DETERMINANTS AND TIMING OF USE OF BREAST MILK SUBSTITUTES AMONG MOTHERS OF INFANTS BETWEEN THE AGES OF 3 TO 6 MONTHS IN THE LEDZOKUKU- KROWOR MUNICIPALITY IN ACCRA

BY

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DECLARATION

The thesis is the result of research work undertaken by Marian Gatiba in the Department of Nutrition and Food Science, University of Ghana, under the supervision of Dr. Esi Colecraft and Prof. Matilda Steiner-Asiedu.

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DEDICATION

This work is dedicated to my dear husband, Mr. Emmanuel Sal Issak, my daughter Amera Issak and the entire Gatiba fimily whose unflinching love, support and encouragement have enabled the successful completion of my thesis.

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TABLE OF CONTENTS TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BMS:	Breast Milk Substitute
BSES-SF:	Breastfeeding Self-Efficacy Scale-Short Form
CEE/CIS:	Central and Eastern Europe/Commonwealth of Independent States
CWC:	Child Welfare Clinic
EBF:	Exclusive Breastfeeding
EBFSE:	Exclusive Breastfeeding Self Efficacy
GDHS:	Ghana Demographic Health Survey
IYCF:	Infant and Young Child Feeding
L.I.:	Legislative Instrument
MCH	Maternal and Child Health
MICS:	Multiple Indicator Cluster Survey
OR:	Odds Ratio
TBA:	Traditional Birth Attendant
UNICEF:	United Nations Children's Fund
WHO:	World Health Organization

ABSTRACT

Background: Infants who are not exclusively breastfed during the first six months of life are given a wide variety of other foods or drinks during the period to complement or replace breast milk, these food items are termed Breast Milk Substitutes (BMS). Inadequate Exclusive Breastfeeding (EBF) is associated with increased infant morbidity and death. In Ghana about one-third of infants under six months old are not exclusively breastfed suggesting reliance on breast milk substitutes (BMS) for infant feeding. Factors associated with mothers' use of BMS has not been adequately explored in Ghana to inform effective interventions to improve EBF and duration.

Objective: To assess the prevalence, determinants and timing of use of BMS among mothers of children 3 to 6 months attending child welfare clinics (CWC) in 3 selected health facilities in the Ledzokuku –Krowor Municipality.

Methodology: A cross-sectional survey with 360 mother infant pairs recruited from CWC at three hospitals (Mission, Public, Private). Data on socio-demographic characteristics, Exclusive Breastfeeding Self Efficacy (EBFSE), exposure to promotion of BMS and use of BMS were collected via face-to-face interviews using semi structured questionnaires. Bivariate analyses were used to assess significant differences between mothers who used and those who did not use BMS in infant feeding. Binary logistic regression analysis was used to identify factors that predicted mothers' use of BMS.

Results: The prevalence of use of BMS was 51.9% and the mean duration of EBF was 2.1 ±1.6 mos among infants who had been introduced to BMS. The main BMS used were water and/or gripe, infant formula and complementary foods. Mothers' main source of exposure to

the promotion of BMS was through advice (50.6%); with health workers being the primary source of advice (74.2%) on using BMS. Significantly more mothers who used BMS than those who did not had been exposed to the promotion of BMS (67.9% vs 55.5%, $p = 0.015$) through commercial advertising or advice from others. Mothers who had already introduced BMS to their infants had a lower mean EBFSE score than those who were not using BMS (20.54 ±10.52 vs. 33.52±4.53), $p = 0.001$) suggesting that caregivers' confidence in practicing EBF influenced the use of BMS. Mothers who did not work away from their infants were less likely to use BMS than those who worked away from their infants (OR 0.142; CI, 0.047 - 0.429); mothers who planned to exclusively breastfeed before delivery were less likely to use BMS than those who planned to mix feed (OR – 0.137; CI, 0.031 - 0.613) while mothers who had a lower EBFSE score had 40.6 times higher odds (95%CI= 15.760 to 104.466) of using BMS.

Conclusion: Infant feeding interventions in the Ledzokuku-Krowor Municipality should be directed at improving maternal confidence in practicing EBF since women with lower confidence are more likely to use BMS. These is also a need for significant effort to change health worker attitude towards the use of BMS among infants less than 6months

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The link between breastfeeding and positive health outcomes for both infants and their mothers has prompted worldwide efforts to promote breastfeeding. In 2002, the World Health Organization (WHO 2002) established recommendations for optimal Infant and Young Child Feeding (IYCF) that advocates for exclusive breastfeeding (EBF) for the first six months of life and continued breastfeeding when complementary foods are introduced until the child is two (2) years old or beyond. It has been demonstrated that sub-optimal breastfeeding, particularly with respect to EBF has serious consequences for child morbidity and mortality (Black et al., 2008) which makes the WHO recommendations even more significant.

Infants who are not exclusively breastfed during the first six months of life are given a wide variety of other foods or drinks during the period to complement or replace breast milk, these food items are termed Breast Milk Substitutes (BMS) (WHO, 2008). While BMS are necessary for infants not breastfed due to mother's ill health or death, studies have shown that adding them to a breast milk diet is associated with a higher risk of occurrence of diarrhea and other diseases among infants less than six months old (Popkins et al., 1990; Arifeen et al., 2001). The significance of the WHO recommendation to the health and wellbeing of the infant and hence the increased need to discourage the use of BMS among infants less than six months old can therefore not be over emphasized.

EBF rates, hence the use of BMS has changed over the years worldwide, regionally and in Ghana. In 2011 the WHO estimated that 65% of infants between the ages of 0 to 4 months had been introduced to BMS globally (WHO, 2011). Before then, the use of BMS had declined worldwide from 52% in 1995 to 48% in 2000. Across the regions of the world, the West/Central Africa region records the highest use of BMS (80%) (www.unicef.org) even though current improvement in EBF rates in countries like Ghana and Benin have caused recent declines in the use of BMS in the region (www.unicef.org). In Ghana, EBF rates increased significantly from 2% in 1998 to 63% in 2008 (GDHS, 2008). More recent data from the 2012 Multiple Indicator Cluster Survey (MICS) (UNICEF, 2012) showed that the EBF rate in Accra was well below the national average at about 46%. Although Ghana has made great strides in improving EBF rates nationally, it is of concern that about one third of infants nationally and possibly even more within the regions, as evidenced by the MICS statistics for Accra, are not exclusively breastfed suggesting high use of BMS for infant feeding. Furthermore, the average duration of EBF (4.4 months) (GDHS, 2008) falls two (2) months short of the recommended six (6) months. This means infants are being introduced to other foods before 6 months.

The reasons for use of BMS for infant feeding despite the WHO recommendation have been the subject of various research studies. Studies have consistently reported link between various socio-demographic variables including educational level social class (Scott and Binns, 1999), marital status (Haller and Simpser, 1999), employment characteristics (Van Esterlk and Greiner, 1981) rural versus urban residence and mother's age (Connolly et al., 1981) and mothers' use of BMS. Other studies have reported that use of BMS is influenced

by maternal breastfeeding self-efficacy (Lawson and Tulloch, 1995) aggressive marketing of BMS like infant formula (Howard et al., 2000), the delivery characteristics of mother and her HIV status (Doherty et al., 2006).

In Ghana, studies on the determinants of use of BMS have basically focused on socio-demographic factors, health care attributes and beliefs or attitudes towards breastfeeding. Few have been done to assess the influence of maternal breastfeeding self-efficacy, employment and exposure to the promotion of BMS. It is important that these predictors of use of BMS be assessed in the Ghanaian setting so that interventions could be appropriately tailored towards the more vulnerable groups in the country.

1.2 Conceptual Framework

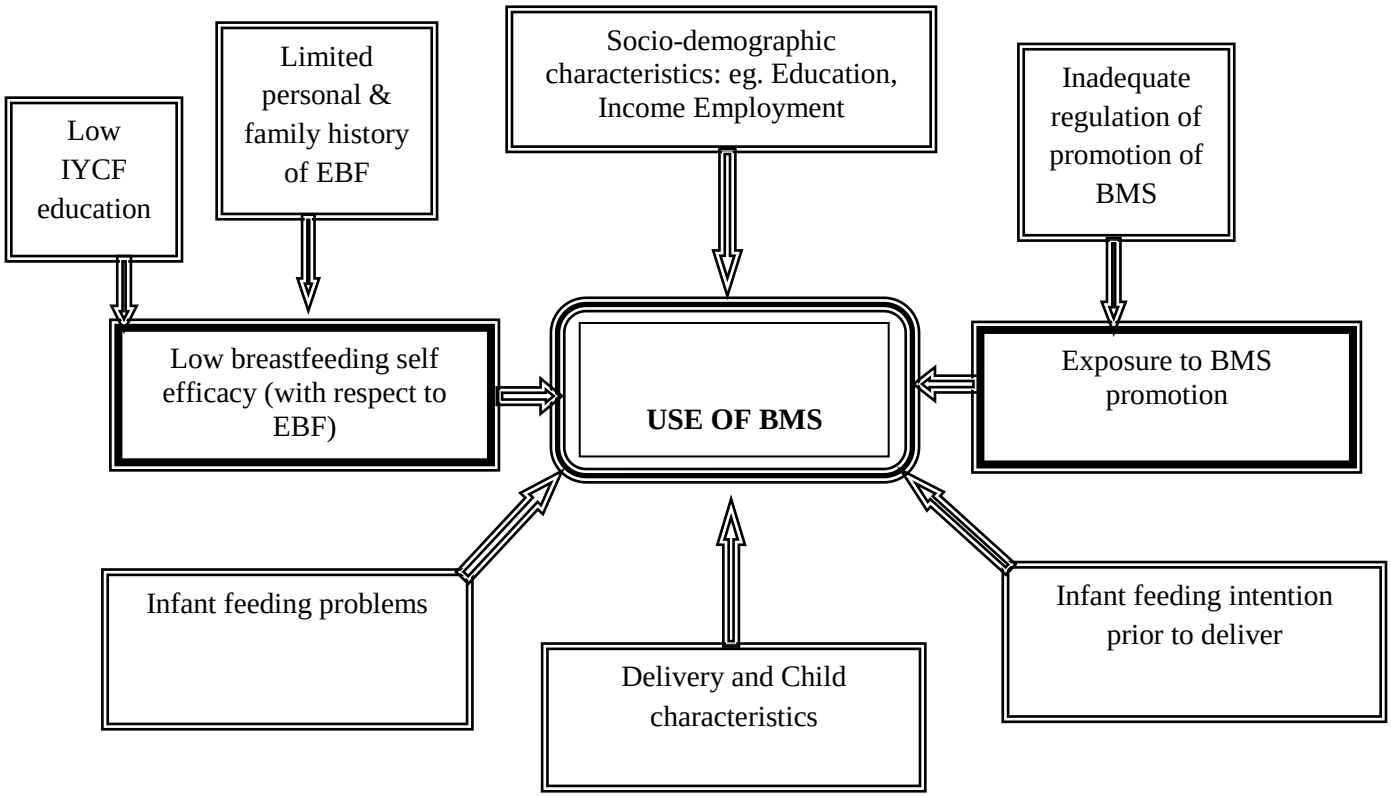

Figure 1.1: Conceptual framework of determinants of use of BMS

The conceptual framework summarizes factors that have been identified by various studies to influence mothers' use of BMS in feeding infants less than 6 months.

Studies have shown that mothers with little knowledge on Infant and Young Child Feeding (IYCF) practices such as Exclusive Breastfeeding (EBF) and mothers who have had limited experience of the practice of EBF tend to have low breastfeeding self efficacy and are more likely to use breast milk substitutes (BMS). Inadequate regulation of the law that prohibits

the promotion of BMS (Ghana Breastfeeding Promotion Regulation, L.I. 1667, 2000) results in mothers' exposure to such promotion which has been shown to promote the use of BMS.

Studies have also shown that mothers who plan to use BMS before delivery of their infants and those who have had delivery and feeding difficulties such as caesarian birth and sore nipples respectively also tend to use BMS. Socio-demographic correlates such as maternal education, income and employment also influence the use of BMS even though the directions of influence in those factors tend to vary according to study location.

In this conceptual framework designed for the study, the determinants with highlighted outlines will be examined.

1.3 Rationale

In Ghana, there is limited information on some determinants of use of BMS that have been shown to be significant in other countries such as the exposure to the promotion of BMS and maternal breastfeeding self-efficacy.

This study therefore intends to expand our knowledge base on determinants of use of BMS by exploring these areas less investigated in the Ghanaian setting so as to inform recommendations to improve EBF rates in the country.

1.4 Research Question

What are the predictors and timing of use of BMS among mothers of infants 3 to 6 months attending child welfare clinics (CWC) in 3 selected health facilities in the Ledzokuku – Krowor Municipality?

1.5 Specific Research Questions

1. What are the prevalence and timing of use of BMS among the selected mothers?
2. What types of BMS are used by the mothers?
3. Does exposure to the promotion of BMS influence the mothers to use them?
4. Does a mother's Exclusive Breastfeeding Self Efficacy (EBFSE) influence her use of BMS?
5. What are the general predictors of use of BMS among the selected mothers?

1.6 Main Objective

To assess the determinants and timing of use of BMS among mothers of children 3 to 6 months attending child welfare clinics in 3 selected health facilities in the Ledzokuku – Krowor Municipality

1.7 Specific Objectives

1 To determine the prevalence and timing of use of BMS among the selected mothers

2 To assess the effect of mothers' exposure to the promotion of BMS on their use of BMS

3 To assess the effect of mothers' Exclusive Breastfeeding Self Efficacy (EBFSE) on use of BMS

4 To identify the factors that predict use of BMS among the mothers

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Implications of Exclusive Breastfeeding (EBF) and Consequences of Suboptimal EBF

Under nutrition is the preventable cause of over one third (3.5 million) of all child deaths globally (Black et al., 2008) and counseling on optimal breastfeeding has been identified among priority interventions to improve child nutrition and survival (Bhutta et al., 2008). Over the years it has been demonstrated through various studies that it is not just any breastfeeding that enhances child health but the exclusivity and duration of EBF are important (Lauer et al., 2004; Fewtrell et al., 2007). The WHO in May, 2002 gave a recommendation that infants be exclusively breastfed for the first six months of life and continued to be breastfed when complementary foods were introduced until they were two (2) years old or beyond. By the recommendation, the WHO defined EBF as an infant receiving only breast milk from the breast, or expressed breast milk, and not receiving other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines.

There is ample evidence that EBF as currently recommended by the WHO confers several benefits on both child survival and the mother (Black et al., 2008; Kramer and Kakuma, 2012). The study by Black et al (2008) used a random effects meta-analysis of identified papers with appropriate data from three world regions (Africa, Asia and Latin America which include primarily low and middle income countries) to estimate the increased risks of cause specific morbidity and mortality in relation to four patterns of breastfeeding for children under six months old; exclusive (only breast milk), predominant (only water or tea

with breast milk), partial (other liquids or solids in addition to breast milk) and not breastfeeding. The study showed that among infants less than six months old, the relative risks for diarrhoea and pneumonia morbidity and mortality were increased for infants fed according to each of the three patterns as compared to those exclusively breastfed. The causes for mortality were classified as diarrhoea, pneumonia and all-cause mortality while morbidity outcomes were categorized into Diarrhoea incidence and Pneumonia incidence. The results indicated that the relative risks were significant for predominantly breastfed infants for All-cause mortality and pneumonia incidence while there were similar but not significant point estimates for diarrhoea and pneumonia mortality and diarrhoea incidence. Generally however, compared to infants exclusively breastfed, those who were partially breastfed had moderately higher relative risks (2.8, 1.59-5.10) of dying than those predominant breastfed (1.48, 1.13-1.92), while those who were not breastfed had the highest risks (14.40, 6.09-34.05) of death.

A recent review by Kramer and Kakuma (2012) on EBF also indicated similar benefits of breastfeeding exclusively for six months. The review incorporated the use of all internally-controlled clinical trials and observational studies comparing child or maternal health outcomes with EBF. Even though the selected studies were stratified according to study design (controlled trials or observational studies), provenance (developing versus developed) and timing of compared feeding groups, results indicated that infants exclusively breastfed for six months experienced less morbidity from gastrointestinal infection than those partially breastfed.

Some other benefits of practicing EBF were drawn from some individual studies considered in the review by Kramer and Kakuma (2012). Particularly with reference to concerns that exclusive breastfed infants had decelerated growth as compared to formula fed infants, it was revealed that neither the trials nor the observational studies suggested that infants exclusively breastfed showed deficits in weight or length gain. Data from two Honduran randomized trials also considered for the review suggested that EBF through 6 months was associated with delayed resumption of menses and more rapid postpartum weight loss in the mother.

These trends in the benefits of EBF for six months have been observed and reported in several other studies (Lauer et al., 2004; Fewtrell et al., 2007; Kramer et al., 2003). An infant in a resource poor setting (particularly one in a developing country) not exclusively breastfed will therefore miss its highly protective effect.

2.1.1 Mechanisms by which EBF Reduces Mortality and Morbidity

Possible mechanisms of the ability of EBF to reduce mortality and morbidity have been widely documented (Popkins et al., 1990). Breastfed infants have less exposure to enteric pathogens transmitted by contaminated fluids and foods, breastfeeding may offer protection against diarrhea because of humoral and cellular anti-infective properties in human milk and breast milk may promote an intestinal environment and micro flora that inhibits proliferation of enteric pathogens. Finally, breastfeeding can improve an infant's nutritional status, thereby reducing susceptibility to diarrhea.

Freachem and Koblinsky (1984) in their study on interventions for the control of diarrheal diseases among young children reported that it was a combination of all these mechanisms not one alone that was responsible for the observed degree of protection of breast milk.

2.2 Breast Milk Substitutes (BMS) and Suboptimal Breastfeeding

2.2.1 What are Breast Milk Substitutes (BMS)?

Infants who are not exclusively breastfed are given a wide variety of other foods including infant formula, other milks, foods and beverages (nutritive – Juices, and non-nutritive beverages –teas, water herbal concoction) and complementary foods to replace or complement breast milk. These food items are termed Breast Milk Substitutes (BMS). The WHO (1981) defines BMS as any foods being marketed or otherwise presented as partial or total replacements for breast milk, whether or not suitable for that purpose. Since the definition of BMS covers products that are suitable for use as a partial or total replacement of breast milk, the WHO in 2008 urged that BMS be read in conjunction with current global recommendations for breastfeeding and complementary feeding such that, since the global recommendation is EBF for six months, any food or drink used for feeding a baby during this period is a BMS (WHO, 2008).

2.2.1.1 Types of BMS Used in Developed and Developing Countries and in Ghana

In the developing countries the main BMS reportedly used are cereal porridges, family foods, infant formula and water while in the developed world the most used BMS is the infant formula (WHO, 2008). An infant formula is defined as a BMS formulated industrially in accordance with applicable Codex Alimentarius standards, to satisfy the normal

nutritional requirements of infants up to between four and six months of age, and adapted to their physiological characteristics. Infant formula may also be prepared at home, in which case it is described as "home-prepared" (WHO, 1981).

In Ghana, the 2008 Demographic Health Survey (GDHS) indicates that the main BMS used in the country are Plain water only (46%), Complementary foods (46%), Other Milks (6%) and Non milk liquids (3%).

A study by Alabi et al., (2007) which sampled information from six regions in Ghana (the three Northern Regions, Greater Accra, Western and Central Regions) indicated that 48.4% of infants below six months old were fed either commercial or home made preparations of cereal based foods, and/or water while 19.6% were given infant formula. The researchers however indicated that the figures recorded may not have been a true reflection of what infants were consuming since in most cases they had observed that mothers were reluctant to indicate they fed their babies with foods aside breast milk even when they did.

2.2.2 Contribution of Use of BMS to Suboptimal Breastfeeding

While BMS are necessary for infants not breastfed due to mother's ill health or death, studies have shown that adding BMS to a breast milk diet is associated with a higher risk of occurrence of diarrhea and other diseases among infants less than six months old (Popkins et al., 1990; Arifeen et al., 2001).

A longitudinal study by Popkins et al (1990) on breastfeeding and diarrheal morbidity that adequately controlled for a wide range of environmental causes of diarrhea indicated that the

addition of even water, tea and other non-nutritive liquids doubled or tripled the likelihood of diarrhea. The authors also indicated that supplementing breastfeeding with additional nutritive foods or liquids further increased significantly the risk of diarrhea.

Another study which was prospective and observational by Arifeen and colleagues (2001) to investigate the risk of infant deaths attributable to respiratory infection indicated that compared to EBF for the first six months of life, infants given BMS were associated with a 2.40 fold higher risk of infant deaths attributable to Respiratory infections. While this highlights the important role of appropriate breastfeeding practices it also indicates the broad-based beneficial effect of EBF in preventing infectious diseases beyond its role in reducing exposure to contaminated food which may have contributed to the strong protection against diarrhea deaths.

With respect to infant formula, researchers have observed that there are differences in the immediate and future outcomes of infants fed with infant formula as compared with those exclusively breastfed for 4 to 6 months (Heinig et al., 1993; Stettler et al., 2005; Stettler et al., 2003). When the growth rates of breastfed infants were compared with those of formula fed infants in a study by Heinig et al in 1993, it was observed that the breastfed infants had decelerated growth compared to the formula fed ones in the early months of infancy. Whiles there is no evidence of any functional disadvantage to the slower growth of the breastfed infants, other studies have provided evidence that the pattern of rapid weight gain during early infancy among formula fed infants is associated with obesity not only in childhood but also in young adulthood (Stettler et al., 2005; Stettler et al., 2003).

2.3 The International Code of Marketing of BMS and the Ghana Breastfeeding Promotion Regulation, 2000 (L.I. 1667)

Based on concerns about the disadvantages of use of infant formula, the general shortcomings of using BMS and the overall superiority of the benefit of breast milk, the World Health Organization (WHO) rose against the sales and promotional activities of BMS by manufacturers in 1981. The highly commercialized nature of BMS particularly, infant formulae was reported to contribute to the decline in breastfeeding rates in some parts of the world (WHO, 1981). Although there is a legitimate market for BMS for mothers unable to breastfeed or mothers breastfeeding partially, the WHO and UNICEF in their bid to promote breastfeeding and to overcome problems that might discourage it, moved for the adoption of the International Code of Marketing of BMS in 1981. Governments of the member states of the WHO were called upon to take action to give effect to the principles and aim of the Code including the enactment of legislation, regulations or other suitable measures (WHO, 1981).

By the latter requirement of the code, the Breast Feeding Promotion Regulation 2000 (L.I. 1667) was enacted in Ghana on 9th May, 2009. The aim of the LI 1667 (same as the International Code of marketing of BMS from which it was derived) is to prevent aggressive marketing of BMS, hence protect breastfeeding. It seeks to ensure the safe and adequate nutrition for infants by the protection of breastfeeding and to ensure the proper use of BMS when these are necessary, on the basis of adequate information and through appropriate marketing and distribution. The effect of the enforcement of the Ghana Breastfeeding Promotion Regulation (L.I. 1667) on the use of BMS will be discussed in the subsequent section, 2.5.2

2.4 Prevalence and Timing of Use of BMS

2.4.1 Worldwide Prevalence and Timing of Use of BMS

In 2011 the WHO estimated that 65% of infants between the ages of 0 to 4 months had been introduced to BMS globally (WHO, 2012). Before then, the use of BMS had declined worldwide from 52% in 1995 to 48% in 2000, indicating a current rise in the prevalence of use of BMS worldwide.

Across the regions of the world, there is a wide variation in rates of use of BMS. According to UNICEF (www.unicef.org), the regions with the highest use of BMS are West/Central Africa (80%) and Central and Eastern Europe/Commonwealth of Independent States (CEE/CIS) (78%) while those with the lowest are the East Asia/Pacific (57%) and Eastern/Southern Africa (59%) regions. However, the EBF rates in West/Central Africa even though still low have seen significant decline in use of BMS between 1998 and 2008 (www.unicef.org). Several countries including Benin and Ghana managed to improve the EBF rates in the region hence the decline in use of BMS (www.unicef.org)

In the developing world, about 3 out of every 5 children or approximately 60% of infants are introduced to BMS before they are 6 months old (www.unicef.org). Despite these high percentages however, the trends of use of BMS have declined over the years in developing countries; from 66% in 1990 to 60% in 2012 (www.unicef.org). Since 1990 the African countries that have made major strides in reducing the use of BMS are Burkina Faso, Cameroon, Ghana, Madagascar, Mali, Nigeria, Senegal, the United Republic of Tanzania, Zambia and Zimbabwe (www.unicef.org).

2.4.2 Prevalence and Timing of Use of BMS in Ghana

Since the introduction of the WHO recommendation, EBF rates in Ghana have improved noticeably. The decade between 1998 and 2008 saw significant improvement in EBF rates among Ghanaian children under six months from a low 2% in 1998 to 63% in 2008 (GDHS 1998, 2008). While this progress is impressive, it also suggests that 37% of Ghanaian children under six months of age are not Exclusively Breastfed implying considerable dependence on BMS for infant feeding. Furthermore, more recent estimates from the 2012 UNICEF Multiple Cluster Survey (MICS) in five densely populated localities in Accra, indicates a much lower EBF rate of 46% in Accra as compared to the national rate. Thus there is even greater dependence (54%) on BMS among populations in Accra. Additionally, even among women who do any EBF the mean duration of EBF nationally is 4.4 months (GDHS, 2008), and 2.5 months in Accra according to the UNICEF MICS (2012) which are suboptimal and suggesting early introduction of other liquids and foods besides breast milk.

Other studies have estimated the rates of use of BMS in different parts of Ghana. One by Aidam et al (2005) that involved three hundred and seventy-six (376) women with infants 0–6 months, attending maternal and child health (MCH) clinics in Ablekuma, a sub-district in the Greater Accra Region indicated a 48.4% use of BMS in the area. The rate above was based on a recall of liquids or foods given to the infants since birth. When the rates in the same study were based on the recall of what the mother had given her infant in the last 24 hours however, the rates of use of BMS reduced to 29.8%. In another study by Alabi et al (2007) that sought to assess compliance to the L.I. 1667 since its enforcement in 2000, the rate of use of BMS among 127 mothers interviewed in six regions of the country (the three

Northern regions, Greater Accra, Western and Central regions) was Sixty-eight percent (68%). The writers indicated that most mothers recruited in the study introduced BMS when the infants were 3months old. The reasons most mothers gave for this early age of introducing BMS was because they had to return to work whether formally employed or self-employed as such were compelled to introduce BMS. The control group of yet another study in the Tema Municipality of the Greater Accra region that assessed the effect of lactation counseling on EBF had an 80.4% use of BMS. This EBF rate however involved the use of only 44 study participants.

Generally, percentages of use of BMS in various parts of the country though high, are varied. It is important that the prevalence in many other areas are determined so that interventions can be more appropriately tailored.

2.5 Determinants of Use of BMS

Existing research has examined the relationship between many variables and their impact on the use of BMS. As indicated in the conceptual framework for this study, scientific evidence has demonstrated the impact of factors such as Socio-demographic characteristics, Exposure to the promotion of BMS, Infant feeding intentions, Feeding problems and low exclusive breast feeding self-efficacy (EBFSE).

In the following sections, Maternal Breastfeeding Self Efficacy, Breastfeeding Intention Prior to Delivery, Employment and Exposure to the Promotion of BMS which will be emphasized in this study are briefly discussed.

2.5.1 Breastfeeding Self Efficacy

2.5.1.1 The Theoretical Perspective of Self Efficacy

The theory of self-efficacy asserts that much of human behavior is self-regulated (Bandura, 1977). It is based on the assumption that individuals regulate their behavior based on their self-efficacy beliefs such that humans avoid situations they believe they are unable to cope with successfully but seek out situations that they believe they can successfully overcome. Perceived self-efficacy therefore plays a role in humans' self-regulation behavior. It refers to a person's beliefs about what he or she is capable of doing based on the expectations of the outcomes that will result when engaging in certain tasks (Bandura, 1977; Hergenhahn and Olson, 2005).

In 1999, Dennis incorporated Bandura's (1977) social cognitive theory and developed the Breastfeeding Self Efficacy Theory to promote the conceptual development of breastfeeding confidence and to guide effective supportive interventions. Breastfeeding self-efficacy refers to a mother's confidence in her ability to breastfeed her infant. It predicts whether a mother chooses to breastfeed or not, how much effort she will expend, whether she will have self-enhancing or self-defeating thought patterns and how she will emotionally respond to breastfeeding difficulties. An individual's level of self-efficacy may be influenced by four factors namely Personal Accomplishments, Vicarious Experiences, Verbal Persuasion and Psychological Response. Personal accomplishments refers to past breastfeeding experiences, Vicarious Experience involves the boost of one's confidence when they watch other women breastfeed, Verbal Persuasion refers to encouragement from influential others such as friends, family, health workers etc. while Psychological Responses which is the final way to

enhance self-efficacy is a person's reaction to stress, fatigue and anxiety during the actual practice. It is hypothesized that health professionals may enhance a mother's breastfeeding confidence by altering these sources of self-efficacy information.

In this study, Dennis' (1999) breastfeeding self-efficacy theory was applied in assessing maternal confidence in EBF. For the purposes of this study, it was termed Exclusive Breastfeeding Self Efficacy (EBFSE).

2.5.1.2 The Effect of Scores on the Breastfeeding Self Efficacy Scale on the Use of BMS

Some studies have demonstrated an inverse relationship between breastfeeding self-efficacy and the use of BMS (Blyth et al., 2004: Dennis, 2006). Dennis (2006) examined the variables which most impacted self-efficacy at one week postpartum and identified eight of them including maternal education, support from other women with children, type of delivery, satisfaction with labor pain relief, and postpartum care, perceptions of breastfeeding progress, infant feeding as planned and maternal anxiety. The variables explained 54% of the variance in the self-efficacy scale scores at one week postpartum. In addition to the variables she indicated that older, more educated, multi parous women were more likely to score higher on a breastfeeding self-efficacy scale. Women with high stress levels and conflict with their mothers tended to score lower on the breastfeeding self-efficacy scale. Mothers who experienced deliveries that required more intense interventions (forceps, cesarean section) scored lower on the self-efficacy scale.

Blyth and colleagues (2002) in their study to determine the effect of maternal confidence on breastfeeding duration also indicated that Mothers with high breastfeeding self-efficacy

were significantly more likely to be breastfeeding, and doing so exclusively, at 1 week and 4 months postpartum than mothers with low breastfeeding self-efficacy. In another study to examine relationships among socio-demographic variables, maternal self-efficacy and the duration of breastfeeding, Pollard and Guill (2009) similarly reported that Mothers who scored higher on the Breastfeeding Self Efficacy scale breastfed longer (r = .264, p = .049). Their results further indicated that, there were five statements on the Breast feeding self efficacy scale including the following that positively correlated with a longer duration of breastfeeding; I can always determine that my baby is getting enough milk (r=313, p=.019), I can always manage to breastfeed even if my baby is crying (r=.318, p=.017), I can always breastfeed my baby without using formula as a supplement (r =.281,.p =036), I can always ensure that my baby is properly latched on for the whole feeding (r=.313, p=0.002) and I can always successfully cope with breastfeeding like I have with other challenges (r=3.26, p=.014)

Identification of levels of self-efficacy for breastfeeding can assist health care providers in targeting women at risk for early weaning of breastfeeding and assist in determining appropriate interventions. This makes measuring breastfeeding self-efficacy a predictive tool in identifying mothers at risk.

2.5.2 The Effect of Mothers' Exposure to the Promotion of BMS on their Use

A factor that has been identified to contribute largely to the decline in breastfeeding is the commercial promotion of infant food products and health care practices that encourage the use of these products (WHO, 1981). When parents need information about infant feeding, very often what is most readily available emanates from a commercial source. A study in the

United States of America by Howard et al (2000) shows that the use of materials produced by such commercial sources has an adverse effect on breastfeeding. Specifically, the study indicated that although breastfeeding initiation and long-term duration were not affected, exposure to formula promotion materials increased significantly breastfeeding cessation in the first two weeks.

The Ghana Breastfeeding Promotion Regulation (L.I. 1667) that was adopted from the WHO code covers sixteen regulations to control the promotion of BMS in Ghana. Notable among these are the prohibition of sale and promotion of designated products, prohibition of distribution of free and low cost designated samples and the need for health personnel to support breastfeeding. Independent analysis of the Ghana Breastfeeding Promotion Regulation suggests that it is one of the strongest national laws that regulate the marketing of BMS (ICDC 2000). An assessment of the effects of the law (LI 1667) on the marketing of infant foods in 2007 revealed that the promotion of BMS had been restricted to the provision of technical information to health workers and promotion through labeling of food products (Alabi et al., 2007). The report indicated that throughout the study, direct advertisement of infant foods to the general public was virtually nonexistent. The study therefore indicated enhanced enforcement of the regulation.

Six years after the report by Alabi and colleagues (2007), our study which investigates the effect of promotion of BMS on their use will not only explore current trends in compliance to the Ghana Breastfeeding Promotion Regulation (L.I. 1667) but inform the direction of interventions.

2.5.3 The Effect of Mothers' Employment Characteristics on the Use of BMS

Data on breastfeeding and its duration consistently identify return to work as an important determinant. When the maternity leave entitlement (job protected and compensated) in most provinces in Canada was extended from 6 months to 1year in 2000, the proportion of mothers EBF for six months increased nearly by 40% (Baker and Milligan, 2008). This trend of employment affecting EBF rate has been replicated in other studies worldwide (Bick et al., 1988; Lansinoh Laboratories, 2003).

On the other hand, some studies that have focused on employment characteristics have reported that it is not maternal employment itself that influences the use of BMS but more specific characteristics of employment (Van Esterlk and Greiner, 1981). The study by Van Esterlk and Greiner (1981) indicated that some particularly relevant conditions of employment such as separation of the mother from the baby, inflexible shifts, lack of work-site child care, transportation, and maternity leave policies also influenced the use of BMS.

The Ghana Statistical Service in 2008 estimated the percentage of women in the labour force at 53.4%. At least 50% of such women return to work by the time their children are three months old (Mensah, 2011). Based on literature and recognizing that the vast majority of women work in recent times, this present study will investigate the attributes of maternal employment specifically; employment away from baby with regards to the use of BMS.

2.5.4 Mother's Feeding Intention Prior to Delivery

The importance of assessing and supporting mothers' breastfeeding intentions in the pre- and postpartum period is documented (Aidam et al, 2005). Prenatal intention to use BMS has

been shown to have an influence on both initiation and duration of EBF for six months. In a study by Chezem et al (2003) to assess breastfeeding knowledge, breastfeeding confidence, and infant feeding plans of seventy-four mothers with prenatal intentions to breastfeed, women who planned to introduce BMS to their infants before delivery, reported shorter actual duration of EBF (p= .022) and were less likely to meet their breastfeeding goal (p= .034) as compared to those who planned to exclusively breastfeed.

In a large population based prospective study (involving 10,548 women resident in the UK) by Donath et al (2003) on the relationship between prenatal infant feeding intention and initiation and duration of breastfeeding, 96.6% of women who planned to breastfeed for at least four months actually initiated breastfeeding while only 3.4% who did not plan to breastfeed actually breastfed their infants. Among the women, at six months postpartum, the mean duration of breastfeeding for women intending to breastfeed for at least five months was 4.4 mo (95% CI 4.3, 4.4), compared with 2.5 mo (95% CI 2.4, 2.6) for women with a prenatal intention to breastfeed for only one month.

In this study, caregivers' breastfeeding intentions before delivery were also be assessed.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of Study Area

The Ledzokuku-Krowor Municipality is one of the ten (10) districts of the Greater Accra Region. The municipality has three (3) sub-districts namely, Teshie North, Teshie South and Nungua. It has an estimated population of 227,932 with a sex ratio of 1:1.08 males to females (Ghana Statistical Service, 2012).

According to figures from the 2000 population and housing census, the municipality is populated by people from various ethnic backgrounds of which the Ga Adangbe ethnic group (which the indigenous Gas belong) is the majority (44.3%). Akans make up 34.8% of the population, Ewes 12.4% while the remaining 8.5% constitute other ethnic groups (Ghana Statistical Service, 2005). The predominance of a particular ethnic group depends on the sub-district. The majority of the inhabitants of the Teshie South sub-district are indigenous Gas, while the bulk of migrants in the municipalities are concentrated in the Teshie North and Nungua sub-districts. Socioeconomically, the Teshie South sub-district is perceived as being the least developed sub-district within the municipality. It is a fishing community where educational attainment is generally low.

The study population was recruited from health facilities in the Ledzokuku-Krowor Municipality. At the time of the study the municipality had a total of 16 health facilities, four of which were government run, one was a mission hospital and the remainders were privately owned. Table 3.1 shows the distribution of different types of health facilities by the sub-districts of the municipality.

3.2 Study Sites

One health facility was selected from each of the 3 sub-districts for the study. The facilities were purposively selected to reflect the three types of service providers (i.e. government, mission or privately owned) of health facilities in the municipality. Thus the health facilities selected for the study were the only government-run health facility in the Teshie South sub-district, the only mission hospital in the municipality located in Teshie North and one privately owned hospital randomly selected (using simple random sampling) from the five private hospitals in the Nungua Sub-District. Figure 3.1 shows the distribution of the selected health facilities in the municipality.

Table 3.1: Distribution of different types of health facilities within the three sub-districts in the Ledzokuku-Krowor Municipality

Sub-district	Type of health facility			Total
	Private	Government	Mission	
Teshie South	3	1	0	4
Teshie North	3	2	1	6
Nungua	5	1	0	6

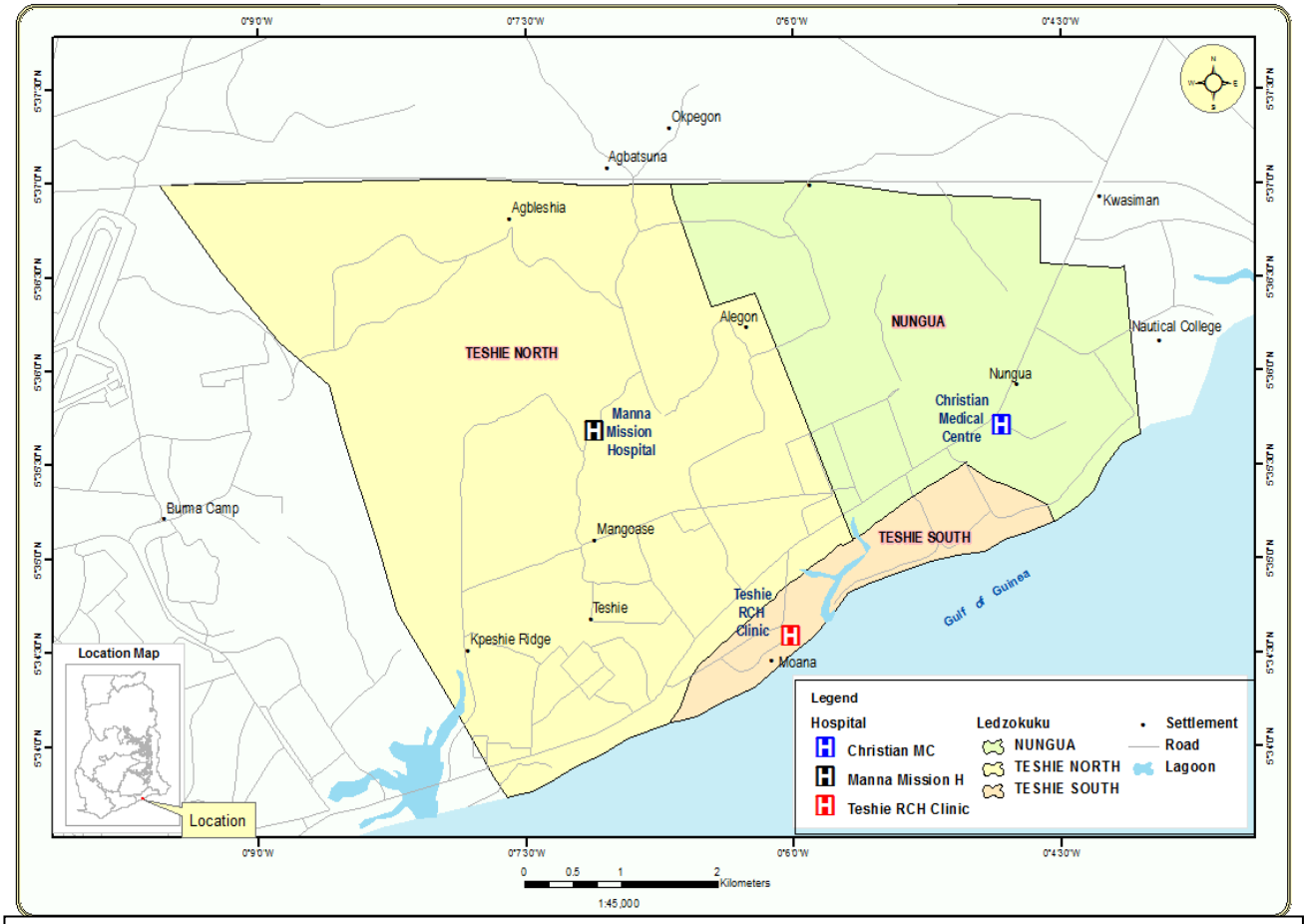

Figure 3.1: Map of Ledzokuku-Krowor Municipality showing distribution of selected health facilities

3.2.1 Description of Health Facilities

All the three hospitals provided child welfare services to the communities they served. Child Welfare Clinics (CWC) were organized on a weekly basis at the mission hospital (Thursdays) and the privately owned hospital (Mondays); and at the government hospital in Teshie South, the child welfare clinics were carried out two times a week on Tuesdays and Thursdays. In all three facilities, the operating hours of the CWC was 8am to 2pm. The

CWC services were delivered by community health nurses and encompassed growth monitoring, due vaccinations and infant feeding and health counseling.

Average weekly attendance at the CWC was 300 mothers for the mission and privately owned hospitals and 200 for the government hospital (Teshie RCH)

3.3 Study Design

The study was a cross-sectional survey.

3.4 Study Participants

The study participants were mothers with infants between the ages of 3 to 6 months attending child welfare clinics at the selected health facilities between January and March 2013 who voluntarily agreed to participate in the study.

3.5 Sample Size

The sample size was calculated based on the following formula proposed by Daniel (1999):

- $N = \frac{[Z^2 * P(1-P)]}{d^2}$

  Where N= Sample size,

  Z=Z-statistic for 95% confidence interval which is 1.96,

  d= Precision at a P-value of 0.05 with 95% confidence

P= Expected prevalence or proportion (The national prevalence of infants not exclusively breastfed (37%) as reported in the 2008 Ghana Demographic and Health Survey was used as the expected prevalence of use of breast milk substitutes for feeding infants less than 6 months in the study)

An estimated total sample size of 358 was calculated which was rounded up to 360 to take into account possible exclusions due to incomplete data.

Proportionate weighting was used to determine the number of participants to be recruited from each of the three selected health facilities using the following formula:

$$\frac{\text{Estimated number of women attending CWC at specified health facility per month}}{\text{Cumulative number of women attending CWC at all the selected health facilities per month}} \times \text{Total sample size (N=360)}$$

The sample size distribution of the study participants based on the proportionate weighting computations is provided in Table 3.3:

Table 3.2: Estimated sample size recruited from each of the selected health facilities

Hospital	**Sub-district**	**Estimated monthly attendance**	**Sample size**
Teshie RCH clinic	Teshie South	200	90
Manna Mission hospital	Teshie North	300	135
Christian Medical Center	Nungua	300	135
Total		**800**	**360**

3.6 Data Collection

Data were collected via face-to-face interviews using semi structured questionnaires (Appendix Two). Mothers with infants 3 to 6 months were identified by midwives during Child Welfare Clinics (CWC) and approached by trained field assistants who confirmed the mothers' eligibility to participate in the study. The study protocol was explained to interested eligible mothers and informed consent processes undertaken. After signing the informed consent document the mothers were interviewed while they waited to for their turn to be seen by the nurses or after seeing the nurses. The interviews were completed in the language of preference of the mothers. Additionally data on the children were abstracted from their child welfare cards. Data were collected by the trained field assistants in the language of preference of the mothers.

The semi structured questionnaire instrument was designed to collect information on the mother's socio-demographic characteristics including employment characteristics, her Exclusive Breastfeeding Self Efficacy (EBSE), her exposure to the promotion of Breast Milk Substitutes (BMS), and her use of BMS. Details on the information collected by the different sections of the questionnaire are provided below.

3.6.1 Socio-Demographic Characteristics

Information collected included mother's age, her parity, marital status, ethnicity and employment, educational level completed, income earnings, ownership of household assets and predominant means of transportation. The mothers were also asked, in relation, to the

index child or child of interest for the study, questions pertaining to the place and type of delivery, antenatal visits and her infant feeding intention prior to delivery.

3.6.2 Exclusive Breastfeeding Self Efficacy (EBSE)

A modified version of the short form of Breastfeeding Self-Efficacy Scale (Appendix 3) under the copy right of Dennis (2006) which was obtained by way of permission form Dr. Dennis Cindy Lee (Appendix 3), was used to interview mothers about their self-efficacy in relation to exclusive breastfeeding (EBF) (Appendix Two) for the study, hence termed Exclusive Breastfeeding Self Efficacy (EBFSE). The modified version was made to enhance questionnaire administration and to reflect the mother's confidence to exclusively breastfeed for six months despite the duly documented perceived challenges of the practice. Specifically, positive statements on the original copy by Dennis (2006) were changed into questions to enhance translation into the local dialects of mothers. Also, some statements on the original copy that were about general breastfeeding such as "I can always determine that my baby is getting enough milk" were modified to reflect the duration of exclusivity of six months as follows "How confident are you that the breast milk you will produce will be enough for the baby for the first six months of life?". The modified questionnaires also took into consideration documented challenges to EBF that were not included in the original copy. These include the assumption the baby will be thirsty (Otoo et al., 2009), the decelerated weight gain of breast fed babies as compared to formula fed babies (Heinig et al., 1993; Stettler et al., 2005; Stettler et al., 2003) and lack of support from family members (Otoo et al., 2009, Tawiah-Agyemang et al., 2008).

The modified scale consisted of a seven item questionnaire to which mothers were asked to rate their confidence. Details of the questions are indicated in table 3.3. The confidence ratings to the questions were put on a 5 point Likert scale as follows; **1** = Not at all confident **2** = Not very confident **3** = Sometimes confident **4** = Confident **5** = Very confident. The total score for each mother on the scale was calculated to determine the level of exclusive breastfeeding self-efficacy. Possible scores ranged from 7 (lowest) to 35 (highest).

Table 3.3: Questions to Assess EBFSE and the Summarized Versions used subsequently in this Report

No.	Question (How confident are you that…)	Summarized version of question in report
1	You can feed your baby with only breast milk until he/she is six months old	Feed only BM
2	The breast milk you will produce will be enough for the baby for the first six months of life	BM Sufficient
3	Your baby will be alright if you do not give him/her water during the first six months of life	Water not needed
4	You can continue to give your baby only breast milk until he/she is six months old even though it will be time consuming	Time Consuming
5	You can continue to feed your baby with only breast milk until he/she is six months old even if he/she cries a lot	Baby Cries
6	You can continue to feed your baby with only breast milk for the first six months even if he/she does not gain as much weight as you would prefer,	No wt Gain
7	You can continue to feed your infant with only breast milk until he/she is six months old even if your family members discourage you from doing exclusive breast feeding	No Family Support

3.6.3 Exposure to the Promotion of BMS

Exposure to the promotion of BMS was determined by assessing mothers' responses to questions based on the Legislative Instrument on Breastfeeding Promotion Regulation, (L.I. 1667). The questions were based on Sections 1 (Prohibition of sale and promotion of designated products) Section 3 (Distribution of free and low cost designated samples) and Section 14 (Health personnel to support breastfeeding) of the Legislative Instrument, 1667. Mothers were asked to indicate if they had seen any commercial advertisements of BMS before or after delivery and where. Specifically, the first question read; Before delivery, did you ever see any advertisement about foods that can be given to infants below six (6) months? if yes, where? They were also asked if they had been advised to use any BMS or received any free samples of BMS and from whom.

3.6.4 Use of BMS

Information on the use of BMS was obtained by asking about the first fluids or food introduced to the child after delivery and the timing of introduction of other foods (either fluids or solid foods) besides breast milk to the infant. The mothers were also requested to list the types of foods or fluids they had given their infants since delivery and give reasons for their feeding decisions. Mothers' perceptions on the WHO's recommendation of EBF for the first 6 months of an infant's life were also obtained.

3.6.5 Data Abstraction

Some information was abstracted from the infant's child welfare card. These included the delivery and birth characteristics of the infant such as if the delivery was caesarian or vaginal, and the birth date and weight of the infant.

3.7 Data Management and Analysis

Data entry and analysis were completed using SPSS version 16.

Descriptive statistics was used to describe the background characteristics of mothers and their infants, the prevalence and timing of use, and the types of BMS used by mothers. Specifically, frequencies and proportions were used to describe categorical background characteristic variables while means and standard deviation used to describe the continuous variables. The prevalence of use of BMS was based on the percentage "yes" response to whether mothers had given any solid or liquid food items including water to their infants since delivery while the timing of use of BMS was based on the mean age at which the infants first received any BMS. The types of food items given as BMS were described organized and categorized using descriptive statistics, percentages and proportions.

Bivariate analyses were used to find any differences between the background information of mothers and infants recruited from each of the three hospitals visited. Bivariate analyses (chi square) were also used to analyze the difference between the number of mothers exposed to the promotion of BMS who actually used BMS and the number of those exposed to promotion of BMS who did not use them. Specifically, these differences were obtained for each of the response variables for assessing 'exposure' (Commercial exposure before and after delivery, Exposure based on advice and At least one of the above mentioned exposure

categories). Chi square analyses and the independent t-test were used in assessing self-efficacy. Specifically, chi square analyses were used to compare between users and non-users of BMS the number of mothers who were not confident, somewhat confident or very confident about each of the questions used to assess EBFSE. The independent t-test was used to compare the mean self-efficacy scores of mothers who used BMS to the scores of mothers who did not use BMS.

To analyze the general predictors of use of BMS, chi-square analyses were first used to select variables that showed significant association with the use of BMS. These variables together with those obtained from literature were subsequently entered into a logistic regression model to determine the variables that were important predictors of use of breast milk substitutes since the birth of the infant when all variable were controlled simultaneously.

All analysis were significant at a p-value of less than 0.05

3.8 Ethical Considerations

The study protocol was submitted for ethical review by the Institutional Review Board of the Noguchi Memorial Institute for Medical Research, University of Ghana and duly approved. A signed informed consent was obtained from each participant before the questionnaires were administered.

3.9 Quality Assurance

The questionnaires were pretested on a total of 30 mothers attending CWC at both the University of Ghana Hospital and the Madina Polyclinic. Based on the pre-test, problems that were identified were resolved and the questionnaires improved for the actual data collection. Field assistants fluent in Twi, Ga and Ewe were recruited and trained in informed consent and questionnaire administration. After each session of data collection, the questionnaires were reviewed and checked for potential errors.

CHAPTER FOUR

4.0 RESULTS

4.1 Background Characteristics

The socio-demographic characteristics of the 360 mothers who participated in the survey are summarized in Table 4.1. The mothers ranged in age from 19 to 52 years with the majority in the 20 to 39 age range. Their mean age was 29.16±5.45 years**.** Participants from the mission hospital were about one year older than those from the other hospitals. In all the three hospitals, the Akan and Ga Adangbe ethnic groups were the most common. More than 50% of mothers recruited from the public hospital were of Ga Adangbe ethnicity. The majority of mothers in the study had some formal educational with the majority (94.4%) having completed at least Junior Secondary School or Middle school. Among mothers who had completed at least secondary or vocational education, a significantly greater proportion were recruited from the private hospital. Most of the mothers were married.

Over 80% of the mothers were working as at the time of the study and the most common primary occupations were petty trading (33%) and vocational or skilled work (23%). Most of the mothers reported a monthly income between 100 and 500 Ghana Cedis; just fewer than 20% of them said they earned less than 100 Ghana cedis a month and about 10% had a monthly income higher than 500 Ghana cedis. Among spouses of mothers who were married, the most common occupations were professional employment (e.g. Teachers, Doctors, Actors, Pastors etc.), technical, sales or administrative work (33.6%) and vocational employment (30.8%); only a few (less than 5%) of mothers said their spouses were not working.

Table 4.1: Socio-demographics of Mothers in the study

Characteristic	Total N = 360	Health Facility			P-value[1]
		Mission N = 135	Public N = 90	Private N - 135	
Age	**29.16±5.45[2]**	**29.76±5.54**	**28.16±6.10**	**28.24±4.8**	0.032
< 20	9 (2.5)[3]	1 (0.7)	6 (6.7)	2 (1.5)	
20 – 39	335 (93.1)	129 (95.5)	76 (84.4)	130 (96.3)	0.004
40 – 52	16 (4.4)	5 (3.7)	8 (8.9)	3 (2.2)	
Tribe					
Ga Adangbe	115 (31.9)	31 (23.0)	50 (55.6)	34 (25.2)	0.001
Akan	139 (38.6)	59 (43.7)	21 (23.3)	58 (43.0)	
Ewe	75 (20.8)	34 (25.2)	12 (13.3)	29 (21.5)	
Northern Ethnicity	24 (6.7)	9 (6.7)	7 (7.8)	8 (5.9)	
Non Ghanaian	7 (1.9)	2 (1.5)	0 (0)	5 (3.7)	
Education					
≤ Primary	56 (15.6)	15 (11.1)	26 (28.9)	15 (11.1)	0.001
Junior Secondary/Middle School	162 (45.0)	67 (49.6)	43 (47.8)	52 (38.5)	
≥ Vocational/Senior Secondary	142 (39.4)	53 (39.3)	21 (23.3)	68 (50.4)	
Marital status					
Single	34 (9.4)	9 (6.7)	13 (13.4)	12 (8.9)	0.142
Married	326 (90.6)	126 (93.3)	77 (85.6)	123 (91.1)	
Primary occupation					
Professional (Eg. Teachers, Actors, Lawyers, Doctors)	40 (11.1)	19 (14.1)	3 (3.3)	18 (13.3)	0.07
Technical/Sales/Administrative	55 (15.3)	18 (13.3)	13 (14.4)	24 (17.8)	
Petty Trading	120 (33.3)	44 (32.6)	38 (42.2)	38 (28.1)	
Vocational Work	82 (22.8)	36 (26.7)	17 (18.9)	29 (21.5)	
Not working	63 (17.5)	18 (13.3)	19 (21.1)	26 (19.3)	
Income (GH¢)	**N=255[4]**	**N=101**	**N=58**	**N=96**	0.14
50 – 100	46 (18.0)	17 (16.8)	14 (24.1)	15 (15.6)	
>100 - 300	100 (39.2)	37 (36.6)	28 (48.3)	35 (36.5)	
> 300 – 500	78 (30.6)	30 (29.7)	13 (22.4)	35 (36.5)	
>500 – 1000	21 (8.3)	11 (10.9)	3 (5.2)	7 (7.3)	
>1000	10 (3.9)	6 (5.9)	0 (0)	4 (4.2)	
Spouse's Occupation					
Professional (Eg. Teachers, Actors, Lawyers, Doctors)	92 (25.6)	42 (31.1)	8 (8.9)	42 (31.1)	0.013
Technical/Sales/ Administrative	121 (33.6)	41 (30.4)	35 (38.9)	45 (33.3)	
Petty Trading	21 (5.8)	6 (4.4)	6 (6.7)	9 (6.7)	
Vocational Work	111 (30.8)	41 (30.4)	36 (40.0)	34 (25.2)	
Not working	15 (4.2)	5 (3.7)	5 (6.6)	5 (3.7)	

[1]Significant difference with chi square or ANOVA: [2]Mean ± SD: [3]N (%): [4]Smaller sample size because mothers who did not work and those who did not know their income were excluded from the analysis

4.1.1 Information on Pregnancy and Delivery Characteristics that Resulted in Birth of Index Child

Pregnancy and delivery characteristics in relation to the index child in the study are summarized in Table 4.2. Most (82%) of the mothers indicated that their last pregnancy which resulted in the birth of the index child was planned. Almost all the index children were born at term and the majority were delivered at a health facility, either a public hospital or polyclinic, or in private clinics or maternity home. Cumulatively, less than 7% of all mothers in the study reported that delivery of the index child was assisted by a Traditional Birth Attendant (TBA). Use of TBA was highest among mothers recruited from the public hospital. About one fifth of the mothers indicated that the index child was delivered by caesarian section but those recruited from the public hospital were significantly less likely to report that their index child was delivered by caesarian section.

Table 4.2: Mothers' Pregnancy and Delivery Characteristic Relative to the Index child in the study

Characteristic	Total N = 360	Health Facility			P-value[1]
		Mission N = 135	Public N = 90	Private N - 135	
Pregnancy was planned					
Yes	294	112 (83.0)	71 (78.9)	111 (82.2)	0.73
No	66	23 (17.0)	19 (21.1)	24 (17.8)	
Gestation length					
≥37 weeks	356 (98.9)	134 (99.3)	88 (97.8)	134 (99.3)	
<37 weeks	4 (1.1)	1 (0.7)	2 (2.2)	1 (0.7)	0.51
Place of delivery					
Public Hospital /Polyclinic	225(62.5)	79 (58.5)	59 (65.6)	87 (64.4)	0.001
Private Clinic/Maternity	114 (31.7)	55 (40.7)	16 (17.8)	43 (31.9)	
Traditional Birth Attendant (TBA)	21 (5.8)	1 (0.7)	15 (16.7)	5 (3.7)	
Type of delivery					
Vaginal delivery	284 (78.9)	99 (73.3)	81 (90.0)	104 (77.0)	0.01
Caesarean section	76 (21.1)	36 (26.7)	9 (10.8)	31 (23.0)	

[1]Significance associated Chi-Square statistic

4.1.2 Background Characteristics of Infants in the Study

There were slightly more female (54%) than male (46%) infants in the study (Table 4.3). The mean age was 4.31±1.12 months. The infants' mean birth weight was 3.17±0.54kg. About 8% of the infants were born with low birth weights and 2.2% were reportedly placed in incubators after birth.

Table 4.3: Background characteristics of Infant in the study

Characteristic	Total N = 360	Health Facility			P-value
		Mission N = 135	Public N = 90	Private N - 135	
Sex					
Male	167 (46.4)	60 (44.4)	51 (56.7)	56 (41.5)	0.07
Female	193 (53.6)	75 (55.6)	39 (43.3)	79 (58.5)	
Age (Mos)	4.31±1.12	4.27±1.17	4.48±1.12	4.26±1.07	0.07
3 – 4	204 (56.7)	82 (60.7)	42 (46.7)	80 (59.3)	0.08
5 - 6	156 (43.3)	53 (39.3)	48 (53.3)	55 (40.7)	
Birth Weight (g)	3.17±0.54	3.19±0.53	3.17±0.58	3.17±0.54	0.09
< 2,500g	27 (7.5)	6 (4.4)	11 (12.2)	10 (7.4)	0.10
≥ 2,500g	333 (92.5)	129 (95.6)	79 (87.8)	125 (92.6)	
Child kept in incubator?					
Yes	8 (2.2)	2 (1.5)	2 (2.2)	4 (3.0)	0.71
No	352 (97.8)	133 (98.5)	88 (97.8)	131 (97.0)	

4.2 Prevalence and Timing of Use of Breast Milk Substitutes (BMS)

About one half (51.9%) of the infants in the study had been introduced to BMS. The mean age at which these infants who had already been introduced to BMS started receiving BMS was 2.1 ±1.6 months. Infants were started on BMS as early as the first day of birth to 6 months. The age distribution of infants in the study who received BMS before 6 months is provided in Fig 4.1. About 27% of those who received BMS before 6 months were introduced to BMS in the first month, while 3 months was the next most common age at which BMS were introduced to the infants.

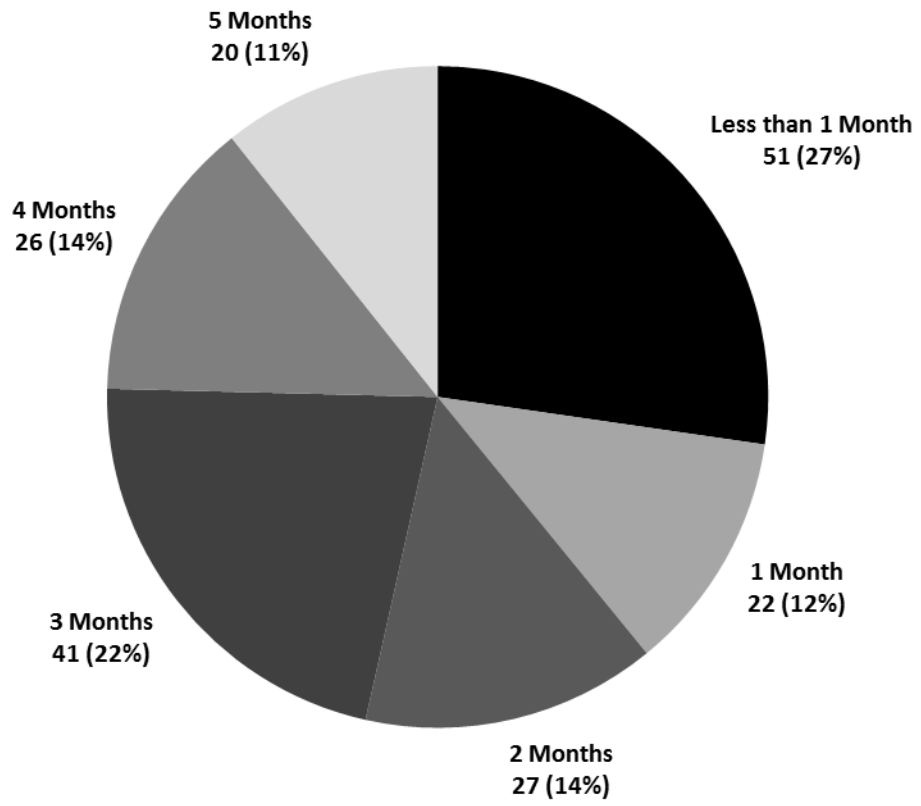

Figure 4.1: Age of infants in the study who received BMS before they were six months old

4.3 Types of BMS Used by Mothers

Water and/or Gripe water was the most predominant BMS provided to the children in the study, and about one-half of the mothers reported using infant formula (Fig 4.2). The least common BMS used among the mothers was Juice/Herbal concoctions. Medications and food supplements are not considered as BMS according to the WHO definition. Mothers in the study who reported that they gave medications or food supplements to their infants also indicated that they used at least one of the listed BMS.

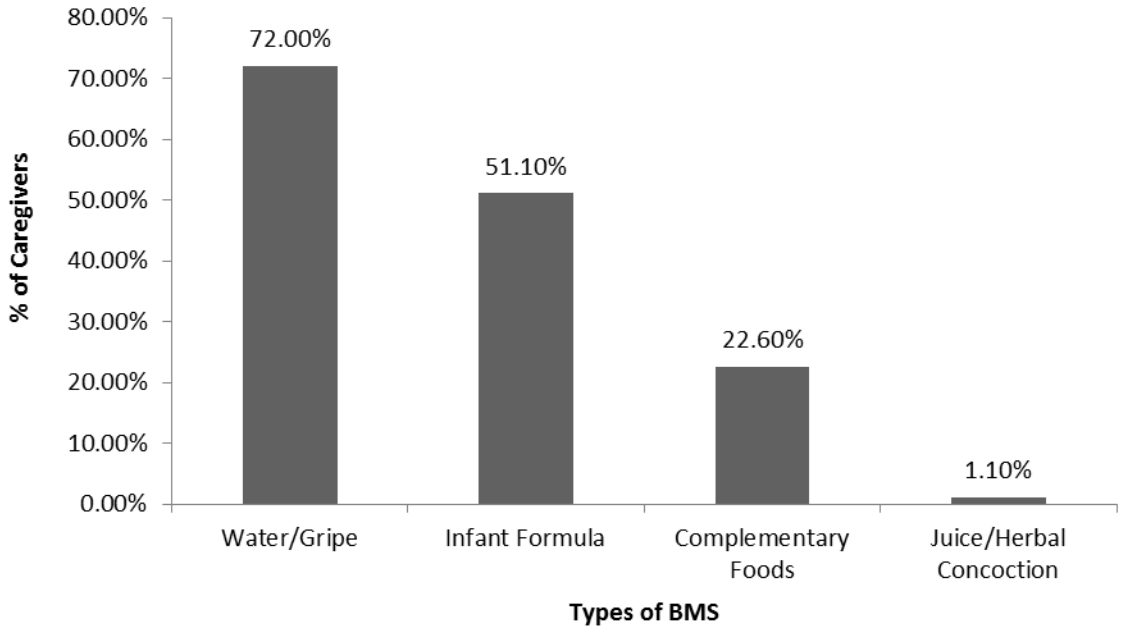

Figure 4.2: Percent of mothers who used different types of BMS

4.3.1 Reasons for Use of Particular BMS

4.3.1.1 Water/Gripe

Mothers who gave their infants water/gripe said they did so mainly because of concerns with the baby being thirsty because of the hot weather. Mothers who gave their infants gripe water perceived it as a treatment for the hiccups or colic (27%), or were advised by either health workers or family members to give it to their infants. A small percentage of mothers gave their infants water to comfort them when they cried (1%) or because the mothers' breast milk flowed late after birth (2%).

4.3.1.2 Infant Formula

About one half (51%) of the care givers who gave their infants formula did so because they experienced feeding problems; the infants could either not suck or mothers could not breastfeed due

to varied reasons such as mother or infant being ill or caesarean birth . Thirty-three percent (33%) of mothers perceived that breast milk alone was not enough for the infant and needed supplementation with infant formula. Fourteen percent (14%) reported that they were compelled to feed their infants formula because they worked away from them. Very few respondents (2%) were advised by relations to use infant formula.

4.3.1.3 Complementary Foods

The bulk of mothers (74%) who gave their infants complementary foods did so because they perceived that breast milk was not sufficient for their children. Some twenty-one percent (21%) chose to give complementary foods because they similarly experienced feeding problems; their infants could either not suck or the mothers could not breast feed due to varied reasons such as mother or infant being ill or caesarean birth. A few respondents (5%) indicated that they chose to give complementary foods as BMS to sustain their infants' appetite for such food during the complementary feeding period since practicing exclusive breast feeding according to them made the infant lose appetite during the period.

4.4 Mothers' Perception on the WHO Recommendation to Exclusively Breastfeed for Six Months

Majority of mothers (90%) were in agreement with the WHO recommendation on EBF for six months. Their reasons for agreeing to the recommendation are summarized in Figure 4.3. Many respondents (76%) could mention at least one true benefit of practicing EBF to the infant or relate to a previous good experience of the practice. The most commonly mentioned benefit was "it keeps the baby strong and prevents him/her from falling sick". About 22% of respondents based their agreement with the practice on the confidence they

had in the public health scientists who proposed the recommendation. They were often heard saying “the health workers know best, we have no choice but to agree with what they say”. Some few mothers (2%) based their agreement on the fear that infants who were fed other foods during the first six month period were likely to grow obese. One mother particularly mentioned that “when babies receive food before six months, they gain weight and cannot walk early”.

The remaining 10% of respondents who did not agree with the recommendation provided the reasons summarized in Figure 4.4 to support their position. More than half of them (56%) perceived that breast milk was not sufficient to sustain an infant for six months. Nineteen (19%) percent of them reported that they did not observe any difference between the exclusively breastfed and non-exclusively breastfed infants even among their own children. An equal percentage of mothers (19%) indicated that the practice was not feasible for the employee mother who had to return to work after the limited three month maternity leave period awarded her. The remaining 6% intimated that the Ghanaian weather was too hot to sustain EBF. One mother stated that “I will be hurting my baby if I do not give her water for six whole months in this hot weather”.

About 77% of the mothers planned before the delivery of their index child that they would practice EBF while the remaining 23% planned to mix feed. This gave a reflection of the enormous respondent support of the WHO recommendation.

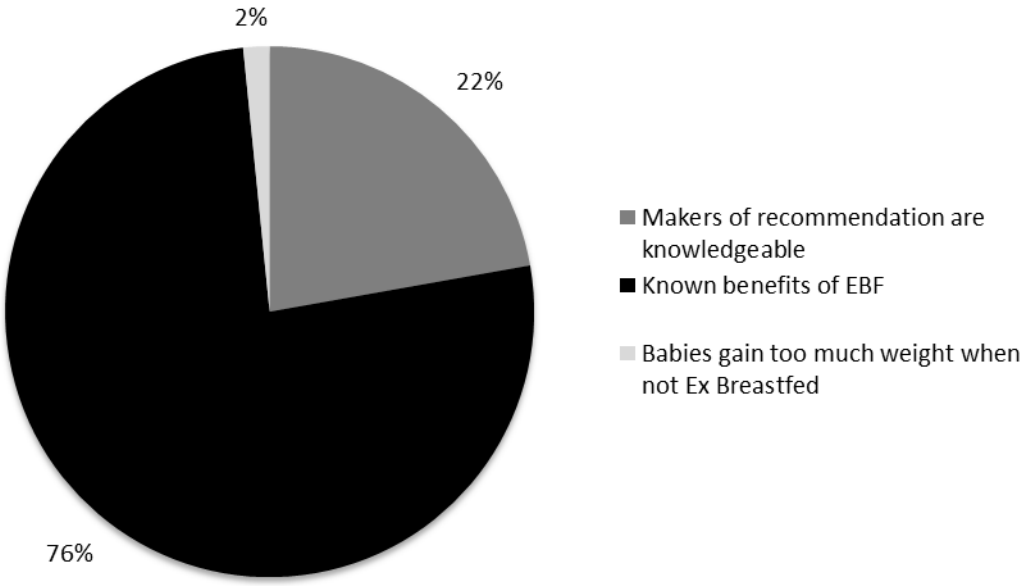

Figure 4.3 Distribution of mothers' reasons for agreeing with the WHO recommendation on EBF

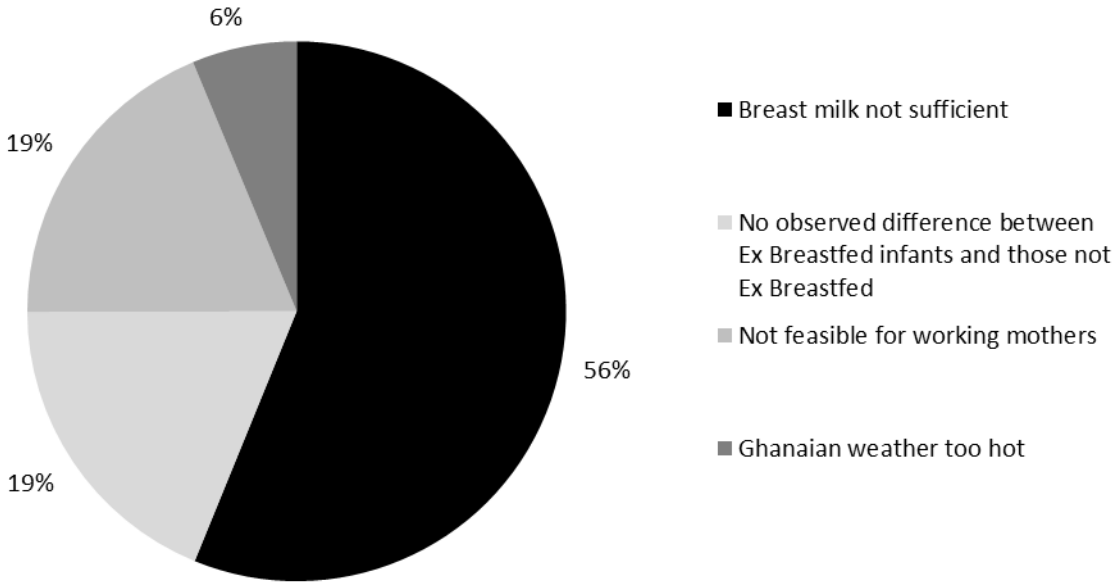

Figure 4.4: Distribution of mother's reasons for **not** agreeing with the WHO recommendation on EBF

4.5 Mothers' Exposure to Promotion of BMS

4.5.1 Sources of Exposure

The exposure categories considered for the study were exposure to commercial advertisements of BMS before and after delivery and exposure to promotion to BMS by way of advice. Approximately 62% of the mothers had experienced at least one of the three exposure to BMS categories assessed.

Figure 4.5 shows the percentage of mothers who experienced the different categories of exposure to promotion of BMS. Exposure by way of advice was the most common form of BMS promotion experienced by mothers (50.6%). A fairly equal number of respondents were exposed to commercial promotion of BMS both before (26.9%) and after delivery (27.2%).

The sources of exposure to commercial promotion of BMS are shown in Figure 4.6. The percentage of mothers exposed to each source of promotion was similar for those exposed before and after delivery. The most common sources of commercial promotion of BMS were the radio/television and super markets (Fig. 4.6).

The sources of advice to use BMS among mothers are shown in figure 4.7. The bulk of advice received was from health workers (74.2%), while the remaining was from their friends (24.7%) and relations (16.8%) (Fig.4.7). None of the mothers reported being exposed to BMS by direct interactions with a representative of a baby food manufacturing company or by receiving free samples of BMS.

Mothers were allowed multiple responses for all the frequencies shown in figures 4.5, 4.6 and 4.7

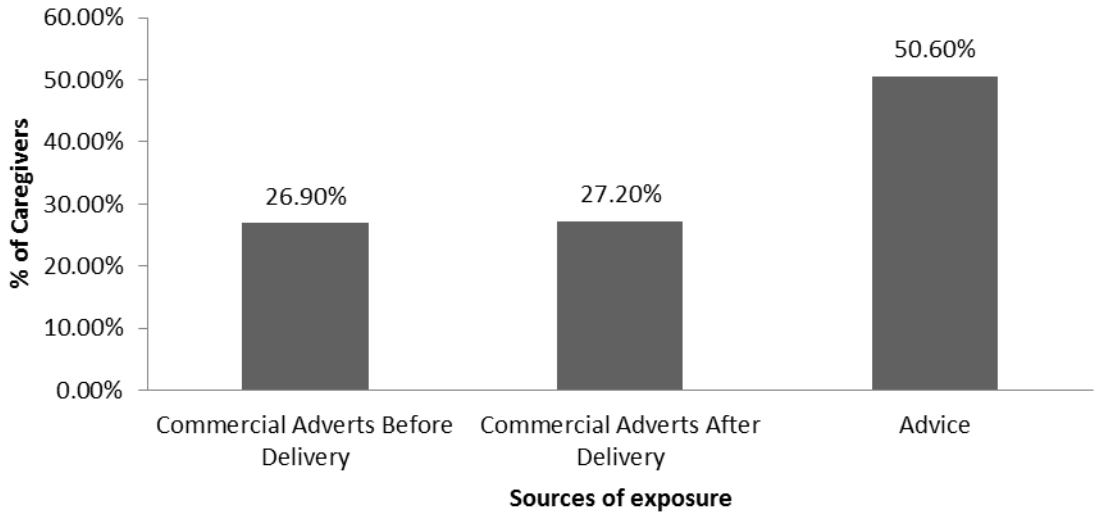

Figure 4.5: Percent of Mothers who experienced different categories of exposure to BMS (N=223)

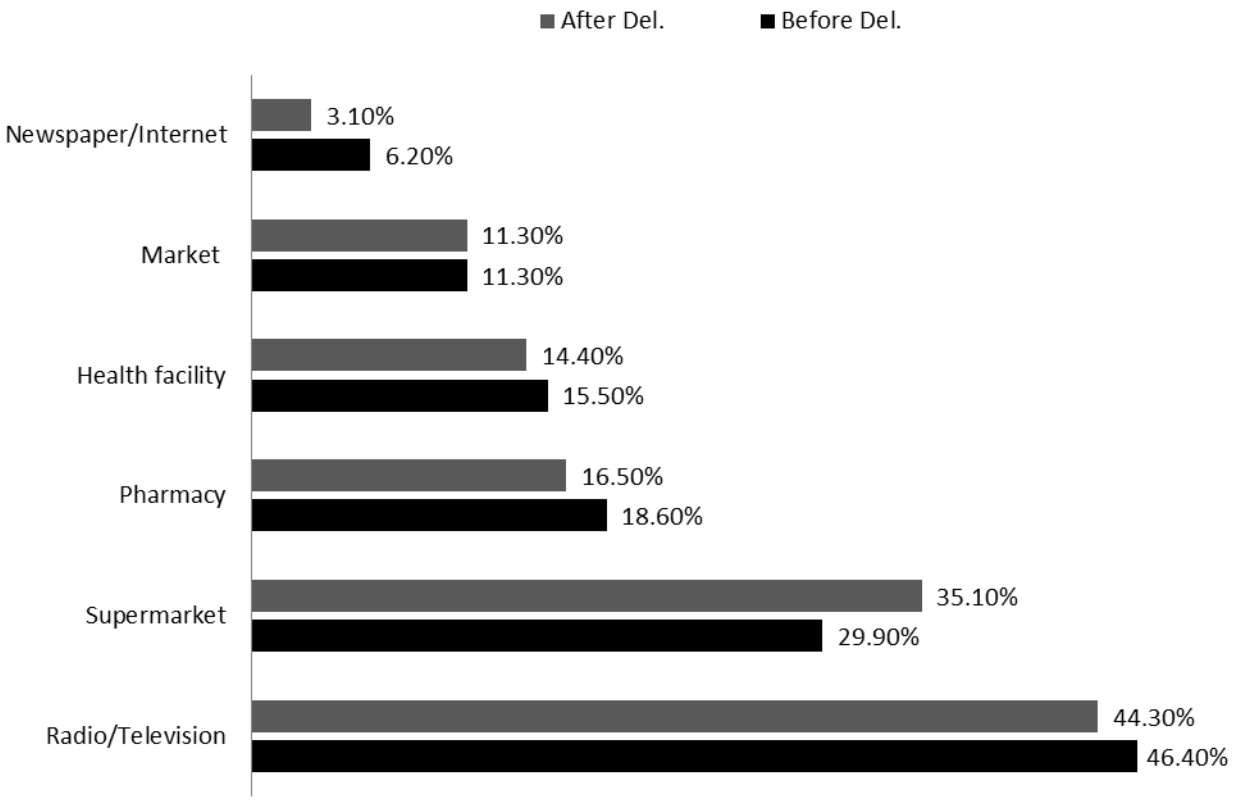

Figure 4.6: Sources of exposure to the use of BMS through commercial advertisements before and after delivery (Before delivery, N=97/ After delivery, N=98)

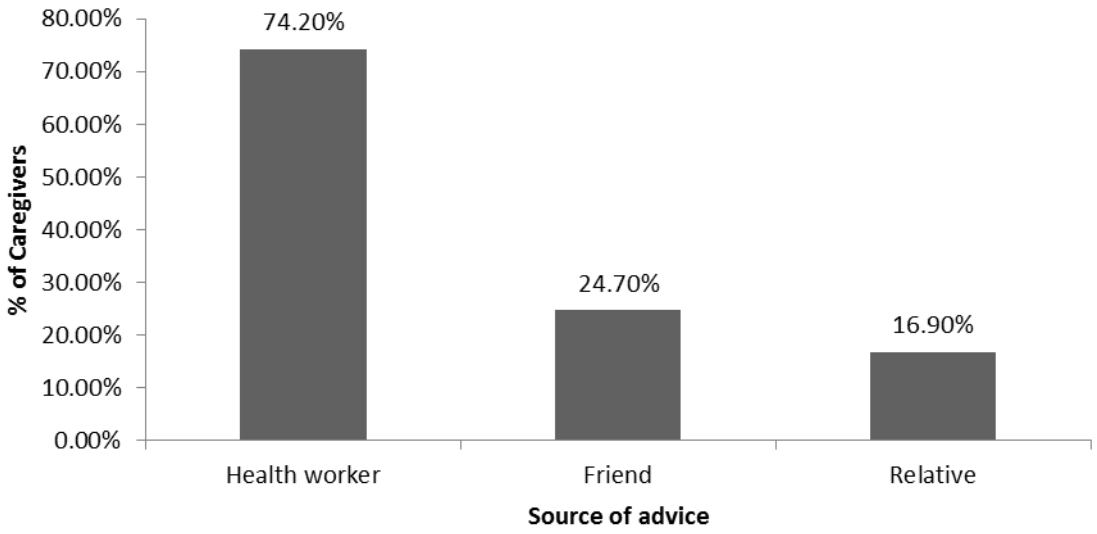

Figure 4.7: Mothers' sources of advice on using BMS

4.5.2 Mothers' Exposure to BMS in Relation to Use of BMS

Figure 4.8 shows the distribution of mothers' exposure to BMS by their use or non-use of BMS. A significantly higher proportion of mothers who used BMS than those who did not use BMS had been exposed to BMS before delivery (34.2% vs 19.1%, p = 0.001), after delivery (32.1% vs 22.0%, p = 0.031), and by way of advice (56.7% vs 43.9%, p = 0.016). Also, significantly more mothers who used BMS than those who did not, had experienced at least one of the three exposure categories (any exposure) (67.9% vs 55.5%, p = 0.015). Among all the exposure categories, the biggest percentage difference between mothers who used and those who did not use BMS was for exposure before delivery.

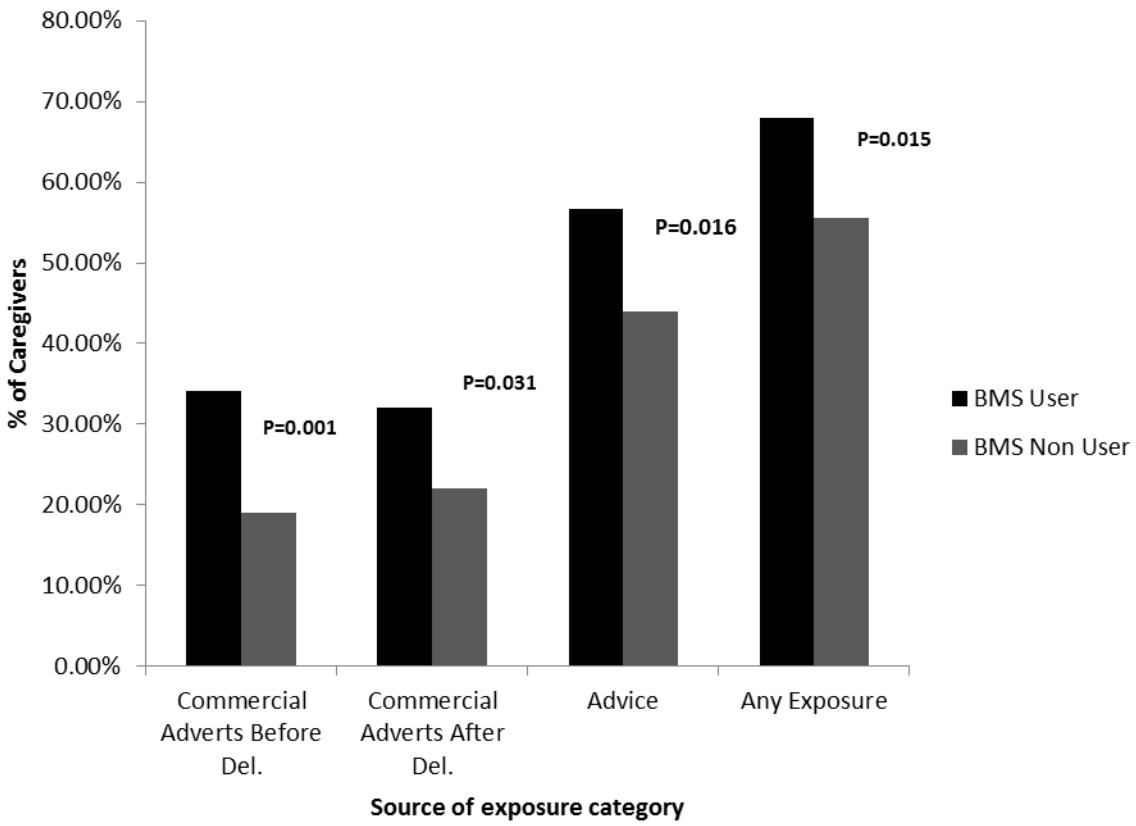

Figure 4.8: Mothers' exposure to BMS by whether they used or did not use BMS

4.6 Mothers' Exclusive Breastfeeding Self Efficacy (EBFSE)

4.6.1 Mothers' Scores on Their EBFSE

Generally mothers in the study had high scores on the EBFSE scale. The mean score was 26.76 ± 1.05 out of the maximum score of 35.

Figure 4.9 shows mothers' level of confidence in each of the EBFSE questions. Among all the mothers, the majority (≥ 60%) responded very confident to all the EBFSE questions (Fig 4.9).

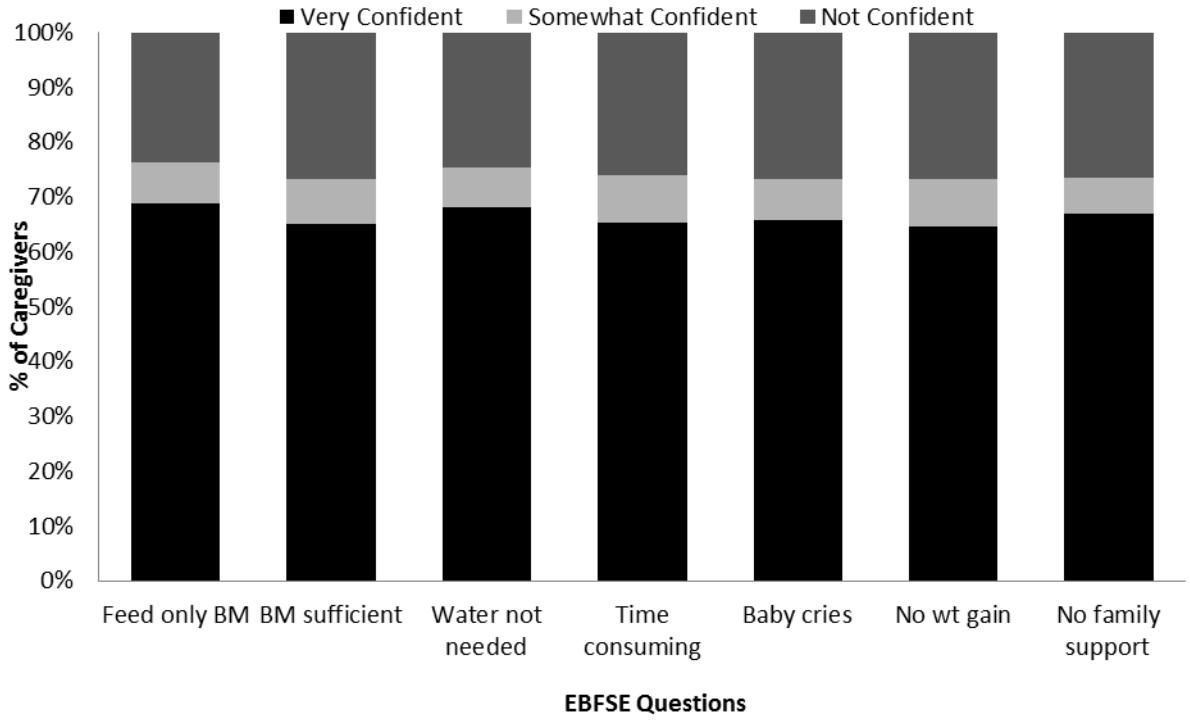

Figure 4.9 Mothers' level of confidence in relation to EBFSE questions

4.6.2 Mothers' EBFSE and their Use of BMS

Over all, there was a statistically significant difference between the mean EBFSE scores of mothers who used BMS and those who did not, with users of BMS scoring lower (20.54 ±10.52) than non-users of BMS (33.52±4.53), t (358)=15.0, p = 0.001). These results are summarized in Table 4.4

Table 4.4: Mean EBFSE scores of users and non-users of BMS

	BMS USE		
	User	**Non-user**	P-value[1]
EBFSE Score	20.54±10.5[2]	33.5±4.5	0.001

[1]Significant difference with independent t-test: [2]Mean ± SD

Figure 4.10 categorizes respondents who were "Very confident" in each of the EBFSE questions into "Users" and Non users of BMS. It was observed that there was a statistically significant difference between the percentage of mothers who used BMS and those who did not use BMS with the Non users being the greater majority (Figure 4.10).

Alternatively, Figure 4.11 categorizes mothers who stated to be "Not Confident" in each of the EBFSE questions into "Users" and "Non Users" of BMS. Similarly, there was a statistically significant difference between the number of mothers who used BMS and those who did not. Those who did not use BMS however were the majority (Figure 4.11). Among all the EBFSE questions, the biggest percentage differences between mothers who used and those who did not use BMS were the questions about mothers' ability to practice EBF if their baby did not gain as much weight as they would prefer, if their baby cried often, if the practice were time consuming and due to the fact that it involved not giving other foods until the baby were six months old (Figure 4.11).

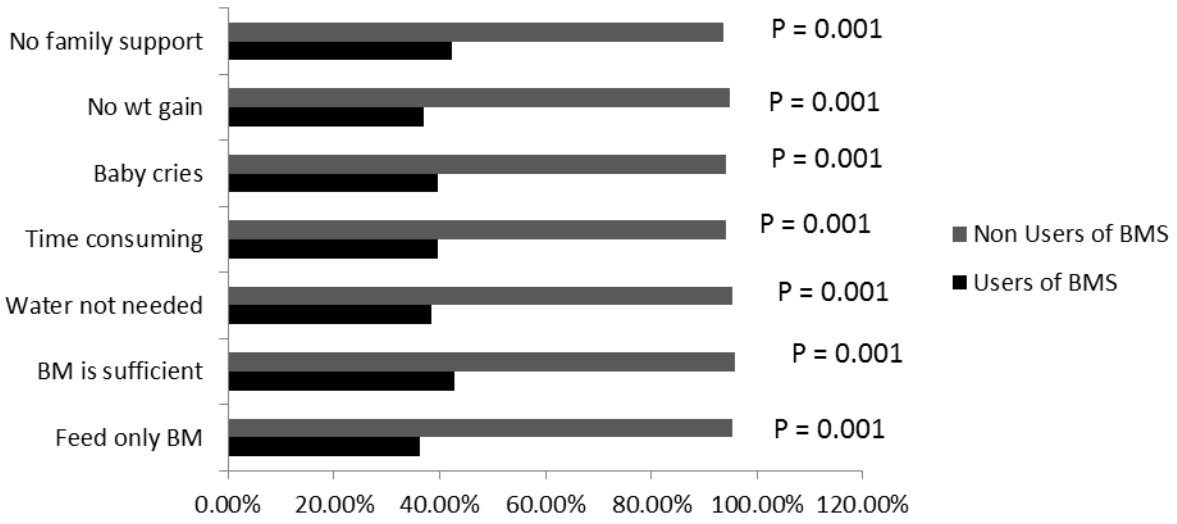

Figure 4.10 Percentage of respondents **Very Confident** about the statements on the exclusive breast feeding self-efficacy scale and whether or not they use BMS

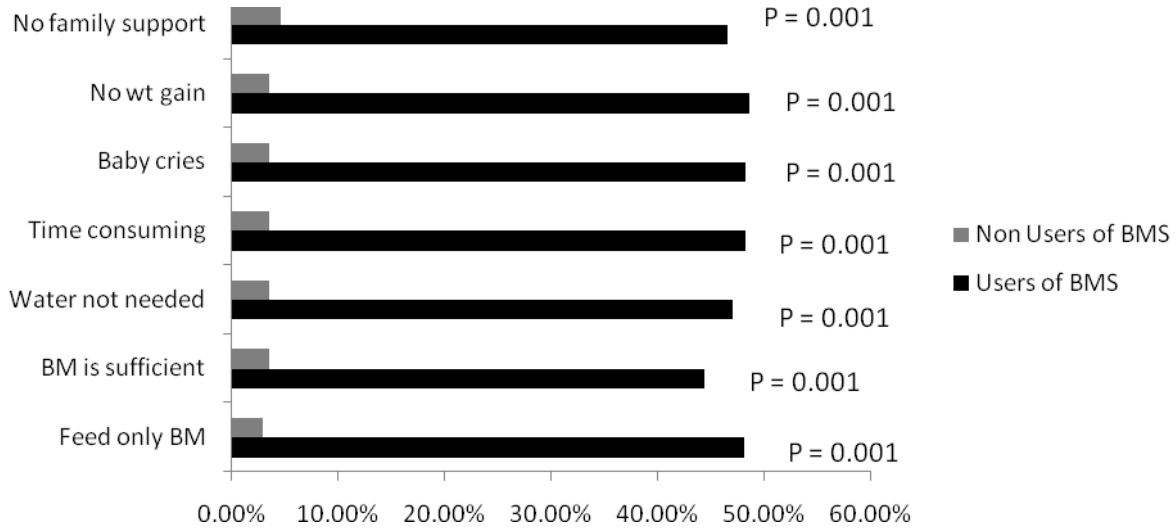

Figure 4.11 Percentage of respondents **Not Confident** about the statements on the exclusive breast feeding self-efficacy scale and whether or not they use BMS

4.7 Factors Associated with Mothers' Use of BMS

4.7.1 Differences in Background, Pregnancy and Delivery, and Infant Characteristics of Mothers Who Used and Those Who Did Not Use BMS for Infant Feeding

With the exception of occupation and income, Mothers who used and those who did not use BMS had similar background characteristics (Table 4.5). Mothers who were non-users of BMS were significantly more likely to be earning higher than the 50 to 100 Ghana cedis monthly income range.

Mothers who did not use BMS were significantly more likely than those who used BMS to have planned their pregnancy with the index child (88% vs. 75%, p=0.001) and were less likely to have delivered by cesarean section. Mothers who used BMS tended to have older infants (p=0.06) than those who were not users of BMS, otherwise the mothers were similar with respect to the infant characteristics assessed.

Table 4.5: Differences in background pregnancy, delivery and infant characteristics of mothers who used and those who did not use BMS

Characteristic	Mother's use of BMS		P-Value[1]
	Users (N = 187)	Non User (N= 173)	
Mothers' characteristics			
Age			
< 20	7 (3.7)[3]	2 (1.2)	**0.15**
20 – 39	174 (93.0)	161 (93.1)	
40 – 52	6 (3.2)	10 (5.8)	
Tribe			
Ga Adangbe	61 (32.6)	54 (31.2)	**0.21**
Akan	64 (34.2)	75 (43.4)	
Ewe	47 (25.1)	28 (16.2)	
Northern Ethnicity	11 (5.9)	13 (7.5)	
Non Ghanaian	4 (2.1)	3 (1.7)	
Education			
≤ Primary	25 (13.4)	31 (17.9)	**0.367**
unior Secondary/Middle School	83 (44.4)	79 (45.7)	
≥ Vocational/Senior Secondary	79 (42.2)	63 (36.4)	
Primary occupation			
Professional (Eg. Teachers, Actors, Lawyers, Doctors)	26 (13.9)	14 (8.1)	**0.021**
Technical/Sales/Administrative	32 (17.1)	23 (13.3)	
Petty Trading	57 (30.5)	63 (36.4)	
Vocational Work	33 (17.6)	49 (28.3)	
Not working	39 (20.9)	24 (13.9)	
Income (GH¢) N=255[4]	N=124	N=131	**0.022**
50 – 100	28 (22.6)	18 (13.7)	
>100- 300	43 (34.7)	57 (43.5)	
>300 – 500	32 (25.8)	46 (35.1)	
>500 -1000	14 (11.3)	7 (5.3)	
>1000	7 (5.6)	3 (2.3)	
Marital status			
Single	11 (8.9)	11 (8.4)	**0.534**
Married	113(91.1)	120 (91.6)	
Spouse's Occupation			
Professional	45 (24.1)	47 (27.2)	**0.088**
Technical/Sales/ Administrative	75 (40.1)	46 (26.6)	
Petty Trading	11 (5.9)	10 (5.8)	
Vocational Work	49 (26.2)	62 (35.8)	
Not working	7 (3.7)	8 (4.6)	

Table 4.5 continued: Differences in background pregnancy, delivery and infant characteristics of mothers who used and those who did not use BMS

Characteristic	Mother's use of BMS		P-Value[1]
	Users (N = 187)	Non User (N= 173)	
Pregnancy and delivery characteristics relative to index child			
Pregnancy was planned			
Yes	141 (75.4)	153 (88.4)	0.001
No	46 (24.6)	20 (11.6)	
Gestation Period			
≥37 weeks	186 (99.5)	170 (98.3)	0.354
<37 weeks	1 (0.5)	**3 (1.7)**	
Place of delivery			0.209
Hospital /Polyclinic	110 (58.8)	115 (66.5)	
Private Clinic/Maternity	67 (35.8)	47 (27.2)	
Traditional Birth Attendant (TBA)	10 (5.3)	11 (6.4)	
Delivery type			0.052
Vaginal	140 (74.9)	144 (83.2)	
Caesarean section	47 (25.1)	29 (16.8)	
Infants' Characteristics			
Sex			
Male	85 (45.5)	82 (47.4)	0.712
Female	102 (54.5)	91 (52.6)	
Age (Mos)	4.41±1.10	4.21±1.15	0.061
3 - 4	97 (51.9)	107 (61.8)	0.080
5 – 6	90 (48.1)	66 (38.2)	
Birth Weight	3.18±0.53[2]	3.17±0.57	
< 2.5kg	11 (5.9)	16 (9.2)	0.156
≥ 2.5kg	176 (94.1)	157 (90.8)	
Incubator Use			
Yes	4 (2.1)	4 (2.3)	0.911
No	183 (97.9)	169 (97.7)	

[1]Significant difference with chi square or ANOVA: [2]Mean ± SD: [3]N (%): [4]Smaller sample size because mothers who did not work and those who did not know their income were excluded from the analysis

4.7.2 Predictors of Use of BMS

Logistic regression analysis to determine predictors of use of BMS among mothers in the study are summarized in Table 4.6. The outcome variable was any use of BMS since birth. None of the mothers' socio-demographic characteristics were predictors of them using BMS. Variables that significantly predicted mothers' use of BMS were 'working away from the infant', 'not planning to exclusively breastfeed before delivery' and 'having a low EBFSE score'. Specifically, compared to mothers who worked away from their infants, those who stayed with their infants had 0.142 (95% CI=0.047 to 0.429) less odds of using BMS. Similarly, mothers who planned to exclusively breast feed their infants before delivery as compared to those who planned to mix feed had .137 (95% CI=0.031 to 0.613) less odd of using BMS. Mothers who scored less on the EBFSE scale as compared to those who had higher scores had 40.575 higher odds (95%CI= 15.760 to 104.466) of using BMS.

Maternal age, education, occupation, income, planned pregnancies and exposure to the promotion of BMS did not significantly predict the use of BMS. The results however indicated that the odds of using BMS was higher for non-educated, working and income earning mothers as compared to those with higher education, none workers and none income earners respectively.

Table 4.6: Binary Logistic Regression for use of BMS among mothers in the study

Variable	N	OR	Confidence Interval		[1]P-value
			Lower	Upper	
Maternal Age					
≤ 39	344	0.653	0.118	3.613	0.625
>39	16	1.00			
Maternal Education					
None	16	2.413	0.435	13.405	0.314
Primary	40	0.301	0.065	1.380	0.122
Junior Secondary/Middle School	162	1.017	0.329	3.149	0.976
Vocational/ Senior Secondary	86	0.715	0.199	2.567	0.607
University/ Polytechnic	56	1.00			
Maternal Occupation					
Professional Professional (Eg. Teachers, Actors, Lawyers, Doctors)	40	4.171	0.531	32.757	0.174
Technical/Sales	55	3.338	0.625	17.816	0.158
Petty Trading	120	1.608	0.303	8.545	0.577
Skilled Work	82	2.920	0.543	15.699	0.212
Not Working	63	1.00			
Maternal Income					
Low	267	1.003	0.262	3.842	0.997
High	31	1.028	0.119	8.886	0.980
Not Working	62	1.00			
Do you work away from infant					
No	254	0.142	0.047	0.429	0.001
Yes	106	1.00			
Was Pregnancy Planned					
Planned	294	0.664	0.267	1.652	0.378
Unplanned	66	1.00			
Infant feeding intention before delivery					
Exclusive Breast feeding	276	0.137	0.031	0.613	0.009
Breast feeding and Water	22	1.791			0.998
Mixed Feeding	60	1.00			
Exposure to BMS promotion					
No	137	0.908	0.473	1.748	0.773
Yes	223	1.00			
EBF -Self Efficacy Score					
≤ 25	128	40.575	15.760	104.466	0.001
26 – 35	232	1.00			

[1]Significant at P< 0.05

CHAPTER FIVE

5.0 DISCUSSION

5.1 Socio-Demographics of Study Participants

Generally, the characteristics of study participants were similar to those reported for the Ledzokuku-Krowor Municipality by the Ghana Statistical Service (2000, 2012). The slightly higher percentage of female infants as compared to the males, the predominance of the Ga Adangbe and Akan ethnic groups in the municipality, the distribution of indigenes and migrants among study participants recruited from the various sub-districts and the relatively lower educational attainment of respondents recruited from the public hospital in the Teshie South sub-district were in line with those recorded in literature (Ghana statistical Service, 2005; 2012). The socio-demographic characteristics of study participants could therefore be said to be comparable to those of the residents of the Ledzokuku-Krowor Municipality.

5.2 Prevalence and Timing of use of Breast Milk Substitutes (BMS)

The prevalence of use of BMS for infants in the study population (51.9%) was higher than the national average of 37% but comparable to what has been reported for Accra. The UNICEF Multiple Indicator Cluster Survey (MICS) (UNICEF, 2012) found that 54% of women in five densely populated suburbs of Accra did not do Exclusive Breastfeeding (EBF), suggesting reliance on BMS for infant feeding. Furthermore in a study to assess factors associated with EBF in Accra by Aidam et al (2005) reported that 48.4% of women did not breastfeed exclusively and hence used BMS.

The mean duration of EBF or the timing of introduction of BMS of 2.1±1.6 months was lower than the national average of 4.4 months but again similar to what was reported for populations in Accra by the MICS (UNICEF, 2012). Thus it is evident that EBF for the recommended 6 months (WHO, 2002) is a challenge for Ghanaian mothers, particularly for those in Accra. While this informs the need for EBF promotion interventions in Accra, it also calls for efforts to make the practice more appealing among mothers considered for this study, since they appeared to be already knowledgeable about the benefits of EBF to their infants. Perhaps EBF promotion programs in the municipality could as well place emphasis on the benefits of the practice to women themselves; EBF has shown to provide protection against postpartum hemorrhage, decreased likelihood of breast cancer and delayed return of ovulation (Aidam et al., 2005).

5.3 Types of BMS Used

The BMS that were used mainly by mothers in this study have been reported in other studies. Nationally, the main BMS used are water and complementary foods (GDHS, 2008). Based on information on six regions in Ghana (the three Northern Regions, Greater Accra, Western and Central Regions), Alabi et al., (2007) reported the main use of commercial or home made preparations of cereal based foods, water and infant formula as BMS while in rural Nigeria, Nwankwo and Brieger, (2002) reported a wide use of water, teas and glucose water even during the first week of life among respondents for their infants.

Perceived insufficient milk, infant thirst/hiccups/colic and feeding problems were the major reasons reported for introducing BMS among mothers of the study. Mothers' perceived insufficient breast milk has often been reported as an important determinant of early cessation of EBF. For example, Otoo et al (2008) found out in their study in Ghana on the Barriers to EBF that mothers mainly perceived breast milk was insufficient. Similar results were reported in Mexico by Guerrero et al (1999) among mothers who identified breast milk insufficiency as the main reason for giving infant formula.

The belief that infants will be thirsty hence need water has also been reported by Otoo et al (2008) as a barrier to EBF. The perception that offering water to babies who are consuming only breast milk is still EBF has also been cited by Alabi and colleagues (2007). These findings have important implications for EBF promotion efforts in Ghana.

5.4 Exposure to the Promotion of BMS

5.4.1 Exposure through Commercial Advertisements

About one-third of the mothers in this study reported some exposure to commercial advertising of BMS either before or after delivery. This finding could be an indication that the direct advertisement of infant foods to the general public was existent in the country contrary to the report by Alabi et al (2007) that such advertisement was virtually nonexistent. About one-half of mothers who reported exposure to any form of promotion of BMS cited the radio or television as the main source of exposure. This may reflect some level of violation of Section 1 of the Ghana Breastfeeding Promotion Regulation (L.I. 1667,

2000) which prohibits the sale and promotion of designated products (including BMS). Furthermore mothers also reported seeing print materials that promoted BMS in health facilities, and market places. The content of these print materials may also have violated specification of the L.I. 1667(2000).

It is important to note however that a person's perception of what constitutes a commercial advertisement and interpretation of it are subjective and may not reflect the true nature of the advertisement; these results therefore need not be generalized. However, since no caregiver had reported that she had been approached by any representative of a baby food manufacturing company or received any free samples of BMS, perhaps that section of the L.I. 1667 (2000) had generally been adhered to.

5.4.2 Exposure by Way of Advice

Advice from others was an important source of exposure to the promotion of BMS among mothers in this study and the most important source of advice on using BMS was from health workers. Some studies (Nwankwo and Brieger, 2002; Shah et al., 2005) have similarly reported findings of health workers giving feeding advice contrary to the WHO recommendation on EBF (WHO, 2002) to caregivers. In the study by Shah et al (2005), to assess breastfeeding knowledge among health workers in rural South Africa, it was reported that the majority of health workers indicated they had recommended water, infant formula and solids to breastfed infants less than six months old. Nwankwo and Brieger identified after in depth interviews with health workers in Rural South Western Nigeria that these

health workers gave advice for mothers to give glucose to their newborns. In both studies the writers agreed that the rural settings could have played a substantial role in health workers' below average knowledge or acceptance of the WHO recommendation. However, the municipality where this current study was undertaken is an urban setting where health workers are perceived to be more exposed to current information on infant feeding hence more knowledgeable. These findings therefore heighten concerns about compliance to the WHO recommendation in the study area especially when caregiver confidence in the advice given by health workers is usually very high.

5.4.3 Exposure in Relation to Use of BMS

The statistically significant association between the use of BMS and exposure to their promotion in this study is in line with results from the study by Howard et al., (2000). In their study, Howard and colleagues (2000) asserted that prenatal exposure to formula promotion materials increased significantly the use of BMS in the infant's first 2 weeks of life. These findings by Howard and his colleagues (2000) on prenatal exposure to the promotion of BMS also places emphasis on results from this study that mothers who were exposed to the commercial promotion of BMS before the delivery of their infants (i.e. prenatally) were more likely to use them than those exposed after delivery and by way of advice. Perhaps, the greater influence prenatal exposure has on the use of BMS could probably be explained by that mothers exposed prenatally may have been influenced at a time when they were making their infant feeding decisions and were more likely to stick to their plans; results from this study indicated that feeding plans before delivery tended to influence actual feeding choices.

It is important therefore that the influence of prenatal feeding decisions on actual feeding choices be channeled towards promoting EBF. Educational materials about infant feeding should therefore support unequivocally breastfeeding as optimal nutrition for infants; formula promotion products should be eliminated from prenatal settings.

5.5 Exclusive Breast Feeding Self Efficacy (EBFSE)

5.5.1 Caregivers' General Confidence in Practicing EBF and the Breastfeeding Self Efficacy Theory

Generally, caregivers' confidence in practicing EBF was high. This finding was not odd as the population of caregivers considered for this study was one which generally agreed with the WHO recommendation on EBF, had majority of its members capable of mentioning at least one true benefit of the practice, or relating to a previous good experience of it, or acknowledging that the source of recommendation was reputable. What was not expected however was the high use of BMS among them (51.9%) despite their seemingly high confidence in the practice of EBF. While this could be attributed to the fact that the confidence levels reported by caregivers may have been exaggerated, it could also be explained using Dennis' (1999) breast feeding self-efficacy theory.

By Dennis' (1999) theory, breast feeding self-efficacy is influenced by four main sources of information; Personal Accomplishments, Vicarious experiences, Verbal Persuasion and Psychological responses. Among respondents considered for this study, general attitude towards the practice of EBF identified with at least three (3) of Dennis' (1999) sources of information to achieve breast feeding self-efficacy.

Specifically, some caregivers reported successful personal experiences of the practice (fulfilling the area of Personal Accomplishments), some had reportedly witnessed other people successfully exclusive breast feed (fulfilling the area of Vicarious experiences) while others placed emphasis on their confidence in the source of the recommendation to practice EBF (fulfilling the area of Verbal persuasion). Perhaps it was the inability of caregivers to attain information on the forth source Psychological response or on each of the four sources all together that resulted in the higher use of BMS. This is assumed because it is asserted in the breastfeeding self-efficacy theory that in choosing, performing and maintaining a behavior, individuals weigh all four sources of information (Dennis, 1999).

The fourth source (Psychological Response) considers the caregivers' own responses and emotional reactions towards achieving a goal, particularly their reaction to stress, fatigue and anxiety. A person's own reaction to the challenges experienced in the process of achieving a goal could impact on how they feel about their personal abilities (in this case, to exclusively breast feed) (Bandura, 1977). In other words, the caregivers' high confidence but high use of BMS could be explained by their initial high confidence in practicing EBF

declined when they were faced with psychological challenges during the actual process of practicing it. The importance of psychological factors on infant feeding attitude is reported by Obrien and colleagues (2009) in their study that showed that each woman approaches the stresses, change and social pressures surrounding breastfeeding from her own psychological viewpoint which influences her infant feeding choice.

5.5.2 Mothers' Exclusive Breastfeeding Self Efficacy (EBFSE) Scores and the use of BMS

Despite the general high use of BMS among caregivers however, trends in the total self-efficacy scores of users of BMS as compared to non-users showed that those who scored less on the scale were more likely to use BMS than those who scored more. These results are consistent with those obtained by other studies which have reported inverse relationships between breastfeeding self-efficacy scores and the use of BMS (Blyth et al., 2004: Dennis, 2006).

Some of the individual self-efficacy statements on the scale that caregivers were observed to show least confidence in have been cited in other studies (Otoo et al., 2009; Tawiah-Agyemang et al., 2008). Otoo et al (2009) and Tawiah et al (2008) reported on the issues of milk insufficiency and the need for water for infants less than six months. However, the finding that mothers were least confident about continuing to exclusive breast feed if their infants did not gain as much weight as they would desire was one unique finding to this study. Most studies in the Ghanaian setting rather report on caregivers' perceived milk insufficiency and feeding problems (Otoo et al., 2009; Tawiah-Agyemang et al., 2008). This

finding portrays the cultural value placed on infant weight gain among caregivers in the Ledzokuku –Krowor Municipality. It also highlights the need for interventions to focus on the perceptions about the practice that have discouraged its adherence such as the fear of the infant not gaining weight, the perception of milk insufficiency and the reported need for breast milk substitutes to comfort the crying baby.

5.6 Determinants of Use of BMS

The study identified three factors associated with the use of BMS, 'working away from the infant', 'not planning to exclusively breastfeed before delivery' and 'having a low exclusive breast feeding self-efficacy score'.

Even though some socio-demographic variables like caregivers' education, occupation and maternal income showed associations with the use of BMS, it was only the nature of their employment that predicted use of BMS in the logistic regression model used in the study. The influence of maternal employment characteristics on the practice of EBF or use of BMS has been widely reported (Van Esterlk and Greiner,1981; Otoo et al, 2009). The study by Van Esterlk and Greiner (1981) indicated that some particularly relevant conditions of employment such as separation of the mother from the baby and maternity leave policies influenced the use of BMS. Otoo et al (2009) in their study to determine the barriers to EBF in Accra found that working mothers were less likely to exclusively breastfeed because of the short maternity leave of three months or the inability to find a convenient feeding location especially for mothers who hawked their products or sold in the markets.

With the vast majority (82.5%) of caregivers in the study working, it was not unusual that employment would influence the use of BMS. However, for this study, it must be noted that the percentage of caregivers who worked away from their infants were few (29.4%) compared with the majority (70%) who did not. Alternative explanations must therefore have accounted for the use of BMS even among those caregivers who had their infants with them while they worked.

The association between infant feeding intention and the use of BMS is in line with results obtained by Chezem et al (2003) and Donath et al (2003). In both studies women were more likely to stick to their infant feeding plans before delivery. In the study by Chezem et al (2008) mothers who planned to use BMS before delivery actually reported short EBF rates as compared to those who planned to EBF. These findings raise critical issues that need to be considered in EBF promotion programs; at the antenatal level and after delivery when the mother is still in the maternity ward, the caregivers' infant feeding plans need to be evaluated so that those of them who may need more intensive promotional efforts will be identified and well sensitized.

The finding of low EBFSE being a predictor of the use of BMS supports Dennis' (1999) theory on self-efficacy. The decision of a care giver to give BMS to her infant less than six months old depends greatly on her EBFSE. This finding reiterates the importance of boosting maternal EBFSE in any breast feeding promotion interventions.

It is important to note that even though the magnitude of the odds ratio for use of BMS among caregivers with low EBFSE as compared to those with high EBFSE was extremely

high (40.575), the confidence intervals were wide. The wide confidence interval could be an indication that the sample size was small. Any conclusions that might be drawn from the data therefore need to be replicated with a larger sample size.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions

In conclusion, the prevalence of use of BMS for infants (3 – 6 mos) in the study was higher than the national average of 37% for infants less than six (6) months old but comparable to results obtained in the UNICEF Multiple Indicator Cluster Survey for Accra of 54.3%

The predominant BMS used among respondents (water, infant formula and complementary foods) are similar to those consumed nationally

Being exposed to the promotion of BMS tended to influence their use. Advice from health workers/family was the main avenue by which the mothers were exposed to BMS with health workers being the predominant source of advice

Caregivers' low EBFSE influenced their use of BMS, this finding was in line with Dennis' theory on Breast Feeding Self Efficacy.

The main predictors of use of BMS among study participants (working away from your infant, not planning to exclusively breastfeed before delivery and having low (EBFSE) are consistent with those reported both in Ghana and other countries

6.2 Recommendations

Infant feeding interventions in the Ledzokuku-Krowor Municipality need to be directed towards boosting caregivers' confidence to continue to exclusively breastfeed. The interventions should include but not be limited to the following issues observed to be their main challenges to practicing EBF;

- Infants not gaining as much weight as caregivers would prefer
- Infants crying often
- The practice being time consuming

There is a need for significant effort to change health worker attitude towards the use of BMS among infants less than six (6) months old since caregiver confidence in the advice of health workers is usually high

Mothers' feeding intentions before delivery have been observed to influence their infant feeding decisions. It is important that at the prenatal level and after delivery when the mother is still in the maternity ward, the caregivers' infant feeding plans evaluated so that those of them who may need more intensive promotional efforts will be identified and well sensitized.

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APPENDICES

APPENDIX 0NE

DEPARTMENT OF NUTRITION AND FOOD SCIENCE
UNIVERSITY OF GHANA

DETERMINANTS AND TIMING OF USE OF BREAST MILK SUBSTITUTES AMONG MOTHERS OF INFANTS BETWEEN THE AGES OF 3 TO 6 MONTHS IN THE LEDZOKUKU- KROWOR MUNICIPALITY IN ACCRA

INFORMED CONSENT FORM

Title: Determinants and Timing of use of Breast Milk Substitutes Among Mothers of Infants between the Ages of 4 to 6 months in the Ledzokuku- Krowor Municipality in Accra

Principal Investigator: Marian Gatiba

Address: University of Ghana, Department of Nutrition and Food Science, Legon, Accra.

General Information about Research

You are being invited to participate in a study that seeks to determine the predictors of use of breast milk substitutes. This study involves research.

Breastfeeding is very important to both mother and infant. The purpose of the study is to find out what causes mothers to decide to give their infants breast milk substitutes despite the known benefits of breast milk. It also seeks to identity the types of breast milk substitutes mothers are giving to their infants. This is important to know because information from this study could help identify the mothers who are most likely to use breast milk substitutes so that intervention exercises can be directed more appropriately.

Identifying the types of breast milk substitutes mothers give their infants could inform healthcare staff to better advice mothers on feeding practices. This will in the long term inform policy makers to make policies and implement strategies that would go a long way to improve both maternal and infant health.

Description of Procedures

If you agree to participate in this study, you will be asked questions about your personal characteristics, such as your age, ethnicity, level of education, your occupation and its nature, where you live, the number of children you have; your infant's background characteristics, such as birth weight, age at birth; your biomedical history such as delivery type and your use of any medications. Some of these indices will be abstracted from your infant's weighing card. In addition, you will be asked if you use breast milk substitutes and reasons why you use them and at stage you started using them. Your confidence in breastfeeding will also be assessed by asking a series of questions like 'how you feel when you breastfeed'. Similarly, your exposure to the promotion of breast milk substitutes will be assessed by asking you if you have received any free breast milk substitutes from any one. This would take about 30-45 minutes.

Possible Risks and Discomforts

There would be no physical hurt/pain to you and your baby. However, the time to be spent responding to the questions may pose some inconvenience to you. It is possible that some of the questions to be asked may pose some discomfort or intrude on your privacy.

You are free to choose not to answer any question(s) that you are not comfortable with or do not wish to discuss and you may stop the interview at any time.

Possible Benefits

You may not personally benefit from participating in this study, however knowledge gained from this research will be useful to society as a whole.

Confidentiality

Information obtained from your participation will be kept strictly confidential. Your consent form will be kept separate from the data and the data will not be available to anyone other than the researcher. The results from this research may be used in presentations and/or research papers. However, your name will never be used in any presentation, paper or report.

You should also know that the Institutional Review Board (IRB) of the Noguchi Memorial Institute of Medical Research may inspect study records as part of its auditing program but these reviews will only focus on the researcher and not on your responses or involvement. The IRB is a group of people that review research studies to make sure they are safe for participants.

Compensation

At the end of the study, you will be appreciated with one cake of Johnson's baby soap.

Voluntary participation and Right to Leave the Research

Participation in this research is voluntary. You are free to decide whether to be in this study or not. If you decide to participate but later change your mind, you may withdraw your participation without any penalty.

Additional Costs

Participating in this study will be at no cost to you. If you choose to participate in the study, researchers would provide all the tools (questionnaires, pens, work station, etc.) needed for the study. We will meet you either at the health care facility or at your home or another location that you prefer to have the interview.

Contacts for Additional Information

If you have further questions or concerns relating to your participation in this study you may contact the Principal Investigator on telephone number 020-3182599 or by e-mail at magat12001@yahoo.com and we would be glad to offer help.

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline number 0302916438 or email addresses: nirb@noguchi.mimcom.org or HBaidoo@noguchi.mimcom.org .

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title, **Determinants and Timing of use of Breast Milk Substitutes Among Mothers of Infants between the Ages of 4 to 6 months in the Ledzokuku- Krowor Municipality in Accra** has been read and explained to me. I have been given an opportunity to have questions about the study answered to my satisfaction. I agree to participate as a volunteer.

…… ……

Date Name and signature or mark of Volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered to the volunteer's satisfaction and the volunteer has agreed to take part in the research.

…… ……

Date Name and signature of Witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this study have been explained to the above individual.

…… ……

Date Name/ Signature of Person Who Obtained Consent

APPENDIX TWO

DEPARTMENT OF NUTRITION AND FOOD SCIENCE
UNIVERSITY OF GHANA

DETERMINANTS AND TIMING OF USE OF BREAST MILK SUBSTITUTES AMONG MOTHERS OF INFANTS BETWEEN THE AGES OF 3 TO 6 MONTHS IN THE LEDZOKUKU- KROWOR MUNICIPALITY IN ACCRA

STUDY QUESTIONNAIRE

BACKGROUND INFORMATION

ID NUMBER: ……

NAME OF INTERVIEWER: ……

DATE OF INTERVIEW (DD/MM/YY): ……

HEALTH FACILITY **1** = Teshie RCH Clinic **2** = Manner Mission Hospital **3** = Christian Medical Center

INFANT INFORMATION

1. Name of child ……
2. Gender of child…… **1** = Male **2** = Female
3. Child's date of birth (DD/MM/YYYY)……___ ___/ ___ ___ /___ ___ ___ ___
4. Age of child……
5. After how many weeks of pregnancy was this infant born?…… **1** = <32 weeks **2** = 32-35weeeks **3** = ≥ 36 weeks
6. Was your baby put in an incubator after birth?..... **0** = No **1**= Yes
7. What was the weight (kg) of your infant when you gave birth? ……

MATERNAL INFORMATION

A. Demographics

1. Name of mother: ……
2. Telephone number: ……

3. How old are you?…… ☐

4. What tribe are you?..... ☐

5. Where do you live?..... ☐

1 = Within Teshie North/Teshie South/Nungua Sub-district

2 = Outside Teshie North/Teshie South/Nungua Sub-district

6. What is your marital status?..... ☐

0 = Never been married **1** = Married /Co-habiting **2** = Divorced

3 = Widowed

7. What work does your spouse do?..... ☐

1= Professional **2=** Technical/Sales/Administrative **3**= Petty trading

4= Skilled Work (Carpenter, Mason, Plumber) **99** = Not Applicable (does not work)

8. What is the highest level of education you have completed?..... ☐

1 = None **2** = Primary school **3** = Junior Secondary/Middle School

4 = Vocational/Senior Secondary **5** = University/polytechnic

9. What kind of work did you have before delivery of your infant (index child)?..... ☐

88 = Was not working **1** = Salaried Work **2** = Self employed 3= Other (specify)……

10. What was your actual work?..... ☐

1= Professional **2=** Technical/Sales/Administrative **3**= Petty trading

4= Skilled Work (Hairdressing, Caterer, Seamstress) **99** = Not Applicable (was not working)

11. How long (months) after delivery did you go back to work?..... ☐

88 = Not yet back to work **99** = Not Applicable (was not employed)

12. What do you do with your infant most of the time when you are working?..... ☐

1 = He/ She stays with me **2=** Leave him/her with my mother

3= Leave him/her with my mother in-law **4**= Leave him/her with other relatives

4= Leave him/her with house help **5=** Leave him/her at Crèche **99**=Not Applicable (not working) **88=**Not yet back to work

13. On average, is your monthly income between…?..... ☐

1 = GH¢50 – 100 **2** = GH¢ 100 – 300 **3** = GH¢ 300 – 500 **4**= GH¢500 – 1,000 **5** = GH¢1,000 – 1500 **6** = > GH¢1,500 **7** = Don't Know **99** = Don't Work

14. What is your living arrangement?..... ☐

1= Nuclear Family **2**= Extended Family

15. How many rooms are available to you in the house?..... ☐

16. How many people in your household are children (below 18yrs)..... ☐

17. How many people in your household are adults (18yrs and above)..... ☐

18. What is the total number of people in your household..... ☐

19. I am going to mention a number of items that people may have in their homes… when an item is mentioned please indicate whether or not you have it

ITEM	0 = No 1 = Yes
Radio	
Television	
Fridge/Freezer	
Telephone	
Fan	
Air conditioner	
Computer (Desktop/Laptop)	
Internet facility	

20. What is your primary mode of transport?..... ☐

1= Own Car **2** = Own Motor Bike **3** = Own Bicycle **4** = Public transport

B. Exposure to Promotion of Breast Milk Substitutes

1. Before delivery, did you ever see any advertisement about foods that can be given to infants below six (6) months?..... ☐

0 = No, Never **1** = Yes

Yes, Where?	0=No 1=Yes
Supermarket	
Newspaper/Internet	
Pharmacy	
Health Facility	
Market	
Radio/Television	
Other (specify)……	

2. After delivery, did you ever see any advertisement about foods that can be given to infants below six (6) months?..... ☐

0 = No, Never **1** = Yes

Yes, Where?	0=No 1=Yes
Supermarket	
Newspaper/Internet	
Pharmacy	
Health Facility	
Market	
Radio/Television	
Other (specify)……	

3. Has anyone ever advised you to give any liquid or food beside breast milk to your infant?..... ☐

0 = No, Never **1** = Yes

Yes, Who?	0=No 1=Yes
Health worker	
Relative	

Representative of baby food manufacturing company	
Other (specify)……..	

C. Use of Breast Milk Substitutes

1. What was the first thing your child received after delivery?..... ☐

   1=Breast milk **2**=Water **3**= Infant Formula **4**= Medication **5**= Herbal concoction **6**= Don't know 7= Other (Specify)…… ☐

2. Are you currently breastfeeding?..... ☐

   0= No **1**= Yes

3. From delivery to this time, what foods or drinks have been given to the child (*Please answer 0 = No and 1 =Yes and give the reasons why you give them to the infant)*

Reason

☐ Only Breast milk ……....

☐ Water/Gripe ……....

☐ Juice ……..

☐ Herbal Concoction ……....

☐ Infant Formula ……....

Other Other (Specify) ……

4. At what age did the child first receive any other food/drink besides breast milk?..... ☐

   99= Baby is still fed with only breast milk

5. Do you agree with the recommendation to feed your infant with only breast milk until he/she is six months old? **0** = No **1** =Yes

Reason

……

……..

.....

D. Exclusive Breast Feeding Self Efficacy

I am going to ask you about how confident you are about doing certain things concerning the feeding of your baby. When I ask the question please let me know if you are not confident at all, not very confident, sometimes confident, confident or very confident about doing the thing.

1 = Not at all confident **2** = Not very confident **3** = Sometimes confident **4** = Confident **5** = Very confident

How confident are you that:

1	You can feed your baby with only breast milk until he/she is six months old	1	2	3	4	5
2	The breast milk you will produce will be enough for the baby for the first six months of life	1	2	3	4	5
3	Your baby will be alright if you do not give him/her water during the first six months of life	1	2	3	4	5
4	You can continue to give your baby only breast milk until he/she is six months old even though it will be time consuming	1	2	3	4	5
5	You can continue to feed your baby with only breast milk until he/she is six months old even if he/she cries a lot	1	2	3	4	5
6	You can continue to feed your baby with only breast milk for the first six months even if he/she does not gain as much weight as you would prefer,	1	2	3	4	5
7	You can continue to feed your infant with only breast milk until he/she is six months old even if your family members discourage you from doing exclusive breast feeding	1	2	3	4	5

E. ***Biomedical Information*** *(Please abstract from infant's weighing card where necessary)*

1. How many children do you have?..... ☐
2. Did you plan to become pregnant for this infant?..... ☐
   1 = Planned **2** = Unplanned
3. Where did you attend antenatal clinic when you were pregnant for this infant?..... ☐
   0 = No, did not attend antenatal clinic **1** = Gov. Hospital/Polyclinic
   2 = Private clinic/Maternity home **3** = Mission Hospital
4. At what point in pregnancy did you start attending antenatal clinic?..... ☐
   0 = No, did not attended antenatal clinic **1** = 0 – 3months **2** = > 3 months
   3=Don't Know
5. How many antenatal clinic visits did you complete before delivery of the infant.. ☐
6. Where did you deliver this infant?..... ☐
   1 = Hospital/Polyclinic **2** = Private clinic/Maternity home **3** = Traditional birth attendant (TBA)
7. What type of delivery did you have for your infant (index child)?..... ☐
   1 = Vaginal delivery **2** = Caesarean section
8. Before delivery, did anyone give you any advice on infant feeding?..... ☐
   0 = No **1** = Yes
   If yes who? Was it a… (please answer **0**=No and **1**=Yes)
   ☐ Health Worker ☐ **R**elative ☐ Friend ☐ Other…….
9. Before delivery how did you plan to feed your infant (the index child) once born?.. ☐
   1 = Exclusive breastfeeding for six months **2** = Breastfeeding and Water for six months **3**= Mixed Feeding **4**= Other (specify) ……..
10. After delivery, did anyone give you any advice on infant feeding?..... ☐
    0 = No 1 = Yes

If yes who? Was it a… (please answer **0**=No and **1**=Yes)
☐ Health worker ☐ Relative ☐ Friend ☐ Other ……

11. How do those around you react to the way you are feeding your infant now?..... ☐
    1= Give Encouragement **2** = No encouragement **3** = Unconcerned

APPENDIX THREE

BEASTFEEDING SELF-EFFICACY SCALE –SHORT FORM

Email or mail all correspondence to:

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Breastfeeding Self-Efficacy Scale – Short Form

For each of the following statements, please choose the answer that best describes how confident you are with breastfeeding your new baby. Please mark your answer by circling the number that is closest to how you feel. There is no right or wrong answer.

1 = not at all confident 2 = not very confident 3 = sometimes confident 4 = confident

5 = very confident

1	I can always determine that my baby is getting enough milk	1	2	3	4	5
2	I can always successfully cope with breastfeeding like I have with other challenging tasks	1	2	3	4	5
3	I can always breastfeed my baby without using formula as a supplement	1	2	3	4	5
4	I can always ensure that my baby is properly latched on for the whole feeding	1	2	3	4	5
5	I can always manage the breastfeeding situation to my satisfaction	1	2	3	4	5
6	I can always manage to breastfeed even if my baby is crying	1	2	3	4	5
7	I can always keep wanting to breastfeed	1	2	3	4	5
8	I can always comfortably breastfeed with my family members present	1	2	3	4	5
9	I can always be satisfied with my breastfeeding experience	1	2	3	4	5
10	I can always deal with the fact that breastfeeding can be time consuming	1	2	3	4	5
11	I can always finish feeding my baby on one breast before switching to the other breast	1	2	3	4	5
12	I can always continue to breastfeed my baby for every feeding	1	2	3	4	5
13	I can always manage to keep up with my baby's breastfeeding demands	1	2	3	4	5
14	I can always tell when my baby is finished breastfeeding	1	2	3	4	5
		1	2	3	4	5