

Title: Socio-demographic factors associated with exclusive breastfeeding among mothers with children less than six months of age in Zimbabwe



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DECLARATION

I, Pamela Takudzwa Munjoma, declare that this research report is my original work. It is submitted in partial fulfilment of the requirements for the Master's Degree in Public Health, Maternal and Child Health at The University of the Witwatersrand, Johannesburg.

Signature Date

ABSTRACT

Background

Exclusive breastfeeding (EBF) is one of the most effective public health interventions known to reduce infant morbidity and mortality. Despite evidence on benefits of exclusive breastfeeding, rates remain low in Zimbabwe. Few studies have looked at the factors associated with low EBF rates in Zimbabwe. The aim of the study was to determine the socio-demographic factors associated with exclusive breastfeeding among mothers with children less than six months of age in Zimbabwe.

Methodology

The study conducted a secondary data analysis of the 2010/2011 Zimbabwe Demographic Health Survey (ZDHS). Data on 638 mothers with children aged less than six months was analysed guided by the framework of determinants of exclusive breastfeeding. Using Stata 13, factors associated with exclusive breastfeeding were identified using bivariate and multiple logistic regression analysis.

Results

This study revealed that the exclusive breastfeeding rate was 30.9% (197/638) among mothers of infants aged 0-5 months. Urban residence (0.0389) and health facility deliveries (0.0195) were positively associated with exclusive breastfeeding practice among mothers. Factors that negatively influenced exclusive breastfeeding were; bottle feeding ($p = <0.0001$) and increasing infant age ($p = <0.0001$).

Conclusions

In conclusion, EBF rates are still low among women in Zimbabwe. To scale-up exclusive breastfeeding, interventions should target mothers from rural areas, improve health facility deliveries and strengthen the enforcement of the code of marketing of breast milk substitutes. Breastfeeding mothers should be supported beyond the health facility to sustain exclusive breastfeeding for six months.

DEDICATION

I would like to dedicate this research report to my supportive husband Cosmas, my loving parents and my brother Tafadzwa.

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I am grateful to the Lord for enabling me to write and complete this report. It is through His mercy and grace that I have been able to do this. Thank you Jesus!

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ACRONYMS

ANC	Ante-Natal Care
BFHI	Baby Friendly Hospital Initiative
CDC	Centers for Disease Control and Prevention
EBF	Exclusive Breastfeeding
HIV/AIDS	Human Immuno-Deficiency Virus/ Acquired Immune Deficiency Syndrome
ILO	International Labour Organisation
IMR	Infant Mortality Rate
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoHCC	Ministry of Health and Child Care
MoHCW	Ministry of Health and Child Welfare
PMTCT	Prevention of Mother to Child Transmission of HIV/AIDS
SI	Statutory Instrument
UMR	Under 5 Mortality rate
UNICEF	United Nations Children's Fund
WHO	World Health Organization
ZDHS	Zimbabwe Demographic and Health Survey
ZNNS	Zimbabwe National Nutrition Survey

CHAPTER 1

This chapter briefly discusses the recommended duration of exclusive breastfeeding, its benefits and some initiatives to support breastfeeding that Zimbabwe has put in place. Also presented in this chapter is the study's conceptual framework, statement of the problem, justification and research question, aim and objectives.

1. Introduction

Breast milk is considered the perfect food for babies and contains all the nutrients required for growth and development (1). The WHO and UNICEF recommend that all children be exclusively breastfed for the first six months of life and continue to breastfeed until two years old or beyond (2). Exclusive breastfeeding means that the child is given breast milk only for the first six months of life without any other foods given except for vitamins or medicines prescribed by the doctor (3). It has been proven to be one of the Essential Nutrition Interventions (ENI) that contributes to the child's growth and development during the first 1000 days of life (4). This covers the period from which the mother is pregnant until the infant reaches two years of age. This phase is generally referred to as the 'window of opportunity' as this is the stage where interventions can take place to prevent irreversible effects of poor health outcomes, for example malnutrition (5).

The WHO estimates that about 35% of the children worldwide are exclusively breastfed (3). Sub-Saharan Africa has an exclusive breastfeeding rate of 33% (6) whilst 41% of the infants are breastfed exclusively in Zimbabwe (7). These rates are low compared to the recommended 90% (8). Exclusive breastfeeding for the first six months of life offers many health benefits to both the mother and child. Its benefits to the child include lower risk of infection, prevention of allergies, and it provides all the required nutrients (9, 10). Weight loss, contraction of the uterus, affordability compared to infant formula, and a delayed return to fertility are some of the benefits to the mothers. It also promotes bonding for both the mother and child (4, 5). Infants who are not exclusively breastfed are at high risk of morbidity and mortality. In their adulthood years, non exclusive breastfed infants are likely to be less productive, have impaired intellectual and social development, become obese and develop chronic diseases compared to those exclusively breastfed (6, 10)

Zimbabwe has high infant mortality (57/1000 live births) and under five mortality rates (84/1000 live births) and is unlikely to meet the Millennium Development Goal 5 (11, 12). MDG number 5 aims to reduce the under-five mortality rate by two thirds between 1990 and 2015; exclusive breastfeeding can contribute to the success of meeting this goal (2, 13). Previous studies have also proven that if exclusive breastfeeding is practised for the first six months, it can reduce infant mortality, morbidity and prevent mother to child transmission of HIV/AIDS (4, 5, and 10). Infants that are not exclusively breastfed are prone to death due to diarrhoeal diseases and pneumonia which are amongst the top childhood killer diseases (8, 14). In addition, the WHO estimates that 35% of the under-five deaths are due to under nutrition which can be prevented by interventions such as exclusive breastfeeding, complementary feeding and good sanitation among other interventions (6).

Although exclusive breastfeeding for the first six months of life is recommended, mixed feeding is common (1, 15). Mixed feeding is defined as the giving of other liquids or solids in addition to breast milk in the first six months of life (3). Mixed feeding puts the lives of infants and young children at risk as it is associated with high incidence of diarrhoea, malnutrition, mother to child transmission of HIV and infant mortality (1, 2, and 8). In the event that a mother chooses not to breastfeed, it is recommended that she exclusively formula feeds; this is referred to as replacement feeding (8, 16). Exclusive breastfeeding is highly protective in poor resource settings where there is poor hygiene and sanitation, high malnutrition rates and mother to child transmission of HIV which all contribute to morbidity and mortality in children (13, 14)

[Exclusive breastfeeding in Zimbabwe](#)

Zimbabwe is a breastfeeding country; the National Nutrition Department under the Ministry of Health and Child Care has made a lot of effort to increase and sustain exclusive breastfeeding rates (12). The National Nutrition Department partners with other government ministries, non-governmental organizations, United Nations agencies, academic and research institutions; to scale-up exclusive breastfeeding and other infant and young child feeding programs (12). Despite these efforts, exclusive breastfeeding rates among mothers with children aged less than six months remain low in Zimbabwe. In 2010, a national nutrition survey was conducted; exclusive breastfeeding rates were at 5.8% (17) among children aged less than six months. An

improvement of about 35% has been noted between 2010 and 2015 (7). However, more than half of the mothers are still practicing mixed feeding.

1.1 Conceptual framework

There are various factors that contribute to the success or failure of practising exclusive breastfeeding among mothers with children less than six months old. According to the conceptual framework below (figure 1), exclusive breastfeeding is directly associated with physiological and psychological factors (19). These are associated with maternal, socio-economic, demographic, contextual, cultural or infant related factors (19). Maternal factors include employment status, highest education level attained, parity (number of children born to the mother) knowledge on breastfeeding and workload. Socio-economic and demographic factors include mother's age and whether or not she is married. Place of delivery and breastfeeding support in the form of counselling have been identified as contextual factors whilst infant characteristics are age, sex and morbidity (19). Cultural beliefs and norms are identified as a significant factor that influences a mother's decision to breastfeed. The framework below shows the factors associated with exclusive breastfeeding (19).

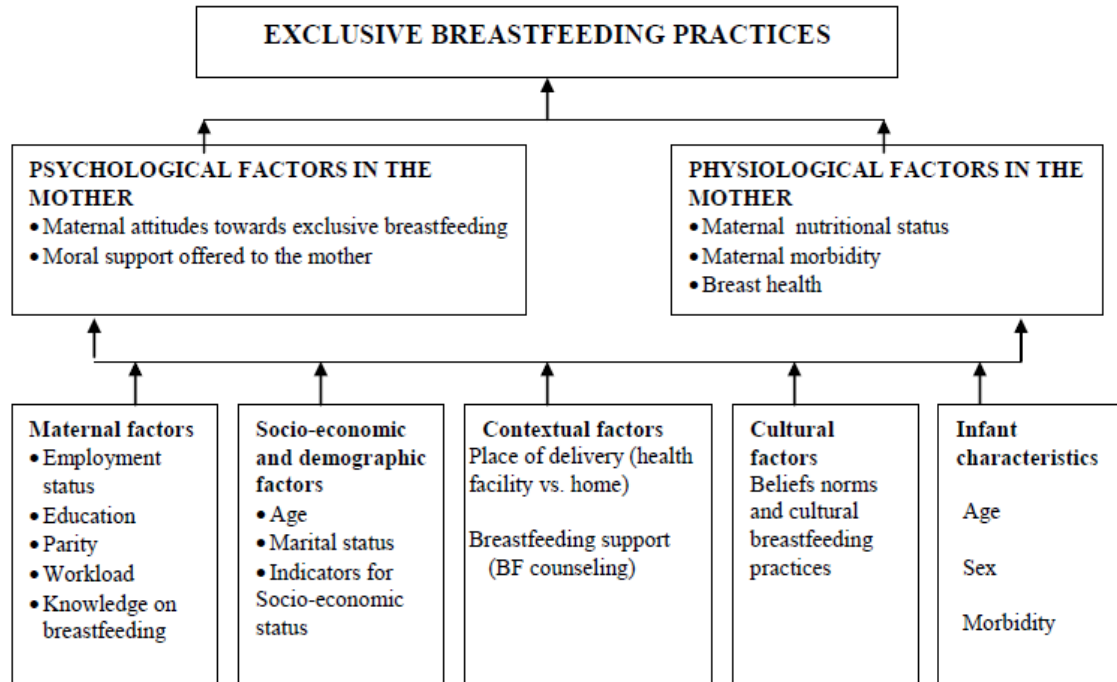


Figure 1: Conceptual framework for factors associated with exclusive breastfeeding (19)

In this study, infant characteristics, maternal factors, contextual factors, socio-economic and demographic factors were considered as illustrated in the framework. However, because of the limitations of not being able to collect primary data, variables of interest were limited to those already collected by the ZDHS.

1.2 Statement of the problem

Infant and under five mortality rates remain high in Zimbabwe. According to the 2010/2011 Demographic Health Survey, infant mortality rate was 57/1000 live births; under five mortality was 84/1000 live births (11). The major causes of death are HIV/AIDS, diarrhoea and pneumonia (11, 12). However, malnutrition is an underlying factor and is responsible for approximately 12,000 deaths in under fives (12). One in every three children in Zimbabwe is stunted; this is attributed to under nutrition (17). Stunting is irreversible and leads to unhealthy adults who are less productive.

Evidence shows that exclusive breastfeeding is the single most effective preventive measure which can prevent up to 13% of all causes of deaths in children under five years of age (14).

Breast milk only for the first six months can also prevent the transmission of HIV/AIDS, diarrhoea, pneumonia and stunting (4, 14). Despite its positive impact in reducing mortality, exclusive breastfeeding rate remains low in Zimbabwe at 5.8% in 2010 (17) and 41% in 2014 (7). If exclusive breastfeeding and appropriate complementary feeding are not achieved, the child can suffer from irreversible growth faltering or die from diseases like HIV/AIDS, diarrhoea and pneumonia (16). Therefore, it is essential to intervene during the ‘window of opportunity’ in order to improve the health and survival of children.

1.3 Justification

Zimbabwe has high infant and under five mortality rates including deaths from diarrhoea and pneumonia and low breastfeeding rates (11, 12). Although it is known that exclusive breastfeeding rates are low and efforts are made to improve, few studies have looked at the factors increasing or decreasing the rates, especially in the Zimbabwean context (20). It is important to investigate the determinants of exclusive breastfeeding among mothers with children aged below six months. As evidence shows that exclusive breastfeeding on its own can prevent under-five deaths by up to 13% (14), this study will provide evidence to policy makers and NGO interventions targeted at improving infant health and survival.

Implementation of evidence based interventions can decrease malnutrition and child mortality especially due to diarrhoeal diseases and pneumonia and mother to child transmission of HIV (5, 14). Improving child health will result in healthy adults and break the poverty cycle in Zimbabwe (16). Previous studies have shown that factors associated with exclusive breastfeeding differ. This study will help to identify the maternal, socio-economic, demographic, contextual and infant factors associated with exclusive breastfeeding and compare to the previously reported factors to find out if they are significant in the Zimbabwean context. Findings from this study can also influence further research aimed at scaling up exclusive breastfeeding

1.4 Research question, aim and objectives

Research question: What are the socio-demographic factors associated with exclusive breastfeeding practice in mothers with children aged 0-5 months?

Research aim: To determine the socio-demographic factors associated with exclusive breastfeeding in children aged less than six months in Zimbabwe, using the 2010/2011 ZDHS data.

Specific objectives

1. To describe the socio-demographic characteristics of Zimbabwean women with children aged 0-5 months using 2010/2011 ZDHS
2. To determine the proportions of different breastfeeding types among women with children aged less than six months in Zimbabwe
3. To determine the trends of exclusive breastfeeding by infant age among mothers with children aged less than six months using 2010/2011 ZDHS
4. To determine the socio-demographic factors associated with exclusive breastfeeding among mothers with children less than six months old in Zimbabwe using 2010/2011 ZDHS

CHAPTER 2

This chapter reviews literature on previous studies on the determinants of exclusive breastfeeding. The determinants are disaggregated based on the conceptual framework presented in chapter 1.

2. Literature Review

Breast milk is recommended as the best food for babies in the first six months of life (8, 16). Continued breastfeeding after six months is encouraged as it provides half the nutrients between 6-12 months and up to one third between 13-24 months of age (10). Evidence shows that exclusive breastfeeding can reduce mortality due to diarrhoea, malnutrition and pneumonia which are part of the top five leading causes of death in under-fives (4,6,14).

To allow mothers to exclusively breastfeed their infants for six months, WHO and UNICEF recommend:

- Timely initiation of breastfeeding within the first hour of life
- Exclusive breastfeeding – that is breast milk only without any liquids or solids except medicine prescribed by a doctor
- Breastfeeding on demand – that is as frequent as the child requires day and night
- No use of bottle, teat or pacifier (8,16)

2.1 Breast feeding practices

Although WHO and UNICEF recommend that children under six months should be exclusively breastfed, infants are exposed to other types of feeding (8). The other feeding practices among mothers with children less than six months old include predominant breastfeeding (breastfeeding plus other liquids like water, tea, and juice), mixed feeding (breastfeeding plus other solid or semi-solid food before six months of age) and formula feeding (11, 16, 17).

2.2 Prevalence of exclusive breastfeeding

Globally, about 40% of infants under six months of age are breastfed exclusively (16). In Sub-Saharan Africa, exclusive breastfeeding rates have improved from 27% to 32% between 1996 and 2006 (8). According to WHO, the exclusive breastfeeding rate is calculated based on a 24-hour recall (10). A study conducted in Uganda showed that although breastfeeding is common among mothers, exclusive breastfeeding is uncommon (13). Exclusive breastfeeding rates in some countries are: United States of America 16.8% (14), Cambodia 74% (16), Pakistan 37.1% (21), Ghana 64% (22), Nigeria 16.4% (23), Ethiopia 49% (24), Tanzania 49.9% (25); Rwanda has the highest rate of 85% (22). Evidence shows that less than 50% of the infants are exclusively breastfed in the first 6 months of life with the exception of countries like Ghana, Cambodia and Rwanda. Zimbabwe is no exception when it comes to low exclusive breastfeeding rates (12). According to the 2015 Multiple Indicator Cluster Survey, the prevalence was 41% (7).

2.3 Determinants of exclusive breastfeeding

Infant characteristics

Infant age

Exclusive breastfeeding rates have shown a downward trend as the child grows older. A study in Uganda found that EBF was low during the first six months and decreased by age (13). The trend of EBF decreased from 96% at one month to 62% at 5 months (13). In addition to this, studies in Pakistan and Tanzania showed that the infant's age significantly affected exclusive breastfeeding (21, 25, 26). In Ethiopia, odds of exclusive breastfeeding were 3.8% and 2.8% at 0-1 and 2-3 months respectively than at six months of age. (24). A similar pattern has been observed in Zimbabwe where the practice of exclusive breastfeeding decreases as the child gets older (17).

Infant size at birth

The Mother's perception on infant's size at birth can be a determinant of exclusive breastfeeding. Not many studies have explored how the mother's perception can influence her ability to practice exclusive breastfeeding. However, Ghanaian mothers who perceived their babies to be of average size had as twice as high a chance to exclusively breastfeed than those who perceived their babies to be large at birth (22).

Contextual factors

Place of delivery

The place of delivery can play a part in influencing the mother's decision to either exclusively breastfeed or not, during the first six months of her baby's life (22, 24, 26, 27, 30). Evidence from other studies showed that mothers who delivered in a health facility had a higher chance of practicing EBF as compared to those who delivered at home (22, 24, 26, 27). It is also worth noting that in Ghana, it was not only about delivering in a health facility; mothers who gave birth in government health facilities had the greatest EBF rates, compared to those who gave birth at home or in private health facilities (22). About 65% of the Zimbabwean women delivered in a health facility and about 34% delivered at home (12).

Infant and Young Child Feeding Counselling

Infant feeding counselling has a major role to play in supporting a mother's decision to breastfeed exclusively for the first six months (24). In Tanzania the odds of exclusive breastfeeding were three times higher in mothers who received infant feeding advice during ANC (26). Similarly, in Nigeria, exclusive breastfeeding for the first six months was higher in mothers who had four or more ANC visits during pregnancy (28). In addition to EBF counselling during pregnancy, counselling after delivery was also an important factor promoting EBF in Tanzanian mothers (26). However, mothers who were inexperienced and did not stay for long after delivery, were not likely to benefit from this service offered by the facility (26). Most women (90%) in Zimbabwe receive antenatal care from a skilled provider (12). It is essential to establish how this exposure impacts on the practice of exclusive breastfeeding among mothers with children aged less than six months in Zimbabwe.

Place of Residence

Residence can be an independent factor when it comes to practising exclusive breastfeeding among mothers with children less than six months old. In a study conducted in North West Ethiopia, exclusive breastfeeding rates were three times higher in rural areas than in urban areas (AOR = 3.01; 95% CI 2.65- 3.84) (29). Further to these findings, there was no significant difference in EBF rates between urban and rural areas (24, 26). A study conducted in Zimbabwe found that traditional and cultural beliefs that are prevalent in rural areas have a negative impact on the practice of exclusive breastfeeding.

Maternal factors

Employment

The mother's employment can be a barrier to practicing exclusive breastfeeding especially if maternity leave is short, for example in Tanzania where it is 84 days long (25). Due to a short maternity leave, 35% of mothers tend to introduce other foods at the age of three months because they have to go back to work (26). Evidence from The United Arab Emirates also indicates that housewives are more likely to exclusively breastfeed than those who go to work (4). Working mothers in Zimbabwe get 14 weeks maternity leave in the private sector whilst those in the public sector get 12 weeks plus one hour breaks for six months (12). However, in a study that was done in Malawi, the mother's occupation was not a barrier to exclusive breastfeeding because their occupations were informal (farming or trading) so they took their children with them and practiced exclusive breastfeeding (27)

Type of delivery

Caesarean section is associated with pain and discomfort and can be a barrier to a mother's willingness to breastfeed her infant. Evidence from Ethiopia suggests that exclusive breastfeeding was higher in a mother who had a normal vaginal delivery as opposed to those who had a caesarean section delivery (24). In addition to these findings, another study found that mothers who had a normal/non-caesarean section delivery were two times more likely to practise exclusive breastfeeding than their counterparts (AOR = 2.0; 95% CI 1.68 - 2.87) (29).

Mother's HIV status

A mother's HIV status can play a role in her decision to breastfeed or not. In a study done in Tanzania, the majority of HIV positive mothers stopped exclusive breastfeeding early or did not breastfeed at all (25). Similarly, in a KwaZulu-Natal (South Africa) study, HIV positive mothers chose infant formula over exclusive breastfeeding due to fear of transmitting the virus to the child (30). This was observed even after they were advised by the clinic about the prevention measures that can be taken during breastfeeding (30). These studies clearly show the importance of HIV status as a determinant of exclusive breastfeeding.

Knowledge of breastfeeding

Knowledge of breastfeeding can influence a mother's decision to breastfeed. A quantitative study found that mothers who lacked knowledge on breastfeeding were less likely to practice exclusive breastfeeding (31). For example they had perceptions that breast milk is not enough or that children were crying because of hunger, therefore they had to offer additional foods to children less than six months old (31). Similarly, in studies conducted in Nigeria and Ethiopia, higher exclusive breastfeeding rates were found among mothers with a good knowledge of breastfeeding compared with those who had poor knowledge (32, 33). Baby Friendly Hospital Initiative, Infant and Young Child feeding and other relevant trainings have been conducted in Zimbabwe to equip health care providers so that they can provide breastfeeding knowledge to mothers.

Education level

Highly-educated women were more likely to practice bottle feeding instead of exclusive breastfeeding in Pakistan (21). Similarly, according to the Ethiopian demographic health survey, higher maternal education status was associated with lower exclusive breastfeeding rates (31). On the contrary, a Nigerian study found that educated mothers were more likely to practice exclusive breastfeeding compared to mothers with no schooling (23). However, other studies did not find any significant association between education and exclusive breastfeeding (3, 32). Most women in Zimbabwe have acquired some form of education and it will be worth finding out if it influences their decision to exclusively breastfeed.

Parity

Higher rates of exclusive breastfeeding have been observed in mothers who have had at least one child before as compared to first-time mothers. This association is assumed to be due to the experience and confidence gained on the first child. A study conducted in Anambra State, Nigeria, found higher rates of exclusive breastfeeding rates in mothers with two-or-more children (57%) than first-time mothers (27.6%) (32). Similarly, a study conducted in America showed a significant association between parity and exclusive breastfeeding (9).

Socio-economic and demographic factors

Mother's marital status

A mother with a husband or a partner was more likely to exclusively breastfeed their infant than a single mother. Partners play a significant role as indicated in the Malawi study where they provide financial support hence the mother has access to the health facility which is a positive determinant of exclusive breastfeeding (27). However, in Ethiopia, married women or mothers who had partners were two times less likely to practice exclusive breastfeeding compared to single mothers (24). In The Gambia, a mother who had a husband was more likely to practice exclusive breastfeeding, not because of the financial support given by the husband, but because the husband was involved in decision making on infant feeding which is additional support that single mothers did not have (34).

Mother's age

Previous studies have found the mother's age to be a significant factor of exclusive breastfeeding among mothers with children aged 0-5 months. One study found that exclusive breastfeeding rates were higher among mothers aged 35-39 compared to those less than 20 years old ($p=0.0042$) (32). Higher rates were also found among 25-34 (23) and 36-45 year olds (29) compared to younger mothers. In a study conducted in Ethiopia, infants whose mothers were aged between 36-45 were 2.8 times more likely to be exclusively breastfed compared to those whose mothers were younger (29). Teenage pregnancies in Zimbabwe are quite high and this could have a bearing on the ability of mothers to practice exclusive breastfeeding for six months (12).

These various findings from different countries show that determinants of exclusive breastfeeding vary from one country to another. It shows that results cannot be generalised across borders. This builds a strong case for the need to establish the factors that are significant in, and specific to the Zimbabwean context.

CHAPTER 3

This chapter presents the way the study was conducted. It explains the study design, study setting and study population. The sampling strategy and the sample are also presented. A description of the data collection strategy and the data collected is provided. It explains how the data were managed and analyzed. Finally, the ethical considerations for the study are described.

3. Methodology

3.1 Study design

The study design was a cross-sectional study using secondary data. Analyzed data was collected from women 15-49 years old with children less than six months old during the 2010-2011 Zimbabwe Demographic Health Survey.

3.2 Study setting

This study was conducted in Zimbabwe. Zimbabwe is located in Southern Africa and is a landlocked country (7, 12). Its neighbouring countries are South Africa, Zambia, Botswana and Mozambique. Zimbabwe has 10 provinces and 52 districts which are further divided into wards. In 2012 it had a total population of about 13 million (7). Zimbabwe covers an area of about 390 757 square kilometers (12). The 2010/2011 ZDHS was the fifth demographic health survey to be conducted in Zimbabwe. Below is a map of Zimbabwe showing the major cities and the neighboring countries surrounding it.



Figure 2: Map of Zimbabwe

Most exclusive breastfeeding interventions are guided by the Zimbabwe Infant and Young child Policy. Every year, Zimbabwe joins the rest of the world in commemorating the World Breastfeeding Week to encourage and support breastfeeding (12). Other strategies in place which enable mothers in Zimbabwe to exclusively breastfeed include; training of health care providers in Infant and Young Child Feeding, the adoption of the Statutory Instrument (SI) 46 of 1998 which regulates the promotion of breast milk substitutes, implementation of the Baby Friendly Hospital Initiative among other breastfeeding supporting and promoting initiatives (12). Zimbabwe also took up some components of the International Labour Organisation (ILO) maternal Protection Convention, 183 of 2000, to enable working mothers to nurse their infants (12, 18). The Prevention of Mother to Child Transmission of HIV/AIDS (PMTCT) programme has also enabled HIV positive mothers to exclusively breastfeed their infants without passing the virus to their infants.

Information, Education and Communication materials which promote and support breastfeeding are widely distributed for use by the health professionals and general public. Breastfeeding support is offered at various levels; for example, mothers in Zimbabwe are encouraged, informed

and counselled about breastfeeding during pregnancy, at delivery and given support after delivery (12). They also receive information on recommended feeding practices during the child health visits. Although community systems are still weak in Zimbabwe, breastfeeding mothers, especially in the rural areas, enjoy home visits from village health workers who provide breastfeeding information and give practical support (12). Working mothers also benefit from the maternity leave which is 14 weeks in the private sector and 12 weeks in the government sectors plus a paid one hour break for six months. Although male involvement is a form of support structure that enables mothers to practice exclusive breastfeeding, there is no policy which supports paternity leave at the moment (12, 18).

3.3 Study population

Mothers with children aged less than six months who were interviewed during the demographic health survey were the study population. During the 2010/2011 ZDHS survey, three different questionnaires were used to collect data. These were; household, women and men. However for this study, the women's questionnaire was used to get data on mothers aged between 15-49 (respondents) who had children aged between 0-6 months residing in Zimbabwe.

3.4 Sampling and Sample size of the ZDHS

A total sample of 638 mothers with children less than six months old derived from the women's population, were interviewed during the 2010 demographic health survey. All women questionnaires for mothers with children aged less than six months were included in the study.

The 2010-2011 ZDHS came up with a representative sample of 10,828 households which included all women of reproductive age 15-49 and all men aged 15-49 (11). The sample population that was interviewed had to be either permanent residents of the households or those who had visited and stayed in the household the night before the survey. The 2002 population census was used as the sampling frame, whilst the households were the sampling units (11).

The ZDHS sample was derived using a stratified, two stage cluster design where enumeration areas (EA) were the sampling units in the first stage (11). These enumeration areas were developed by subdividing the wards. This resulted in 169 EAs in the urban and 237 EAs in the rural coming up to 406 EAs for the country. The second stage of the sampling involved coming up with a complete household listing for all the selected EAs in the first stage in July and August

2010 (11). Mapping was done for private households excluding institutional living arrangements listed for all the clusters. .Of the 9,831 eligible women identified in households; 9,171 of these women were interviewed and that translated to a 93 percent response rate (11).

3.5 Data collection

Data were collected through face-to-face interviews at household levels. A written consent was signed by the interviewee before the interview commenced. The ZDHS collected data on socio-demographics, health and nutrition indicators. Although there were three questionnaires (household, men and women) used during the survey, only the women's questionnaire was used because it collected data on variables relevant to this study.

3.6 Measurement

The dependant variable was exclusive breastfeeding. In this study, exclusive breastfeeding was measured based on a 24-hour recall for infants less than six months. Infant less than six months who were currently breastfeeding and had not been fed on any other solids or liquids besides breast milk with the exception of oral rehydration solution, drops or syrups (vitamins, minerals and medicine) were considered to be exclusively breastfed. Exclusive breastfeeding was coded 1 and non-exclusive breastfeeding was coded 0. The 24-hour recall method is the global standard recommended by the WHO for measuring exclusive breastfeeding rates in children less than six months old (10).

The independent variables were selected based on the conceptual framework above, type of data collected through the ZDHS and literature reviewed. The following variables were analyzed in the study:

- i. Maternal:** education, parity, employment, type of delivery, knowledge of breastfeeding in the context of HIV/AIDS, wealth index, literacy
- ii. Contextual:** number of ANC visits, place of delivery, place of residence
- iii. Infant characteristics:** age, sex, size at birth, breastfeeding status, bottle feeding
- iv. Socio-economic and demographic:** mother's age, marital status

Please see Annex 1 for detailed description of variables.

3.7 Data Management

The dataset was downloaded from the Demographic and Health Survey website (web address: <http://www.measuredhs.com>). Only data from women with children less than six months was downloaded for this research. Both the STATA file and flat file databases were downloaded from Measure DHS. Data cleaning and analysis was done using STATA 13.

3.8 Data Analysis

Variables were identified using unique codes from the data set and analyzed based on the study objectives. The primary study used a multi-stage survey sampling. Therefore in descriptive and inferential analysis, complex survey technique was used in STATA to take into account the survey sampling procedures. This technique in STATA accounted for stratification, clustering, and weighting, in order to obtain correct standard errors and accurate effect estimates. Table 1 below summarizes the data analysis plan with the specific objectives.

Table 1: Data analysis plan according to objectives

Objective	Analysis
1. To describe the socio-demographic characteristics of Zimbabwean women with children aged 0-5 months using 2010/2011 ZDHS	Descriptive statistics (frequencies and percentages)
2. To determine the proportions of different breastfeeding types among women with children aged less than six months in Zimbabwe	Descriptive statistics (frequencies and percentages)
3 To determine the trends of exclusive breastfeeding by infant age among mothers with children less than six months using 2010/2011 ZDHS	Descriptive statistics (frequencies and percentages)
4 To determine the socio-demographic factors associated with exclusive breastfeeding among mothers with children less than six months old in Zimbabwe using 2010/2011 ZDHS	Inferential statistics (Bivariate and Multiple regression)

Descriptive

Data were analysed using STATA13 statistical package. Most of the data were already categorical but more categories were created for better interpretation of results. Analysed data were presented as frequencies and percentages. The study analysed data for the youngest alive infants, less than 6 months old, whose mothers were alive, living with them and interviewed during the 2010-2011 ZDHS. Exclusive breastfeeding rate was expressed as: Number of children 0-5 months on EBF (from sampled population)/total number of children 0-5 months (from sampled population). The value obtained was expressed as a percentage. A 24-hour recall was used to get the breastfeeding status of the infants aged less than six months. A list of foods and liquids was used to guide the interview during the primary study. A yes/no response was obtained for each food item and analysed during the secondary data analysis.

Socio-demographic data of women who were interviewed were described; for example age, marital status and employment status and presented in table, graph and pie chart form. Trends of EBF were coded according to exclusive breastfeeding by age in children 0-5 months. Data was presented based on the EBF rates (prevalence rates) in the following categories of age; 0, 1, 2, 3, 4 and 5 months and was presented as percentages. Graphs, pie charts and tables were used to present the data. Breastfeeding types practiced were described as exclusive breastfeeding (breast milk only), mixed feeding (breast milk and other liquids or solids), no breastfeeding and predominant breastfeeding (breast milk and other liquids like water) among children less than six months of age.

Three main classes were derived for marital status. These were; not in union, married and living with a man. Infant size was based on mother's perception and not on specific measures. For easier interpretation it was classified as big, average and small. Knowledge comprised six variables: 1) HIV can be transmitted during pregnancy, 2) HIV transmission during delivery, 3) HIV transmission by breast feeding, 4) HIV transmission from mothers, 5) HIV testing and 6) HIV prevention.

No knowledge indicated that the mothers had no knowledge of any of the six variables; limited knowledge indicates that mothers were at least aware of one or two of the knowledge variables, fair knowledge indicate that mothers had knowledge of at least three or four of the variables. Good knowledge indicated that mothers were aware of five or all the six the factors.

Inferential

Chi square tests were done to determine factors associated with EBF. All independent variables (variables listed in measurement section) were tested for significance using bivariate analysis. The independent variables (determinants) were tested for association against the dependent variable (exclusive breastfeeding). Using the bivariate analysis, independent variables with a p value < 0.05 at 95% confidence interval were considered to be significant. Missing or unknown observations were excluded from the analysis. To control for confounders and to determine the factors associated with exclusive breastfeeding, ordinal logistic regression analysis was done. See annex #1 with bivariate and multiple logistic regression models to identify determinants of exclusive breastfeeding.

3.9 Ethics

Permission was sought from Measure DHS on the internet to use the data (web address: <http://www.measuredhs.com>). The secondary data analysis was approved by the Human Research Ethics Committee (University of Witwatersrand). The certificate number is M141030 (see annex #2). Confidentiality and anonymity was maintained in the primary study by not using names of the study participants, therefore the researcher didn't have access to respondent names.

Chapter 4

This chapter presents the results of the study. It includes results obtained from descriptive, bivariate and multivariate analyses. Data will be presented in graphs, charts and tables. All results shall be presented in numbers and percentages (n; %).

4. Results

4.1. Descriptive analysis

Respondent age

A total of 638 mothers with children less than six months old responded in this study. Majority (n=372; 58.3%) of the respondents were aged between 20 and 34 followed by 28.1% (n=179) between 35 to 49 years old and the minority (n=87; 13.6%) were between 15 and 19 years old. The median age was 25 and IQR= 22-30.

Respondent education level

Out of 638 who responded, about two-thirds, 401 (62.9%) attained secondary education whilst nine (1.4%) never attended school. Figure 3 below shows the education levels among respondents.

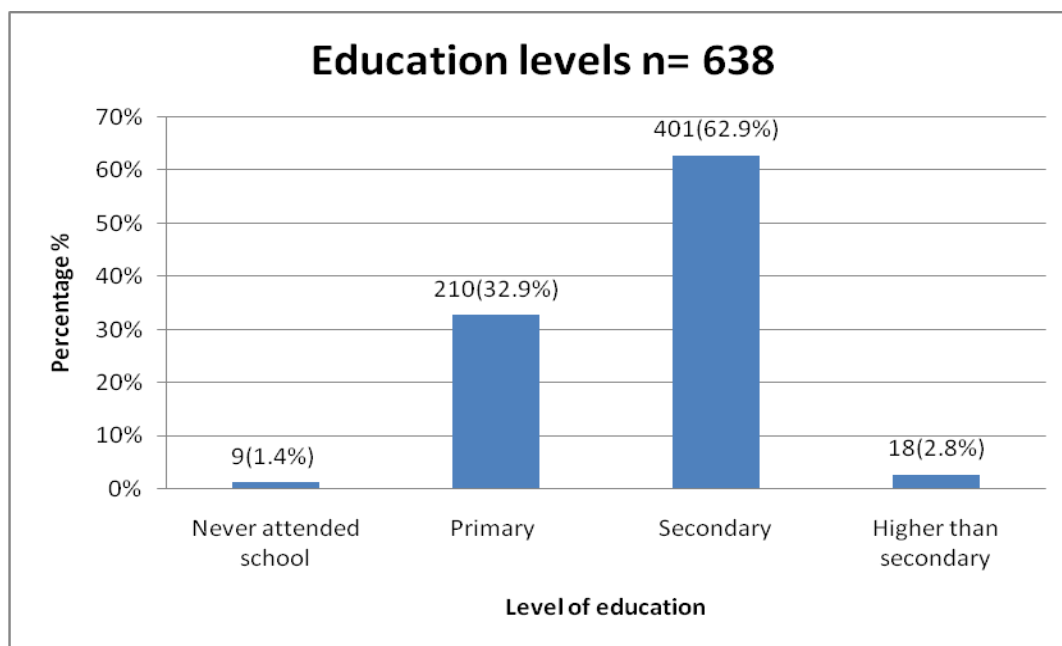


Figure 3: Education levels among mothers with children aged <6 months

Marital status

The majority (n=527; 82.6%) of mothers were married, followed by not in union (n=79; 12.4%) and a small proportion (n=32; 5%) were living with a man.

Mother's employment

As indicated in Figure 4 below, more than two thirds (n=437; 68.7%) of the 636 respondents were unemployed. About 27.9% (n=122) of the unemployed mothers were practicing exclusive breastfeeding, whilst 36.2% (n=74) of the employed mothers were practicing exclusive breastfeeding.

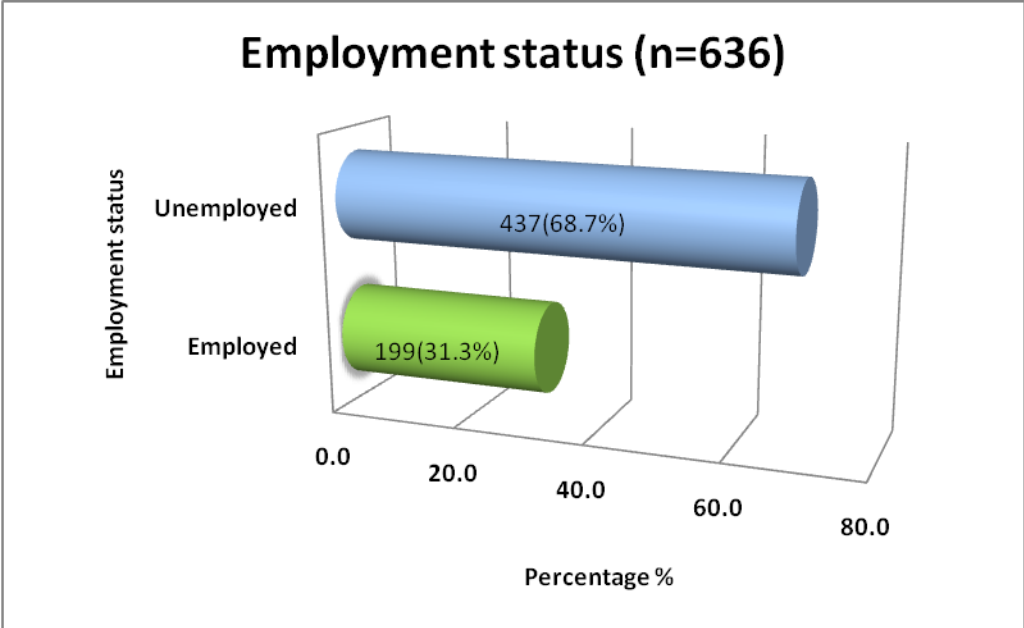


Figure 4: Employment status among mothers with children aged <6 months

Among those who were employed (n=199; 31.3%), the majority (n=78; 39.2%) were in sales/services. However, two (0.3%) cases were missing from the dataset. Figure 5 below shows the type of employment among respondents.

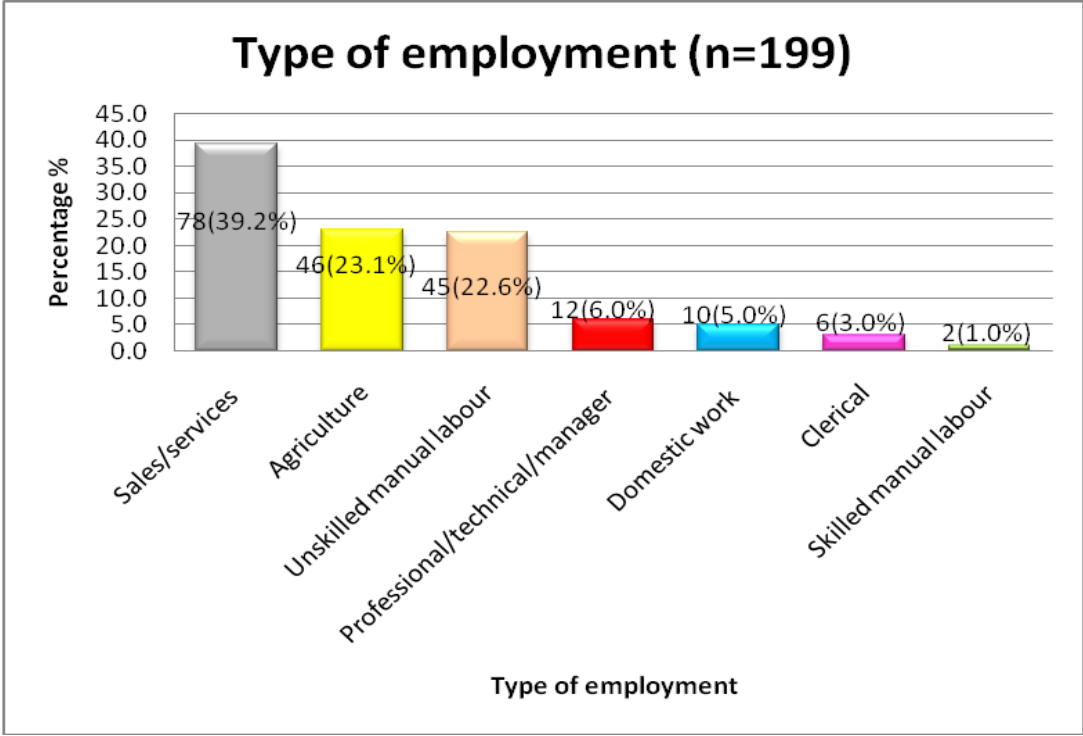


Figure 5: Types of employment among mothers with children aged <6 months

Parity

About two thirds (n=387; 60.7%) of the respondents had between two and four children. Approximately 27.9% (n=178) were first time mothers and 11.4 (n=73) had five or more children.

Place of residence

The majority (n=460; 72.1%) of respondents were from rural areas whilst 27.9% (n=178) were from the urban areas. The chart below illustrates the distribution of the respondents by place of residence.

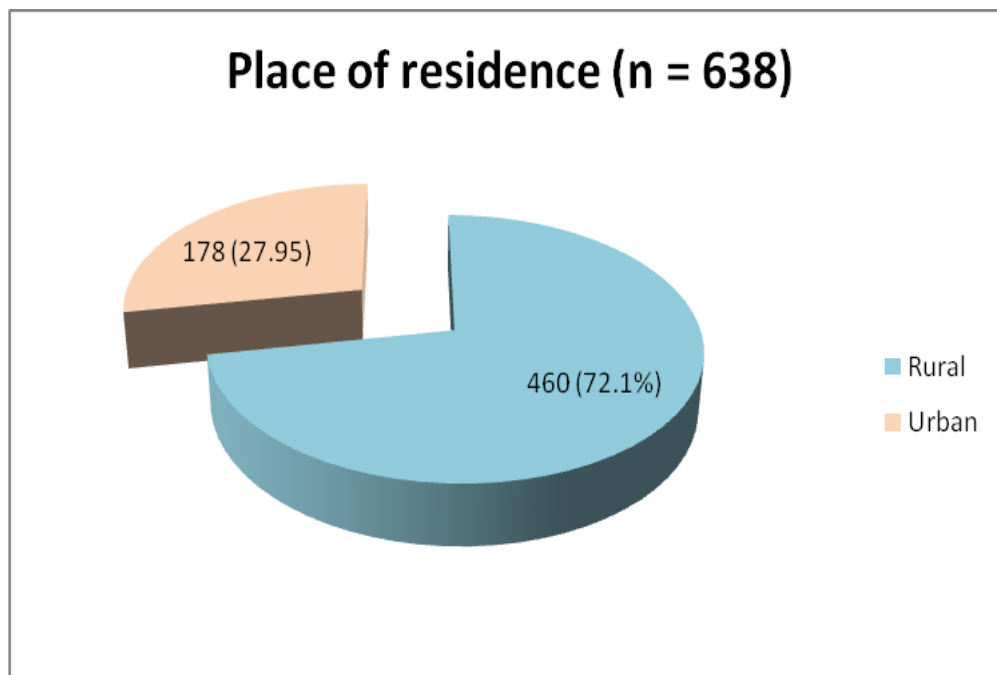


Figure 6: Place of residence among mothers with children aged <6 months

Infant sex

Three hundred and twenty-nine (50.5%) mothers had male children and 309 (49.5%) mothers had female children.

Infant size at birth

Mothers were interviewed on their perceptions about their infant's size at birth. Almost half (n= 307; 48.1%) of the mothers perceived their babies to be average size at birth. About 37.6% (n=240) were of the opinion that their infants were big and 11.1% n=71 thought their infants were small at birth. About 3.1% (n=20) did not know.

Infant age

As depicted by graph below, most (n=142; 22.3%) of the infants were four months and the least were less than one month old during the time of survey.

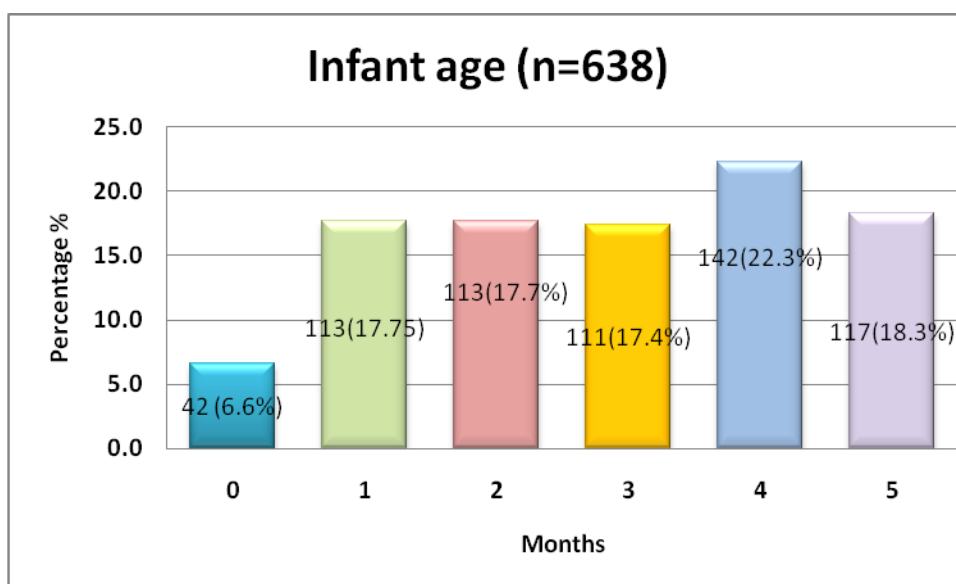


Figure 7: Infant age among mothers with children aged <6 months

Place of delivery

With regards to the place of delivery, the greater proportion (n=440; 69%) of mothers delivered in a health facility whilst 29.8% (n=190) delivered at home. Among those who delivered in a health facility, two thirds (n=380; 59.5%) delivered in a public facility. However, eight (1.3%) said they did not deliver neither in a health facility nor at home but specific details were not included in the dataset. Figure 5 below shows the places of delivery among mothers with infants less than six months old in Zimbabwe.

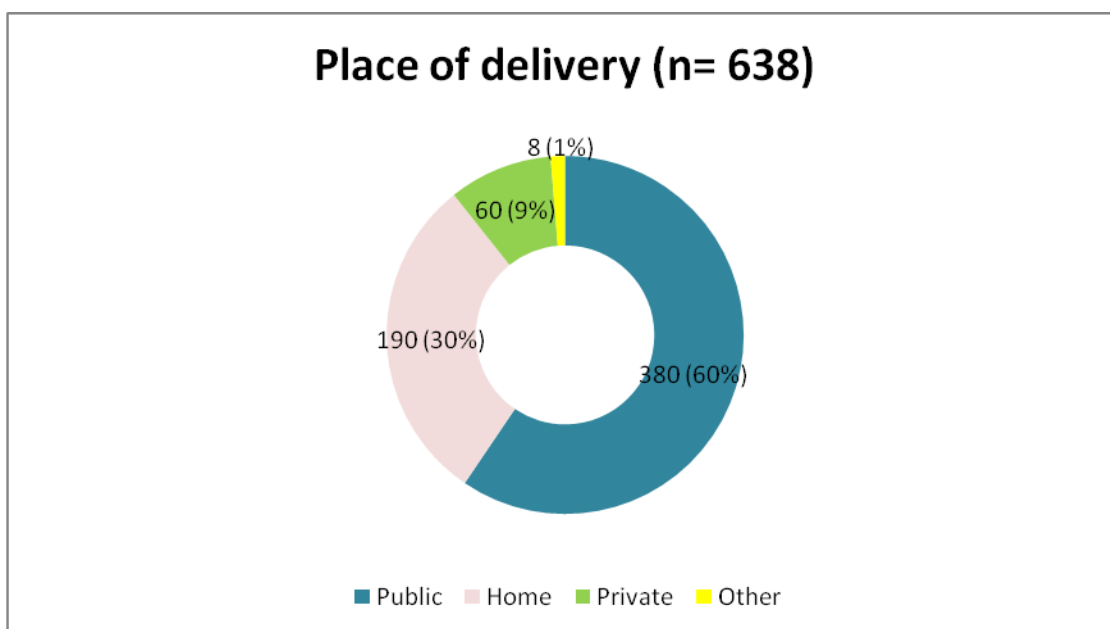


Figure 8: Place of delivery among mothers with children aged <6 months

Type of delivery

Non caesarian section (n=607; 95.1%) deliveries were more common among respondents whilst 4.9% (n=31) had caesarian sections.

Antenatal care (ANC) attendance

Eighty nine percent (n=568) of the interviewed mothers attended antenatal care at least once during their pregnancy. More than half (n=350; 54.8%) of the mothers reported attending ANC at least four times whilst 34.2% (n=218) attended between once and thrice during pregnancy. However, 11.0% (n=70) didn't attend at all.

Knowledge of breastfeeding and HIV

Generally knowledge of breastfeeding and HIV was good among respondents. The greater proportion (n=450; 70.5%) of mothers had good knowledge of breastfeeding and HIV and a smaller proportion (n=28; 4.4%) had no knowledge as depicted in chart below.

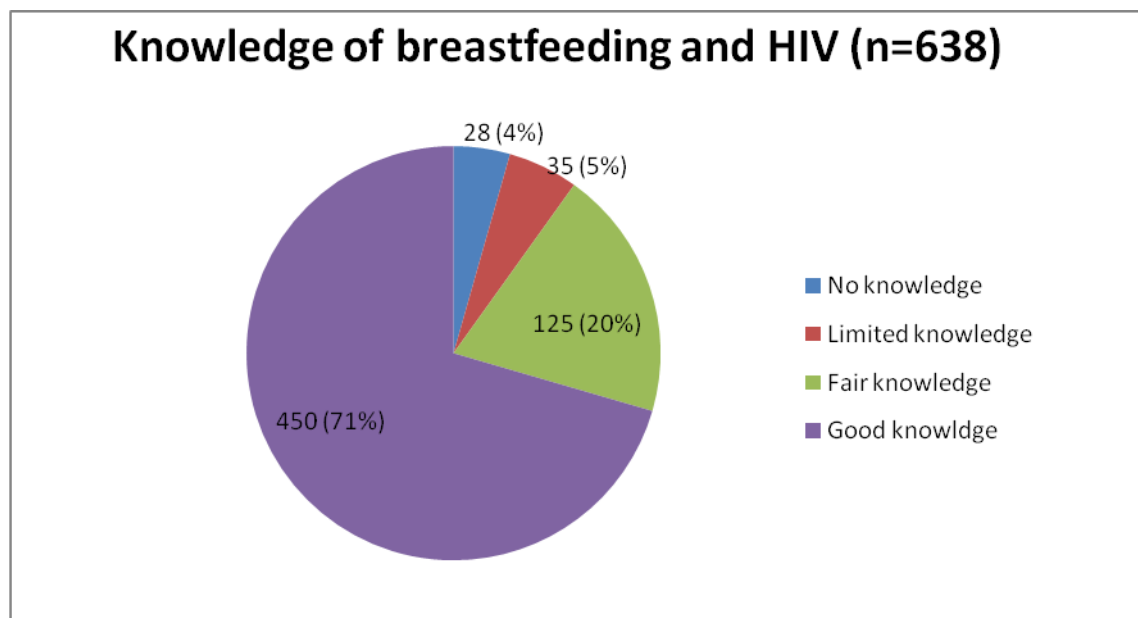


Figure 9: Knowledge of breastfeeding and HIV among mothers with children aged <6 months

Breastfeeding status

As illustrated in Figure 10 below, about 9 out of 10 (n=613; 96.1%) mothers with children less than six months old were currently breastfeeding during the time of the survey.

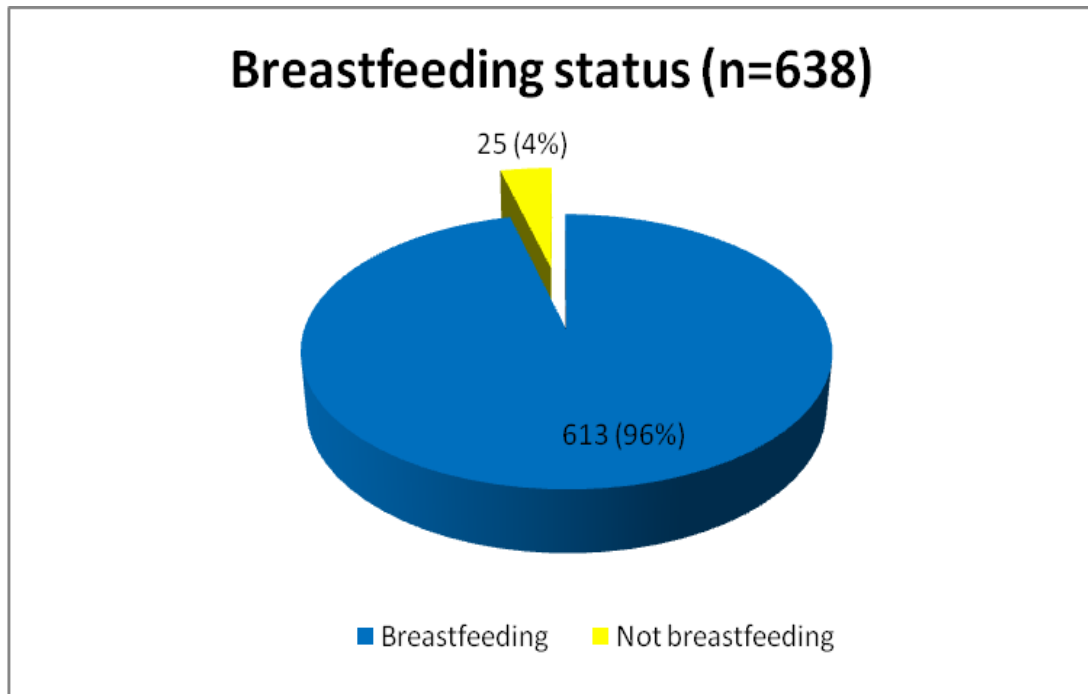


Figure 10: Breastfeeding status among mothers with children aged <6 months

One hundred and ninety-seven (197) mothers (30.9%) were practicing exclusive breastfeeding. The graph below shows the proportion of exclusive breastfeeding versus non exclusive breastfeeding.

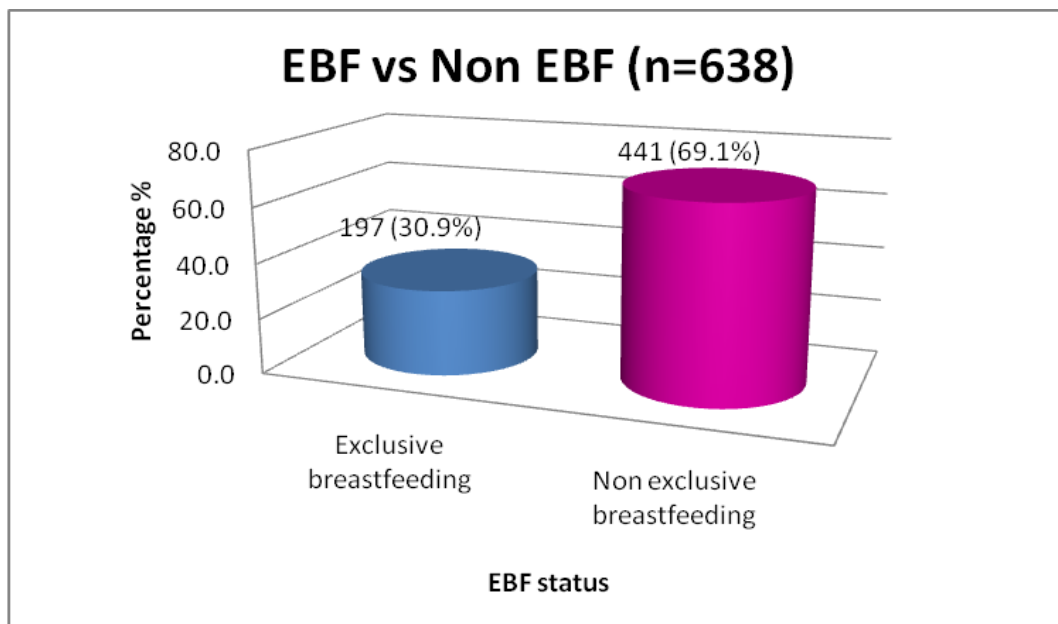


Figure 11: Exclusive vs. non-exclusive breastfeeding among mothers with infants aged <6 months

Among those who were mix feeding n=416 (65.2%), about 29.2% (n=186) were predominantly breastfeeding; 6.9% (n=44) were bottle feeding whilst 36.0% (n=230) were giving complementary foods/solids. Only a small proportion (n=25; 3.9%) were not breastfeeding at all. Breastfeeding status among mothers with infants aged 0-5 months is illustrated in the figure 12 below.

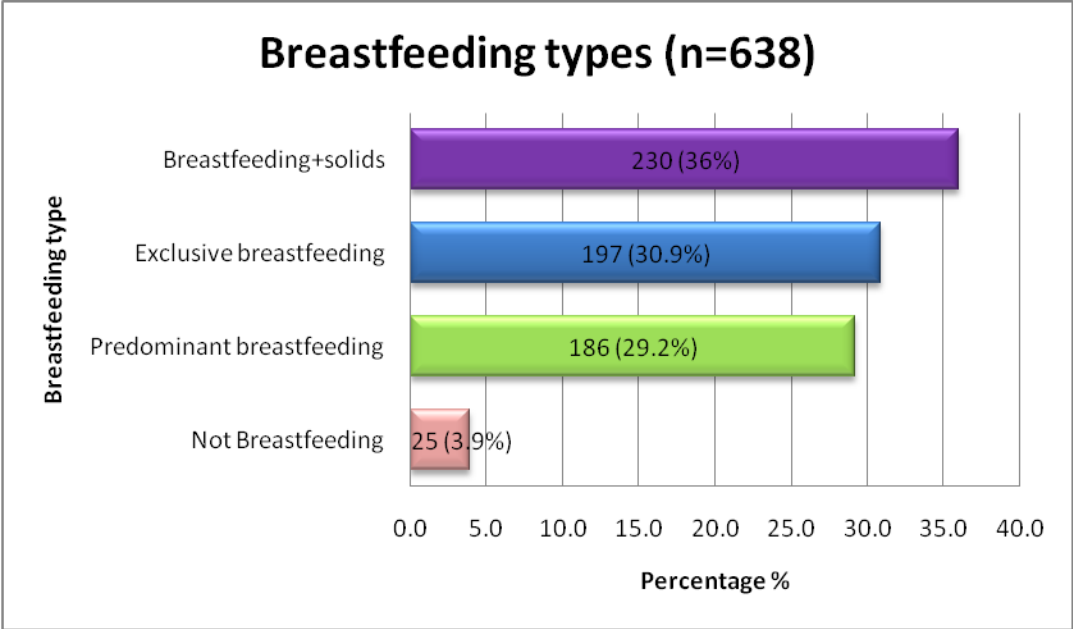


Figure 12: Breastfeeding types among mothers with infants aged <6 months

Trends of exclusive breastfeeding by infant age

A declining trend of exclusive breastfeeding with an increase in infant age was observed. Exclusive breastfeeding was as high as 71.4% (30) among mothers with infants less than one month old and was only 8.5% (10) among mothers with infants aged five months. The graph below shows the declining trend of exclusive breastfeeding versus age of infant in months.

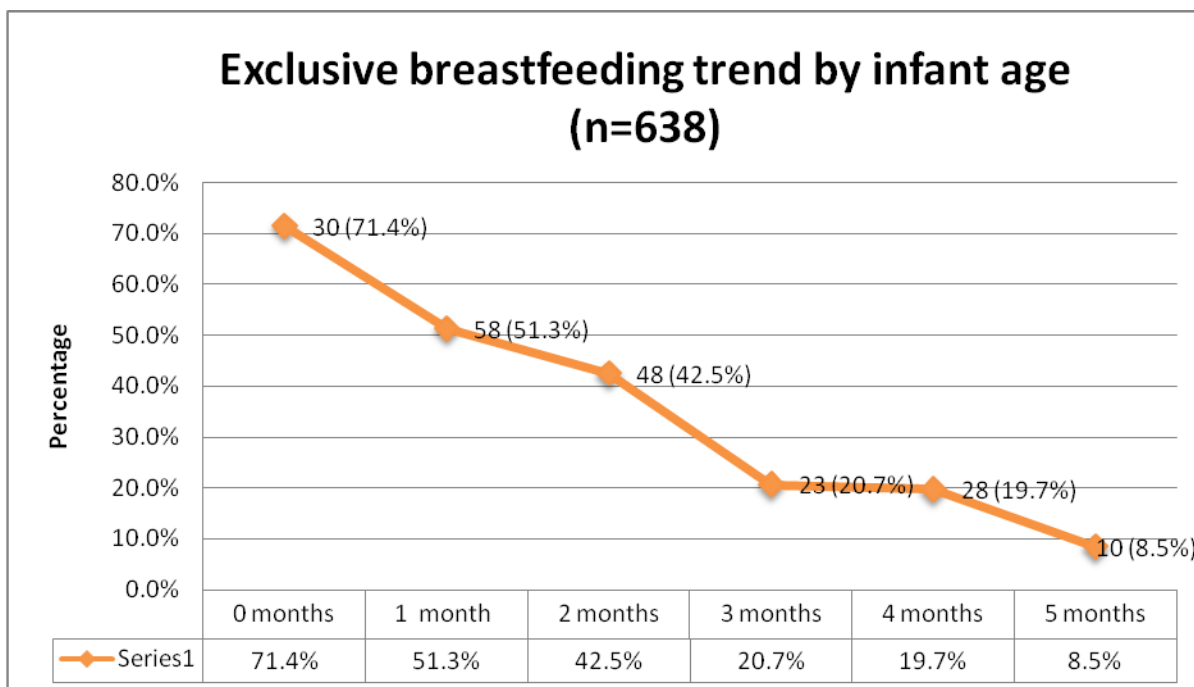


Figure 13: Trends of EBF by infant age among mothers with children aged <6 months

As shown in Figure 14 below, mixed feeding was also found to increase as the infant grew older. Exclusive breastfeeding was less likely to be practiced as the infant grew older among mothers with children aged less than six months.

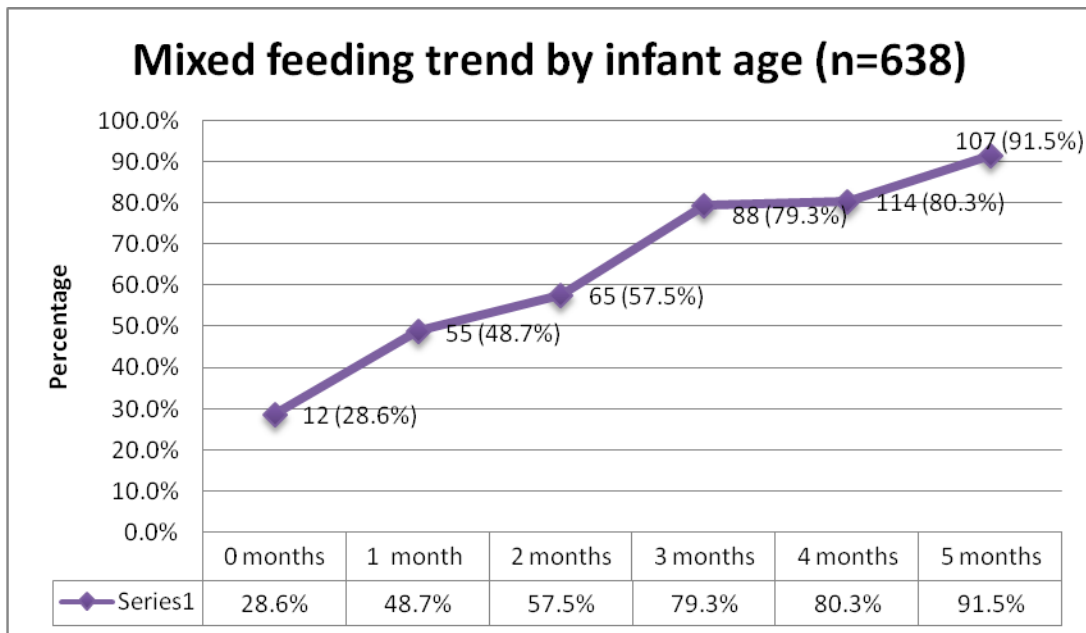


Figure 14: Trend of mixed feeding by age, among mothers with children aged <6 months

4.2 Bivariate analysis

Variables were cross tabulated with exclusive breastfeeding to establish association. The table below shows the factors that were tested for significance using bivariate analysis. Only variables with a p value <0.05 were considered significant at bivariate stage. These were mother's employment (p=0.057), wealth index (0.010) infant age (p= <0.0001), place of delivery (p=0.0195), bottle feeding (< 0.0001) and residence (p=0.0389).

None of the socio-economic and demographic factors were significant at bivariate analysis as indicated in the table 2 below.

Table 2: Socio-economic and demographic

Socio-economic and demographic			
	Factors /variables	Exclusive breastfeeding N (weighted %)	P- value
Mother's Age	15 – 19	22 (29.55)	0.3827
	20 – 34	111 (28.61)	
	35 – 49	64 (35.32)	
	Total	197	
Marital status	Not in a union	167 (30.97)	0.7348
	Married	10 (33.86)	
	Lived with a man	20 (26.81)	
	Total	197	
Media (TV and Radio)	None	80 (40.61)	0.210
	At least one	65 (32.99)	

	Both	46 (23.35)	
	Not a de jure resident	6 (3.05)	
	Total	197	

As indicated in the table 3 below, two out of five infant characteristics were significantly associated with exclusive breastfeeding. These were infant age and bottle feeding.

Table 3: Infant characteristics

Infant characteristics			
	Factors /variables	Exclusive breastfeeding N (weighted %)	P- value
Infant age	0 months	30 (73.45)	<0.0001
	1 month	58 (54.31)	
	2 months	48 (40.62)	
	3 months	23 (19.64)	
	4 months	28 (18.4)	
	5 months	10 (8.09)	
	Total	197	
Infant Sex	Male	103 (31.6)	0.6224
	Female	94 (29.72)	
	Total	197	
Infant size at birth	Big	77 (33.38)	0.6351

	Average	95 (29.74)	
	Small	17 (25.3)	
	Don't know	8 (32.26)	
	Total	197	
Bottle feeding	No	194 (32.43)	< 0.0001
	Yes	3 (4.12)	
	Total	197	

Place of delivery and residence were significantly associated with exclusive breastfeeding as indicated in the table below. Mothers who delivered in public or private hospitals were more likely to practice exclusive breastfeeding than those who delivered at home. Rural residence was negatively associated with exclusive breastfeeding.

Table 4: Contextual factors

Contextual factors			
	Factors /variables	Exclusive breastfeeding N (weighted %)	P- value
Place of delivery	Home	46 (23.34)	0.0195
	Public	130 (34.07)	
	Private	21 (36.57)	
	Total	197	
ANC visits	0	16 (24.83)	0.4986

	1 – 3	69 (32.59)	
	4 +	108 (31.24)	
	Total	193	
Resident	Urban	67 (37.56)	0.0389
	Rural	130 (27.93)	
	Total	197	

Among the maternal factors, mother's employment and wealth index were significantly associated with exclusive breastfeeding. The table below show the factors considered and level of significance.

Table 5: Maternal

Maternal			
	Factors /variables	Exclusive breastfeeding N (weighted %)	P- value
Mother's employment	Not working	122 (27.92)	0.057
	Working	74 (36.21)	
	Total	197	
Type of delivery	Caesarean (Yes)	12 (38.7)	0.333
	Caesarean (No)	185 (30.5)	
	Total	197	
Parity	1	48 (.28.32)	0.6971

	2-4	127 (32.1)	
	5 and more	22 (28.98)	
	Total	197	
Knowledge	No knowledge	7 (28.54)	0.4574
	Fair knowledge	12 (32.5)	
	Limited knowledge	33 (24.47)	
	Good knowledge	145 (32.57)	
	Total	197	
Wealth index	Poorest	39 (19.80)	0.010
	Poorer	42 (21.32)	
	Middle	25 (12.69)	
	Richer	47 (23.86)	
	Richest	44 (22.34)	
	Total	197	
Mother's literacy	Cannot read at all	16 (8.12)	0.545
	Able to read only parts of a sentence	15 (7.61)	
	Able to read a whole sentence	166 (84.26)	
	Total	197	
Mother's level of	No education	5 (47.62)	0.1213

education	Primary	60 (28.71)	
	Secondary	123 (30.24)	
	Higher	9 (53.82)	
	Total	197	

4.3 Multiple regression

Seven out of all the variables which were tested in the bivariate analysis had a p-value of 0.2 or less and were selected for inclusion in the multiple logistic model to take care of confounding factors. The seven include: mother's education, infant age, place of delivery, mother's employment, wealth index, bottle feeding and place of residence.

Using the seven variables, forward selection was used to build the final model. The final model contained four variables which remained significant ($p < 0.05$) in the model and they were: infant age, place of delivery, bottle feeding and place of residence.

The odds of exclusive breastfeeding among one month old infants were 62% (95%CI, 0.16 to 0.88; $P=0.02$) less than zero months old. Exclusive breastfeeding rates decreased with age from one month (OR 0.38; 95%CI 0.16 to 0.88), at two months (OR 0.20; 95%CI 0.08 to 0.49), three months (OR 0.07; 95%CI 0.03 to 0.18) four months (OR 0.07; 95%CI 0.03 to 0.17) and at 5 months (OR 0.03; 95%CI 0.01 to 0.07)

Delivery in health facilities was associated with higher exclusive breastfeeding rates compared to home deliveries. Mothers who delivered in public hospitals (OR 1.9; 95%CI 1.18 to 3.06) and private hospitals (OR 2.1; 95%CI 1.08 to 4.18) were about two times more likely to breastfeed exclusively compared to mothers who delivered at home.

Exclusive breastfeeding rates were about twice as high in urban areas (OR 1.92; 95%CI 1.17 to 3.15) than in rural areas. From the analysis, mothers in urban areas were more likely to exclusively breastfeed their infants compared to their rural counterparts.

The table below shows the significant determinants of exclusive breastfeeding. It includes the odds ratio, confidence interval at 95% and p value. The determinants were considered significant at 95% confidence interval if the range did not include 1. A p value of < 0.05 was also used to qualify a determinant as significant.

Table 6: Multiple logistic regression

Exclusive breastfeeding				
Variable		OR	95% CI	p-value
Child's age in months	0 months	1		
	1 month	0.38	0.16 — 0.88	0.023
	2 months	0.20	0.08 — 0.49	<0.0001
	3 months	0.07	0.03 — 0.18	<0.0001
	4 months	0.07	0.03 — 0.17	<0.0001
	5 months	0.03	0.01 — 0.07	<0.0001
Place of delivery	Home	1		
	Public	1.9	1.18 — 3.06	0.009
	Private	2.1	1.08 — 4.18	0.030
Residence	Rural	1		
	Urban	1.92	1.17 — 3.15	0.010
Drank from bottle	No	1		
	Yes	0.075	0.02 — 0.28	<0.0001

Chapter 5

This chapter discusses the results of the study in more detail. Findings of this study will be compared with existing evidence and differences and similarities will be noted. Possible explanations will be given for any differences noted. Recommendations will be suggested based on findings.

5. Discussion

5.1 Introduction

The aim of this study was to determine the socio-demographic factors associated with exclusive breastfeeding among mothers with children less than six months of age. Exclusive breastfeeding was obtained using a 24-hour recall among mothers with infants aged less than six months. According to the WHO and UNICEF, exclusive breastfeeding does not allow infants less than six months to have any additional drinks or solids apart from breast milk and medicines prescribed by the doctor, oral rehydration solution and vitamins (1, 2, 8). Using the conceptual framework in Figure 1 (19), the factors associated with exclusive breastfeeding were classified as;

- i. Maternal,
- ii. infant characteristics,
- iii. contextual and
- iv. socio-demographic

Cultural variable was not collected as part of the ZDHS, and as such, was not included in the analysis. The variables were described and analysed at bivariate and multiple logistic regression stages and four factors remained significant. These were;

- 1) infant age
- 2) place of delivery
- 3) bottle feeding
- 4) place of residence

5.2 Prevalence of exclusive breastfeeding

Infants should be breastfed only for the first six months of life (1). Evidence indicates that it can contribute to the reduction of infant morbidity and mortality (1, 4, 8, 9, 13). The Government of Zimbabwe has made efforts to scale-up exclusive breastfeeding rates among children aged less than six months (12). According to the findings of this study, 97% of mothers were currently breastfeeding but only 30.9% were exclusively breastfeeding. The findings of this study show that exclusive breastfeeding rates are still low, and more effort is needed to address this public health problem. The WHO recommends an exclusive breastfeeding rate of at least 90% yet only about a third was exclusively breastfed (8).

This EBF rate obtained in this study was higher than the 5.8% obtained in the 2010 national nutrition survey but lower than the current 41% (17, 7). This could have been due to difference in the methodology used to collect data. The 2010 national nutrition survey used the since birth recall (17) whilst the demographic health survey and MICS used the 24-hour recall (7). Compared to other countries, the EBF rate obtained in this study was lower than Pakistan (37.1%) (21), Ethiopia (49%) (24), Ghana (64%) (22) and Tanzania (49.9%) (25). However it was higher than Nigeria (13.5 %) (23), United States of America (16.8%) (14) and almost similar to the Sub Saharan Africa rate (33%) (8).

Early cessation of exclusive breastfeeding deprives infants the benefits of exclusive breastfeeding which include the prevention of infections, malnutrition and death (1, 2, 8, 9). Most complementary foods that are given to children are not nutritionally adequate and are usually a source of infections due to poor hygiene during preparation (2, 8, 9, 18). Inadequate complementary feeding and poor hygiene contributes to the burden of diarrhoeal diseases, stunting and possibly death among children (2, 9). Similar to other studies, the findings of this study showed that mixed feeding is common among mothers with children aged 0-5 months (4, 5, 12-34).

5.3 Significant factors associated with exclusive breastfeeding

The factors that were significantly associated with exclusive breastfeeding among mothers with children aged 0-5 months were place of delivery, child age, place of residence and bottle feeding. The sections below give a detailed account of the study findings and include a comparison with other settings.

Place of delivery (contextual factor)

Place of delivery has been found to be a significant factor that influences exclusive breastfeeding (22, 24, 26). This is similar to the findings in other setting like Ghana, Ethiopia and Tanzania (22, 24, 26). The higher exclusive breastfeeding rates associated with health facility deliveries could be due to the Baby Friendly Hospital Initiative that is implemented in health facilities (22).

Baby Friendly Hospital Initiative promotes, protects and supports breastfeeding including exclusive breastfeeding (8). In Anambra State, Nigeria, an improvement in exclusive breastfeeding rates was noted after the implementation of Baby Friendly Hospital Initiative as opposed to the previous practices which allowed the free advertising and use of formula in health facilities (32). Further, the positive association between health facility delivery and exclusive delivery could also have been due to the breastfeeding training provided by trained health professionals (22, 26, 32). Just like in Tanzania (26), mothers who received counseling after delivery in the health facility were more likely to practice exclusive breastfeeding. In contradiction, in Gambia traditional birth attendants were not trained on exclusive breastfeeding counselling and they advised mothers who delivered at home to give water to newborns (34).

Health professionals play a vital role in influencing mothers' decisions to practice exclusive breastfeeding (12, 26, 28, 35). Mothers in KwaZulu-Natal, South Africa cited health professionals as one of the major sources of influence in their decision to exclusively breastfeed (30). Other studies have also confirmed that mothers with children less than six months old often believe and follow what they are told by health professionals and this might influence their decision to practice exclusive breastfeeding (26, 28). However there is still a big miss considering that about a third of the Zimbabwean women delivers at home and miss out on the assistance of skilled health professionals (12).

Contrary to most studies, mothers in Nepal who delivered at home were more likely to practice exclusive breastfeeding than those who delivered in the health facilities because more than 80% of the mothers delivered at home (35).

Child age (child characteristic)

Like in most countries, child age is a significant factor that influences the practice of exclusive breastfeeding among mothers with children aged 0-5 months (13, 21, 24, 26, 28). In this study there was a decrease in the practice of EBF as the child age increased. The rate declined from 71.4% at less than one month to 8.5% at five months. This inverse association between age and exclusive breastfeeding was also observed in Uganda (13), Ethiopia (24), Pakistan (21) and Tanzania (26). As the child grew older, mixed feeding became more common. In a Nigerian study, more than half of the infants aged less than three months were drinking water plus breast milk, due to the beliefs in some cultures that water helps to quench the thirst of the child (28).

According to the findings of this study, most children were introduced to other liquids and solids during the first three months of life. As indicated in Figure 14, above, there wasn't much difference between 3 and 4 months. This is similar to the findings in Tanzania where mothers introduced others liquids and foods during the first three months because the maternity leave was short (26). Another study that was conducted in Ethiopia showed that mothers who resumed work when their infant was more than three months old were 1.6 times more likely to practice exclusive breastfeeding compared to those who returned earlier (OR = 1.61; 95% CI 1.24 to 2.35) (29). The 71.4% at less than one month is a clear indication that other liquids or foods are given as early as in the first week or day. Introduction of solids within the first month is common in other settings (13, 15, 27).

Another qualitative study conducted in Zimbabwe confirmed that mothers give other liquids especially water during the first days due to cultural reasons or to quench the babies' thirst (20). Herbal infusions and concoctions are usually prescribed by influential members of the family, like grandmothers, as they believe that it cures the sunken fontanel and this interferes with exclusive breastfeeding (20). Another possible explanation for the early introduction of solids is

the perception of mothers that breast milk production is insufficient for the child's growth (3, 14).

Place of residence (contextual factor)

According to a study conducted in the Kilimanjaro region, Tanzania, place of residence was not a significant factor for exclusive breastfeeding among mothers with children aged 0-5 months (26). Exclusive breastfeeding rates were almost similar between rural and urban areas (OR=0.7, CI 0.5 to 1.4) (26). Place of residence was not a significant factor in Kilimanjaro because mothers had similar demographic and reproductive health factors and had equal access to media and health care (26).

Contrary to those findings, place of residence was a significant factor in this study. Mothers in the urban areas were more likely to practice exclusive breastfeeding compared to their rural counterparts. This finding could have been due to differences in accessing health care and media between urban and rural mothers in Zimbabwe (26). Access to health facilities provides a platform for mothers to learn more about exclusive breastfeeding and improve their knowledge (31-33). Knowledge of breastfeeding has been found to be a positive factor that allows mothers to exclusively breastfeed (31-33). Access to media can be a source of information which enables mothers to be more aware of the benefits of exclusive breastfeeding in the urban areas (26).

Higher exclusive breast feeding rates among mothers in urban areas were also observed in Nigeria compared to rural areas (28). This is because mothers in rural areas had a tendency of giving water to infants as a way of quenching thirst (28). This finding contradicts with a study in Northwest Ethiopia where rural residence was a positive factor for practicing exclusive breastfeeding (29).

Lower rates in rural areas could be due to cultural beliefs that hinder the practice of exclusive breastfeeding (4, 20, 27). A study in rural Zimbabwe found that traditional, cultural beliefs and lack of knowledge were significant barriers to practicing exclusive breastfeeding among the rural population (20). This is similar to findings in Nigeria where cultural beliefs about colostrum and pre-lacteal feeds were a barrier to timely initiation of breastfeeding and exclusive breastfeeding

(25). In addition to these findings, infants in rural Malawi were given herbal water during the first weeks of life due to the influence of grandmothers who were perceived as a source of knowledge and expertise with regards to infant feeding (27).

Bottle feeding (child characteristic)

Bottle feeding is associated with infant formula feeding which inhibits the practice of exclusive breastfeeding (10, 16, 18). Formula feeding using feeding bottles is associated with a high incidence of diarrhoea which is one of the major childhood killer diseases (8, 10, 18). To enable mothers to breastfeed their infants exclusively for the first six months of life, WHO and UNICEF recommend no use of bottle, teat or pacifier (8, 16).

In addition to evidence from Nigeria (23) and Nepal (35), bottle feeding was negatively associated with exclusive breastfeeding among mothers with children aged 0-5 months in Zimbabwe. Interference of exclusive breastfeeding with bottle feeding was also observed in Ethiopia and Guatemala where 28.5% and 70% of the mothers used bottles respectively (31, 36). A possible explanation for bottle feeding and infant feeding could be due to poor enforcement of the code of marketing of breast milk substitutes (12, 17, 18). Enforcement of the code of marketing of breast milk substitutes is weak in Zimbabwe (12, 17, 18). Breast milk substitutes including feeding bottles are widely marketed and easily accessible to mothers (12, 17, 18). In Pakistan the attractive marketing of infant formula and others breast milk substitutes was a significant barrier to mothers practicing exclusive breastfeeding (21).

Studies in The United Arab Emirates and Gambia found that mothers were formula feeding using bottles because they perceived their breast milk to be insufficient for the infant (4, 34). Mother's perceptions about milk insufficiency are common and have been reported in other countries including Zimbabwe (20, 31, 36). Mothers in KwaZulu-Natal, South Africa opted for infant formula because they did not want to transmit HIV to their infants, were going back to work/school and were influenced by their families and relatives (30).

In Zimbabwe, these factors can be significant especially considering that HIV prevalence is high (15%) and family members play a role in influencing a mother's decision to breastfeed exclusively (11, 20). A qualitative study in Zimbabwe found that some mothers received mixed

messages about the safety of breastfeeding among HIV positive mothers hence they opted for infant formula (20).

As indicated in the discussion, health facility deliveries and urban residence were positively associated with exclusive breastfeeding whilst bottle feeding and increasing infant age negatively affected the practice of exclusive breastfeeding among mothers with children aged less than six months. Recommendations are given in the next chapter based on the factors that were significantly associated with exclusive breastfeeding.

5.4 Limitations

Due to the nature of the study, the researcher was limited to the variables collected in the primary study. Although the HIV status of the mother is one of the major determinants of exclusive breastfeeding, the ZDHS did not collect data on this variable, therefore it could not be analysed in this study. Other significant factors like cultural beliefs and perceptions of mothers on adequacy of breast milk were also not included.

Recall bias could have affected the accuracy of the results obtained in this study. There is a possibility that mothers were not able to remember all the foods they gave their children 24 hours prior to the survey interview. Using 24-hour recall alone is not accurate enough to calculate the EBF rate because other studies have shown that if, since birth recall method is used, the rate decreases by half. The 24-hour recall does not take into account foods or liquids that could have been taken more than 24 hours prior to the interview. Social desirability could have been a source of bias where mothers tend to give false information about feeding practices due to their awareness of the recommended feeding practices.

In addition to the limitations already cited, the study was purely quantitative which enabled to bring out associations but could not explain why such associations existed. However a qualitative study would have helped to understand better why these factors are associated with exclusive breastfeeding. It could have been more accurate if a cohort study was conducted and infants were followed up for six months.

Chapter 6

This chapter presents recommendations and conclusions based on the findings of this study. Recommendations are mainly targeted at the factors that were significant in this study. A synthesis of the findings and the gaps that still need to be addressed in future are included in the conclusion.

6. Recommendations

The prevalence of exclusive breastfeeding obtained in this study is still low compared to the recommended rates. The following recommendations are made in line with the findings.

Scale-up exclusive breastfeeding

More programmes should be targeted at scaling-up exclusive breastfeeding among mothers with children aged 0-5 months.

Create a supportive environment

Interventions should address the barriers of exclusive breastfeeding among mothers to enable them to exclusively breastfeed their infants so that infant morbidity and mortality rates can decrease. Barriers of exclusive breastfeeding according to this study are bottle feeding, rural residence, home deliveries and increasing infant age. In addition to that, interventions should also target family members and community leaders in order to create a supportive environment that enables mothers to exclusively breastfeed (27).

Increase health facility deliveries

The support and experiences of the mother during the hours and days of an infant's life usually determine the success of exclusive breastfeeding (37); there is need to establish a good referral system between the community and the health facility so that more deliveries can take place in the health facility and mothers can be supported to exclusively breastfeed by trained health professionals. Village health workers can play an active role in identifying pregnant women and referring them to the health facilities for delivery. In addition to that, routine monitoring and supervision should be conducted to make sure health professional are complying with the 10 steps of successful breastfeeding (37). A number of studies have shown the effectiveness of

BFHI certified health facilities in improving exclusive breastfeeding rates hence it should be implemented in all health facilities (37, 38).

Improve continuum of care

Mothers need support beyond the health facility to sustain exclusive breastfeeding (18). There is evidence that village health workers can influence positive behavior change including exclusive breastfeeding because they understand the social norms and are trusted by the community they serve (37). Village health workers can conduct home visits to lactating mothers and support them to exclusively breastfeed. Mother-to-mother support groups can also be established in communities to encourage mothers in rural areas to exclusively breastfeed (38).

Information, education and counselling material

Exclusive breastfeeding information, education and counselling material should be consistent, appropriate, and simple to understand and monitored accordingly by the National Nutrition Department which falls under the Zimbabwe Ministry of Health and Child Care (37). Various types of media should be used to send the messages to the mothers; for example, television, radio and social media. Continuous education and counselling can reduce confusion or mixed messages that can affect exclusive breastfeeding (20). Mixed feeding should be discouraged, especially the addition of water, which is usually given to infants during the first weeks of life, to prevent morbidity and mortality among infants. Most messages emphasise the benefits of exclusive breastfeeding, it might be worth changing the approach so that mothers are aware of the dangers associated with mixed feeding (37).

Code monitoring of breast milk substitutes

Code monitoring of breast milk substitutes should be enforced to ensure that mothers do not opt for breastfeeding substitutes at the expense of their child's health (37-39). The use of infant formula should be discouraged at all levels including at the health facilities. The display of feeding bottles and other breast milk substitutes should be discouraged so that they will not be easily accessible to mothers. Punitive measures should be in place for not complying with the code of marketing of breast milk substitutes (37).

Leadership and Governance

Political will is essential for the success of most interventions (37). There is need for strong political commitment to support exclusive breastfeeding and ensure the availability of resources needed. Political will, especially at the highest levels of government leadership will contribute significantly to the success and sustainability of exclusive breastfeeding interventions. For example, code monitoring of breast milk substitutes (38).

Solutions should come from mothers

Lastly, there is need for further research to determine the kind of support mothers need to practice exclusive breastfeeding. It will be of great benefit if the solutions come from the target population itself (37). This study presents a small piece of evidence hence a qualitative study that includes the different cultures can yield better results to inform policy. As suggested by the Alma Ata Declaration, the people should take ownership of their own health and should come up with solutions to deal with their own health issues (39).

6.1 Conclusion

Exclusive breastfeeding is one of the most effective interventions that can reduce infant morbidity and mortality (1, 2, 8, 12). A lot of evidence on how it contributes to the prevention of malnutrition, diarrhoea, pneumonia, transmission of HIV from mother to child and deaths in infants and under fives (8, 10, 22, 26, 31). Despite the evidence, findings of this study indicate that the prevalence of exclusive breastfeeding among mothers with children aged less than six months is low in Zimbabwe.

This study was able to determine the factors associated with exclusive breastfeeding using the 2010 Zimbabwe Demographic Health Survey. The selection of variables from the dataset was guided by the conceptual framework in Figure 1 above. The factors that remained significant were place of residence, place of delivery, infant age and bottle feeding. According to the conceptual framework, EBF is mainly influenced by infant characteristics and contextual factors (19). These findings are consistent with the already existing evidence in other settings. Recognition of these findings will enable programme managers and other stakeholders to design and implement interventions that are better targeted.

Even though the study was able to determine the factors associated with exclusive breastfeeding, there is still need to understand why such associations exist. There is still need for further investigation on the cultural barriers associated with exclusive breastfeeding and how interventions can be designed to overcome the barriers. Efforts should be made to improve exclusive breastfeeding rates in Zimbabwe considering that it is grappling with high infant morbidity and mortality rates.

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Appendix # 1: Bivariate and multivariate logistic regression to identify determinants of exclusive breastfeeding

				Bivariate model		Multivariate model	
Name Variables	Classification according to conceptual framework	ZDHS question	Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Mother's age	Socio-economic and demographic	1. In what month and year were you born? 2. How old were you at your last birthday?	15-19 years 20-34 years 35-49 years				
Mother's level of education	Maternal	1. Have you ever attended school? 2. What is the highest level of school you attended: primary, secondary, or higher?	No education Primary Secondary Higher				
Parity	Maternal	1. Do you have any sons or	1				

		<p>daughters to whom you have given birth who are currently living with you?</p> <p>2. How many sons live with you? And how many daughters live with you?</p> <p>3. Do you have any sons or daughters to whom you have given birth who are alive but do not live with you?</p> <p>4. How many sons are alive but do not live with you?</p> <p>5. And how many daughters are alive but do not live with you?</p>	<p>2-4</p> <p>5 or more</p>				
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ANC visits	Contextual	4. How many times did you receive antenatal care during this pregnancy?	0 1-3 4+				
Infant sex	Infant characteristic	1. Is (NAME) a boy or a girl?	Boy Girl				
Infant age	Infant characteristic	1. In what month and year was (NAME) born?	0 month 1 month 2 months 3 months 4 months 5 months				
Infant size at birth	Infant characteristic	1. When (NAME) was born, was he/she very big, bigger than average, average, smaller than average, or very small?	Very big Bigger than average Average Smaller than average Very small				
Place of	Contextual	1. Where did you give birth to	Home				

delivery		(NAME)?	Public Sector Private Sector				
Type of delivery	Maternal	1. Was (NAME) delivered by caesarean, that is, did they cut your belly open to take the baby out?	No Yes				
Current breastfeeding status	Infant characteristic	1. Are you still breastfeeding (NAME)?	No Yes				
24 hour recall	Infant characteristic	1. Now I would like to ask you about liquids or foods that (NAME FROM 557) had yesterday during the day or at night. I am interested in whether your child had the item I mention even if it was	No Yes				

		<p>combined with other foods.</p> <p>2. Did (NAME) eats any solid, semi-solid, or soft foods yesterday during the day or at night?</p>					
Marital status	Socio-economic and demographic	1. Are you currently married or living together with a man as if married?	<p>Currently married</p> <p>Living with a man</p> <p>Not in union</p>				
Mother's occupation	Maternal	<p>1. Aside from your own housework, have you done any work in the last seven days?</p> <p>2. What is your occupation, that is, what kind of work do you</p>	<p>No</p> <p>Yes</p>				

		mainly do?					
Knowledge of breastfeeding in the context of HIV/AIDS	Maternal	<p>1.Can HIV be transmitted from a mother to her baby:</p> <p>During pregnancy?</p> <p>By breastfeeding?</p> <p>During delivery?</p> <p>2. During any of the antenatal visits for your last birth were you given any information about:</p> <p>Babies getting HIV from their mother?</p> <p>Getting tested for HIV?</p> <p>Things that you can do to prevent getting HIV?</p>	No Yes				

Appendix # 2: Ethics certificate



R14/49 Miss Munjoma Pamela Takudzwa

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M141030

NAME: Miss Munjoma Pamela Takudzwa
(Principal Investigator)

DEPARTMENT: School of Public Health


PROJECT TITLE: Socio-Demographic Factors Associated with Exclusive Breastfeeding among Mothers with Children Aged Less than Six Months of Age in Zimbabwe

DATE CONSIDERED: 31/10/2014

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR: Aziza Mwisongo

APPROVED BY: 

Professor Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 05/11/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.**

Principal Investigator Signature _____

Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix # 3: Approval email from measuredhs

archive@measuredhs.com

****See Attached.****

You have been authorized to download data from the Demographic and Health Surveys (DHS) Program. This authorization is for unrestricted countries requested on your application.

All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey.

The data sets must not be passed on to other researchers without the written consent of DHS. Users are requested to submit a copy of any reports/publications resulting from using the DHS data files. These reports should be sent to: archive@dhsprogram.com.

To begin downloading datasets, please login at http://www.dhsprogram.com/data/dataset_admin/login_main.cfm. Once you are logged in, you may also edit your contact information, change your email/password, request additional countries or Edit/Modify an existing Description of Project.

If you are a first time user of DHS Data, please view the following videos on downloading and opening DHS data:

http://www.dhsprogram.com/data/Using-Datasets-for-Analysis.cfm#CP_JUMP_14039

Some more resources to help you analyze DHS data efficiently are available at: <http://dhsprogram.com/data/Using-Datasets-for-Analysis.cfm> and on the DHS Program User Forum at: <http://userforum.dhsprogram.com>.

The files you will download are in zipped format and must be unzipped before analysis. Following are some guidelines:

After unzipping, print the file with the .DOC extension (found in the Individual/Male Recode Zips). This file contains useful information on country specific variables and differences in the Standard Recode definition.

Please download the DHS Recode Manual: <http://dhsprogram.com/publications/publication-dhsg4-dhs-questionnaires-and-manuals.cfm>

The DHS Recode Manual contains the documentation and map for use with the data. The Documentation file contains a general description of the recode file, including the rationale for recoding; coding standards; description of variables etc. The Map file contains a listing of the standard dictionary with basic information relating to each variable.

It is essential that you consult the questionnaire for a country, when using the data files. Questionnaires are in the appendices of each survey's final report: <http://dhsprogram.com/publications/publications-by-type.cfm>.

We also recommend that you make use of the Data Tools and Manuals: http://www.dhsprogram.com/accesssurveys/technical_assistance.cfm.

DHS statistics can also be obtained using the STATcompiler tool: <http://www.statcompiler.com>. This tool allows users to select countries and indicators to create customized tables. It accesses nearly all of the indicators that are published in the final reports. Authorization is not needed to use the STATcompiler.

For problems with your user account, please email archive@dhsprogram.com.

For data questions, we highly recommend that users register to participate in the DHS Program User Forum at: <http://userforum.dhsprogram.com>. The User Forum is an online community of DHS data users and contains discussions about many DHS analysis and dataset topics. Please search the contents of the forum, and if you do not see your question addressed, consider posting a new question for users to discuss.

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