871 (0.364, 2.09), p=0.756	--

4.6. Comparison of growth outcomes at 15 months in women reporting exclusive breastfeeding

Growth measures at 15 months were similar between groups overall, with or without the three indicators (exclusive breastfeeding and diet diversity at 9 and 12 months). However, lower mean height for age z- scores (HAZ) in women reporting exclusive breastfeeding at six months was reported (p=0.03). After stratifying the analysis by HIV infection, this observed difference was only in the HIV – unexposed infants. These surprising results could be due to other confounding variables like food supplements, real biological differences or due to statistical artifacts, such as additional confounders, or bias (because the families followed for 15 months might be different than those who dropped out between 6-15 months).

Table 6: Comparison of growth outcomes at 15 months in women reporting exclusive breastfeeding

Outcomes (treated continuous variable)		Exclusive breastfeeding for 6 months (Mean, SD)		
Growth at 15 Months	N	Yes	No	Crude p-value
All Infants	164			
WAZ	101	-0.53 (1.0)	-0.37 (0.85)	0.444
HAZ	99	-0.64 (1.5)	0.032 (1.3)	0.03
WHZ	99	-0.53 (1.3)	-0.67 (0.65)	0.597
HIV-unexposed infants	85			
WAZ	54	-0.42 (1.0)	-0.26 (0.79)	0.551
HAZ	53	-0.40 (1.3)	0 .23 (1.4)	0.091
WHZ	53	-0.52 (1.2)	-0.65 (0.93)	0.659
HIV-exposed infants	79			
WAZ	47	-0.62 (1.0)	-0.65 (1.0)	0.922
HAZ	46	-0.83 (1.6)	-0.54 (1.0)	0.617
WHZ	46	-0.54 (1.4)	-0.72 (1.1)	0.734

4.7. Comparison of growth outcomes at month 15 in women reporting minimum dietary diversity

Overall, growth measures at 15 months were similar between groups of women reporting minimum diet diversity at 9 and 12 months. When stratified by HIV infection, there was still no difference between the groups.

Table 7: Comparison of growth outcomes at month 15 in women reporting minimum dietary diversity

Outcomes (treated continuous variable)		Met Minimum Dietary Diversity at 9 months (Mean, SD)			Met Minimum Dietary Diversity at 12 months (Mean, SD)		
Growth at 15 Months	N	Yes	No	p-value	Yes	No	p-value
All Infants	164						
WAZ	101	-0.43 (1.0)	-0.54 (0.94)	0.568	-0.46 (0.92)	-0.55 (1.3)	0.749
HAZ	99	-0.59 (1.5)	-0.24 (1.3)	0.237	-0.38 (1.4)	-0.73 (1.5)	0.389
WHZ	99	-0.42 (1.3)	-0.77 (1.1)	0.153	-0.58 (1.2)	-0.53 (1.1)	0.888
HIV-unexposed infants	85						
WAZ	54	-0.31 (0.93)	-0.40 (0.96)	0.731	-0.42 (0.85)	-0.028 (1.3)	0.256
HAZ	53	-0.20 (1.4)	-0.054 (1.3)	0.704	-0.13 (1.3)	-0.13 (1.5)	0.994
WHZ	53	-0.46 (1.0)	-0.70 (1.2)	0.418	-0.65 (1.1)	-0.17 (1.1)	0.253
HIV-exposed infants	79						
WAZ	47	-0.54 (1.1)	-0.74 (0.90)	0.515	-0.52 (1.0)	-1.2 (1.0)	0.093
HAZ	46	-0.98 (1.58)	-0.50 (1.3)	0.284	-0.67 (1.5)	-1.4 (1.4)	0.223
WHZ	46	-0.38 (1.5)	-0.85 (0.94)	0.239	-0.51 (1.4)	-0.96 (1.1)	0.42

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

5.1. Discussion

This nested study aimed to investigate the patterns of women who meet WHO recommendations for exclusive breastfeeding and minimum infant dietary diversity among women in the MTCV study in Mathare North Health Center in Nairobi, Kenya. Minimum diet diversity was used as a proxy to complementary feeding practices as per the WHO guidelines.

This study had a total of 164 women who met the inclusion criteria. Women living with HIV were older (mean age 30 years) compare to women without HIV (mean age 27 years old).

Exclusive breastfeeding

Most mothers in this study breastfed in the early postpartum period and initiated breastfeeding within four days of delivery. 73% of mothers were able to achieve exclusive compare to another study done in kenya with similar settings found only 2% of mothers achieved exclusive breastfeeding for six months [23]. Mothers with HIV were more likely than uninfected mothers to report exclusive breastfeeding for six months.But another study done in South Africa with a simple size of 665 HIV positive mothers and 218 HIV negative mothers found that 11% of HIV positive mothers versus 0.7% respectively practiced exclusive breastfeeding for 4 month [57] Mothers with HIV who practiced exclusive breast feeding for six months did not report any difference in achieving minimum diet diversity at 9 and 12 months. This study did not find any significant difference in socio-economic status for exclusive breastfeeding for six months or minimum diet diversity for 9 and 12 months. However, lower mean height for age z- scores (HAZ) in women reporting exclusive breastfeeding at six months was reported (p=0.03). After stratifying the

analysis by HIV infection, this observed difference was only in the HIV unexposed infants. These surprising results could be due to other confounding variables like food supplements, real biological differences, or due to statistical artifacts, such as additional confounders, or bias (because the families followed for 15 months might be different from those who dropped out between 6-15 months).

Several recent studies have suggested that breastfeeding for six months was prevalent among women living with HIV perhaps due to breastfeeding counseling during pregnancy, immediately after childbirth, and at key moments in the postnatal period has been associated significantly with EBF practices [2, 16, 17]. Our analysis did not find this association since EBF was not different among women receiving weekly home nutritional counseling to those who only received counseling at clinic visits which are in line with standard guidelines for WHO immunization visits. These results were consistent with a recent clinic-level study to investigate the impact of a counseling intervention on EBF among mothers with HIV in Nairobi [5] that found no significant difference in EBF prevalence between the cases and controls.

In our study, we also assessed breastfeeding initiation within four days postpartum and report a high prevalence of 99%. Although we found studies in Tanzania Kenya and Uganda reporting 65%, 76%, and 55% respectively reporting of initiation of breastfeeding soon after birth [16, 21, 22], it could be true that on the fourth day, this proportion may have gone up significantly as was reported in our study. The Kenya Demographic and Health Survey (DHS) of 2014 reported that 62% of mothers had early initiation of breastfeeding with mothers in the lowest wealth quintile more likely to initiate early breastfeeding than those in the higher wealth quintile [9]. This is

consistent with the breastfeeding initiation outcome reported given the lower wealth quantile of the study population.

The prevalence of six-month EBF, particularly among mothers with HIV, is higher than in other studies from this region. This may reflect better uptake of PMTCT services among the mothers with HIV in the study area. A community-based survey in Northeastern Tanzania reported a prevalence of six months EBF of 24.1%, lower than in both HIV infected and uninfected mothers in our study [16]. The Kenya 2014 DHS reported EBF prevalence between four to five months of 42%, which was higher than among mothers with HIV, but lower than the rate in our cohort [9]. Our findings of higher EBF prevalence in HIV-infected than uninfected mothers are consistent with a prior study conducted in rural parts of Kisumu [21].

Minimum Dietary Diversity

The overall prevalence of minimum dietary diversity practice was 51.1% and 74.4% at 9 and 12 months, respectively, consistent with a similar study done in Addis Ababa, Ethiopia (59.9%) [58]. A recent study conducted in Eastern Ethiopia reported very low overall DD (24.4%)[59] making it hard to assess progress in achieving diet diversity. While we did not find any statistically significant association between our covariates and diet diversity, we found that married women were 30% less likely to achieve minimum diet diversity at 12 months. Most studies found maternal education as associated with minimum diet diversity [59, 60].

Growth outcomes

Overall, growth measures at 15 months were similar between groups with and without the indicators of exclusive breastfeeding and diet diversity. The study observed a lower mean HAZ in the women reporting EBF for six months, which was only found among HIV-negative women when stratified by HIV infection. These findings are not consistent with findings from a study conducted in Malawi that assessed exclusive breastfeeding and its effect on growth [61] which found a higher mean HAZ and WAZ among women achieving exclusive breastfeeding at six months. Another study looking at the effect of exclusive breastfeeding on selected adverse health and nutritional outcomes found EBF at rates terminated at 0-2 months or 2-4 months increased the odds of babies becoming underweight [62].

5.2. Conclusion

We found better exclusive breastfeeding practices in mothers with HIV than uninfected mothers in this study. The study suggests that breastfeeding counseling for mothers with HIV had a positive impact on EBF practices. The diet diversity prevalence increased at 12 months suggesting positive progress towards achieving diet diversity among breastfeeding women. It is important to improve EBF and minimum diet diversity practices among all mothers and this may require refresher training and improved breastfeeding counseling for all mothers.

5.3. Recommendations

There is a need to support both groups of women (living with or without HIV on the importance of exclusive breastfeeding during the antenatal visits). It is important to strengthen nutritional counseling between 6 and 9 months to improve minimum diet diversity practices to address the

gap of achieving minimum dietary diversity at nine months. This will help in preventing the Risk of malnutrition stunting and underweight among children.

5.4. Limitations

We had limitations that included the use of already collected data on information on feeding practices. Participant dropouts could have only led to a special group remaining that met the inclusion criteria i.e. selection bias, (probably similar groups that could not detect any difference). Also, we had very little power to detect a difference between groups by diet diversity at 9 and 12 months. We would need a bigger sample size to detect this difference with good statistical power between groups by diet diversity at 9 and 12 months.

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7.0. APPENDICES

7.1. APPENDIX I: DATA ABSTRACTION TOOL

Sociodemographic information		
1. The current age of the mother	_ years	
2. Year of birth	numeric)	
3. Marital status (tick all that apply)	□ Currently married □ Widowed □ Divorced/separated □ Steady boyfriend/girlfriend □ Never married □ No answer	
3a. If currently married, is your marriage:	□ Monogamous □ Polygamous □ No answer	
Highest level of education you completed	□ No formal education □ Less than primary school □ Primary school □ Secondary school □ College/University □ No answer	
5. Employment status?	□ Salaried □ Hourly work □ Self-employed □ Unemployed □ No answer	
6. The average amount of money made per week	_____ KSH/week	

Number of rooms are in your house	__ rooms	
Number of people usually reside in your home	__ people	
Number of children residing	__ children	
0. Availability of running water in your house	□ Yes □ No □ No answer	
1. Availability of electricity in your house	□ Yes □ No □ No answer	
2. Roof material	□ Metal □ Wood □ Other □ No answer	
3. Anyone smoking cigarettes inside your house	□ Yes □ No □ No answer	
4. Location of the toilet	□ Inside the home □ Outside the home □ No answer	
5. Does your toilet flush?	□ Yes □ No □ No answer	
6. Whether toilet is shared with other households	□ Yes □ No □ No answer	

Infant and Child feeding practices		
. In the past week, did the mother breastfeed the baby	□ Yes □ No	

	□ No answer	
15. What the baby has been fed on since last week.	□ Breastmilk □ Formula □ Other liquids □ Solid foods □ Other □ No answer	.
r liquids the baby was fed on since last week	□ Cow's milk □ Water □ Juice □ Tea □ Other □ No answer	*1.*
15a-1. If other liquid, please specify	(text entry)	
Solid foods the baby has been fed since last week	□ Grains (like ugali, bread, etc.) □ Vegetables □ Fruits □ Meats □ Fish □ Eggs □ Sweets □ Other □ No answer	
15b-1. If other solid food, specified	(text entry)	
If other, please specify what the baby has been given since last week	(text entry)	
16. How often the baby is given something other than breastmilk	□ All feedings □ Most feedings (more than half)	

	□ Some feedings (less than half, but at least once per day) □ Occasionally not every day) No answer	
. When did you first give anything other than breast milk?	_ _ / _ _ / _ _ _ OR (dd/mm/yyyy) when the baby was __ days old OR when the baby was __ weeks old	
. The number of times per day the baby was fed anything other than breast milk or formula	__ times per day	

8.0 PLAGIARISM REPORT

PATTERNS OF INFANT FEEDING PRACTICES AND ASSOCIATED FACTORS IN MATHARE NORTH HEALTH CENTER, NAIROBI COUNTY

by Dr. Erica Ndayisenga

Submission date: 11-Nov-2021 04:53AM (UTC-0600)
Submission ID: 1699691099
File name: Final_Erica_Ndayisenga_11.11.21.docx (252.05K)
Word count: 8027
Character count: 45013

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