

INFANT FEEDING PRACTICES AND THEIR RELATION TO MATERNAL HEALTH
CARE UTILIZATION

A National Cross-Sectional Study among Ghanaian Women

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ABSTRACT

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Background: Adequate infant feeding enhances growth, overall health and survival of infants in the early years of life and throughout the life cycle. Furthermore, maternal health care services offer mothers education on infant feeding and care. As Ghana seeks to achieve optimal universal health and survival for all mothers and children through targeted policy making, this study makes significant contributions to the current literature on maternal health care utilization and infant feeding that can help to identify vulnerable groups that require immediate attention. The aim of this study is to determine the association between components of maternal health care utilization and infant feeding practices such as: breastfeeding initiation, prelacteal feeding and continued breastfeeding.

Methods: Data from the 2008 Ghana Demographic and Health Survey (GDHS) carried out as the fifth round in a series of national level population and health surveys was used. The survey covers information on maternal health, family planning, fertility, child health and nutrition. This present study focused on women (N= 2099) of the reproductive age group 15 to 49 with live births within five years preceding the study. Timing of first antenatal care visit, number of antenatal care visits, place of delivery and mode of delivery were used as the components of maternal health care utilization. Breastfeeding initiation, prelacteal feeding and continued breastfeeding beyond six months were the infant feeding practices evaluated in this study. Logistic regression analyses was used to calculate the odds ratios (OR) and their 95% confidence intervals (CIs) for infant feeding practices.

Results: In total, 52.5% of women initiated breastfeeding within an hour after birth. Only few women (18.1%) offered prelacteal foods to their infants within three days after birth and 78% of women continued breastfeeding beyond six months. Having a cesarean delivery and a non-institutional delivery was significantly associated with a lesser likelihood of initiating breastfeeding within 1 hour after delivery (OR for Cesarean delivery 0.11, 95% CI 0.12-0.27, OR for non-institutional delivery 0.78, 95% CI 0.62-0.99) and a higher likelihood of prelacteal feeding (OR for Cesarean delivery 1.92, 95% CI 1.19-3.09, OR for non-institutional delivery 1.98, 95% CI 1.42-2.76) in the first three days after delivery. Late antenatal care (after the first trimester) was found to be associated with lower odds of breastfeeding beyond six months (OR 0.77, 95% CI 0.59-0.99). Women belonging to the African traditional religion and the poor wealth quintile were less likely to initiate breastfeeding within an hour after birth and many unmarried women had a higher probability of prelacteal feeding. Moreover, women of the age groups of 25 to 49 years showed significant associations with continued breastfeeding beyond six months.

Conclusion: This study showed that infant feeding practices were partly determined by maternal health care utilization during pregnancy. Therefore, components of maternal health care utilization should be addressed when scaling-up infant feeding in Ghana.

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ABBREVIATIONS

ANC: Antenatal care

CI: Confidence interval

DANIDA: Danish International Development Agency

DHS: Demographic and Health Survey

ENA's: Essential Nutrition Actions

GAC: Ghana Aids Commission

GDHS: Ghana Demographic and Health Survey

GHS: Ghana Health Service

GSS: Ghana Statistical Service

OR: Odds ratio

SPSS: Statistical Package for Social Sciences

UNFPA: United Nations Population Fund

UNICEF: United Nations Children's Emergency Fund

UNSCN: United Nations Standing Committee on Nutrition

USAID: United States Agency for International Development

WHO: World Health Organization

1. INTRODUCTION

Nutrition in the early years of life is a significant determinant of infant growth, development, and survival with implications on future adult health (UNSCN, 2000). The enormous importance of nutrition in the early stages of the lifecycle has been additionally highlighted in the millennium development goals (Skolnik, 2012). Population based studies from developing countries have shown that poor breastfeeding and complementary feeding practices increase the risk of growth retardation and nutritional deficiency in children (Shrimpton et al, 2001). The resulting under nutrition coupled with infectious diseases has been found to be one underlying cause of child mortality (Black et al, 2003).

Breastfeeding has been shown to protect against gastrointestinal and respiratory infections in the first years of life with significant reductions in neonatal mortality and morbidity outcomes (Debes et al, 2013; Chantry et al, 2006; Plenge-Bonig et al, 2010; Arifeen et al, 2001). Previous evidence suggests that exclusive breastfeeding produces marked increases in weight and length gain in the first years of infancy (Kramer et al, 2002). In developing countries, exclusive breastfeeding has been shown to prevent hypothermia and hypoglycemia in newborns (Huffman et al, 2001). Furthermore, improvements in academic achievements have also been attributed to continued breastfeeding (Oddy et al, 2011). Despite the progress in interventions aimed at fostering infant health and survival, various losses in implementing nutritional guidelines remain the leading cause of malnutrition and infant mortality in sub-Saharan Africa and south Asia (Skolnik, 2012).

About a third of under- five deaths occur during the neonatal period in Sub-Saharan Africa with the highest neonatal death of 32 deaths per 1,000 births in 2012 (UNICEF, 2012). The first 28 days of life (neonatal period) is the most vulnerable time for a child's survival, thus neonatal health needs to be addressed effectively if progress is to be achieved in reducing overall child mortality (UNICEF, 2012). The World Health Organization (WHO) global burden of disease report estimates that about 35 percent of all child deaths, in other words 3 million deaths each year, are attributable to nutrition related causes (Black et al, 2008). This is about 8,000 global child nutrition-related deaths each day (Skolnik, 2012).

Maternal health care utilization and the adoption of essential nutritional actions are essential reproductive health care interventions aimed at reducing neonatal and infant mortality particularly in the first week of life and even up to 1,000 days after birth (WHO, 2012; Save the Children, 2012). WHO guidelines highlight that improvements in exclusive breastfeeding practices, adequate and timely complementary feeding with continued breastfeeding for two years and beyond could save the lives of nearly 1.5 million children under five years annually (WHO, 2013; Jones et al, 2003). Additionally, the important role of maternal health care utilization in infant nutrition has been displayed in numerous epidemiological surveys (Mehnaz et al, 2010; Nwaru et al, 2011; Mattar et al, 2007).

An antenatal care visit is one of the most important and highly cost effective interventions required in promoting healthy behaviors and fostering child survival (WHO, 2013). Moreover, it serves as an ideal time to assess the physical wellbeing of the mother and child, counsel her about breastfeeding and lifesaving nutritional practices (UNICEF, 2012; WHO, 2013). A number of studies have proved that this particular component of maternal health care utilization fosters the adoption of other components such as institutional delivery (Feyissa and Genemo, 2014; Abeje et al, 2014; Sugathan et al, 2001). Furthermore, it offers an ideal platform for communicating lifesaving nutrition information to expectant mothers (Aidam et al, 2005; Mattar et al, 2007).

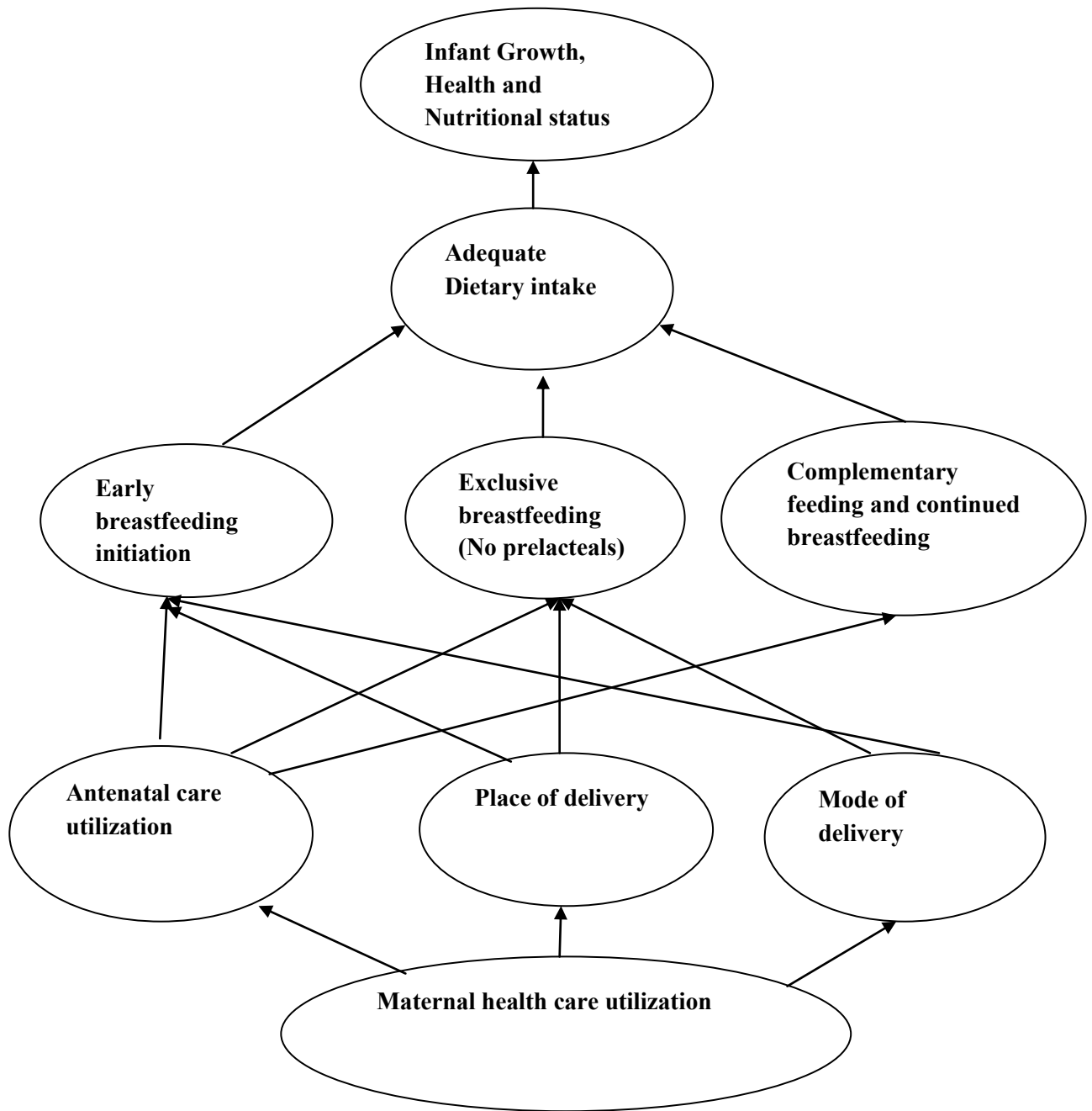
Although considerable research has been devoted to exploring factors associated with maternal health care utilization, less attention has been paid to determining the implications of these interventions on nutrition related strategies focused on enhancing child survival. This study adds to previous research in identifying target groups that need attention, providing recommendations to encourage behavior change and establishing strengths and inadequacies of the maternal health care utilization package. Given the importance of maternal health care utilization and essential nutrition actions on infant health and survival, this study aims to examine the association between maternal health care utilization and infant feeding practices using the national cross-sectional study, 2008 Ghana Demographic and Health Survey Data.

2. LITERATURE REVIEW

This literature review is a critical analysis of research pertaining to various components of maternal health care utilization and infant feeding practices. It explores detailed evidence on components, guidelines, recommendations and determinants of the study area and additionally compares and evaluates research and debates of the phenomenon. A definition of key terms will help complement these efforts. Literature used for this thesis work was found through Pubmed, ovid Medline, eLINA and World Health Organization Databases using various key words such as antenatal care, prenatal care, breastfeeding initiation, prelacteal feeding and breastfeeding duration. Most literature was assessed through the University of Tampere journal subscription database and only the relevant abstracts and full texts were reviewed.

Figure one is a conceptual framework which shows the pathway between maternal health care utilization and infant feeding practices. According to the framework, adequate dietary intake during infancy may have significant implications on infant growth, health and nutritional status. Some prerequisites to achieve adequate dietary intake are shown in level three of the framework and these are; early breastfeeding initiation, exclusive breastfeeding, complementary feeding and continued breastfeeding. Additional highlights of the framework are the pathways that indicate the relation between the components of maternal health care utilization and infant feeding. Antenatal care utilization can foster the adoption of all infant feeding practices. Moreover, maternal place and mode of delivery are important predictors of breastfeeding initiation and exclusive breastfeeding.

Fig 1: Conceptual framework of the components of maternal health care utilization and infant feeding practices



2.1. Components of maternal health care services

Centers that offer health care to mothers serve as important channels to disseminate health counseling, advice and education on numerous health interventions. This awareness has called for the assessment of several components of maternal health care utilization especially antenatal care on life saving interventions. To expand and optimize payoffs for the survival of all infants, the WHO in collaboration with other partners recommend a number of essential nutrition actions such as breastfeeding initiation within the first hour of life, exclusive breastfeeding for six months, adequate complementary feeding starting at six months with continued breastfeeding for two years, appropriate nutritional care for sick and malnourished children, adequate intake of vitamin A for women and children, adequate intake of iron for women and children and adequate intake of iodine by all members of the household (WHO, 2011). Maternal health care service is classified as one of the most important health care intervention aimed at enhancing maternal survival and offering information that could improve infant care and nutrition (Birmeta et al, 2013). In addition, antenatal care and place of delivery are recognized as key determinants of maternal health care utilization and numerous studies have examined determinants of these interventions in varying populations (Chakraborty, et al 2003; Birmeta et al, 2013).

A joint UNICEF and WHO declaration to support, protect and promote breastfeeding brought rise to the well-known “ten steps to successful breastfeeding” (WHO, 1998). These are simple but essential actions all mothers are required to take before and after delivery to foster infant growth and survival. Although these steps are all different and unique, they collectively enhance the adoption and maintenance of breastfeeding. Relevant to this study are steps three, four and six. Step three requires all health care providers to utilize antenatal care services to inform, educate and demonstrate to expectant mothers how to breastfeed. This step also encourages health professionals to ensure that mothers understand are comfortable and equipped to breastfeed. Physical examination of the breasts and preparation of the nipples is also undertaken during these visits. A woman’s decisions on feeding are usually formed during pregnancy thus antenatal preparation and counseling can influence intentions on breastfeeding despite other external socio-demographic and cultural influences. In step four, “help mother to initiate breastfeeding within a half hour of birth”

demands that all birth attendants provide skilled support to ensure skin-to-skin support immediately after delivery. This step helps to establish breastfeeding and fosters bonding. Moreover, step six “give newborn infants no food or drink other than breast milk unless medically indicated” discourages the persistent practice of prelacteal feeding. Health workers have the responsibility of advocating and raising awareness on the importance of colostrum to the newborn infant as well as the very few medical indications for supplements which are seldom needed in normal circumstances (WHO, 1998; Saadeh and Akre, 1996).

2.2. Components of antenatal care (ANC)

Pregnancy is an important time to promote healthy parenting skills and infant care behaviors and the antenatal care arrangements can be used to achieve this objective. In many developing nations, antenatal care coverage is reaching towards success however, there are still a number of families that do not benefit from the full life saving potential of the focused antenatal care package (WHO, 2006). The focused antenatal care package has the goal to prepare for birth and parenthood as well as detect and manage health problems that affect mothers and babies during pregnancy. Additionally, relevant to this study is the goal of the focused ANC package to provide women and their families with adequate advice and information on healthy child care practices including care of the newborn, early breastfeeding initiation and exclusive breastfeeding. Focused antenatal visits generally include assessment of women’s history and health records, complete general and obstetrical examination, screening and testing (hemoglobin, syphilis, proteinuria), treatments, preventive measures and health education, advice and counseling on various health topics including maternal and infant nutrition (WHO, 2006).

The shift in recent years from the high risk approach to focused antenatal care stems from a multi country randomized control trial by the WHO and a systematic review which proved that four antenatal care visits for women whose pregnancies are progressing normally is effective (Villar and Bergsjö, 2003; Villar et al, 2001). All women thus benefit from specific evidence based interventions carried out at certain critical times in the pregnancy.

The first visit should ideally be before 12 weeks but no later than 16 weeks and subsequent visits should be at 24-28 weeks, 32 weeks and 36 weeks (Villar and Bergsjö, 2003; Villar et al, 2001).

2.2.1. Determinants of Antenatal care utilization

There are a number of studies addressing the determinants of antenatal care using data from low-and middle-income countries. Socio-demographic factors and women's characteristics are found to be associated with ANC utilization. A study from Nepal found that age, education, parity, wealth and place of residence were significantly associated with antenatal care (Neupane and Doku, 2012). Older women and those with more children were more likely to have fewer, delayed or no prenatal visits. Moreover, women in poorer wealth quintiles, with lower educational attainment and living in the rural areas were less likely to have early and many prenatal care visits (Neupane and Doku, 2012). In one of the earlier studies from Ghana, it was found that maternal age (OR 1.5, 95% CI 1.1-1.9 OR for 25-34 year olds compared to 15-24 years), religion (OR 1.8, 5% CI 1.2- 2.8 OR comparing Christians and traditional believers) and wealth index (OR 2.6, 95% CI 1.7-3.8 OR for rich compared with poor) were important predictors of ANC utilization (Doku et al, 2012). Similar findings were also reported in a recent study from Tanzania where higher educational attainment of mothers (OR 2.01, 95% CI 1.45-2.80) was strongly associated with four or more ANC visits (Gupta et al, 2014). However, being unmarried (OR 0.75, 95% CI 0.56-0.99) and having the first antenatal care visit after four months (OR 0.16, 95% CI 0.14-0.18) was found to be negatively associated with attending four or more antenatal care visits (Gupta et al, 2014). It has been found that maternal educational attainment is a dominant factor hence it is considered to have a net effect on maternal health care utilization independent of other background characteristics (Chakraborty et al, 2003).

2.2.2. Antenatal care utilization and infant feeding practices

Considering the payoffs of antenatal care utilization on infant health, growth and feeding, reveals a number of studies reporting positive outcomes. A study on the factors associated with the physical growth of children in rural and urban areas of Vietnam highlighted

positive correlations between the number of ANC visits and child growth when adjusted for site, sex, education and household assets (Nguyen et al, 2013).

An earlier study from rural China aimed at exploring infant care practices and their relation to prenatal care utilization reported significant associations between the timing of antenatal care initiation and some infant care practices (Nwaru et al, 2011). The same study also reported that, participants with no antenatal care visits were more likely to introduce infant formula to their offspring when they were less than four months old. (OR 2.36, 95% CI 1.09-5.14). Additionally, the odds of introducing formula to infants less than four months (OR 1.62, 95% CI 1.04–2.51) and cereals or porridge to infants less than six months (OR 1.45, 95% CI 1.08-1.95) was also found significant among respondents who initiated antenatal care after three months of pregnancy (Nwaru et al, 2011). The same study further explained a linear relationship between the time of initiation of prenatal care and the practice of exclusive breastfeeding when adjusted for parity and maternal age. Women who initiated prenatal care less than three months gestation were less likely to mix feed as compared to women who initiated prenatal care in the fourth to fifth (OR 1.34, 95% CI 1.02-1.80) and seventh to ninth months of gestation (OR 1.75, 95% CI 1.06-2.88) (Nwaru et al, 2011).

In Bangladesh, findings from a study found that compared to no antenatal care visit, one to three visits protected infants (OR 0.8, 95% CI 0.7-0.9) from being fed prelacteal foods (Sundaram et al, 2013). Moreover, Neupane and Nwaru demonstrated in a study from Nepal that more than three antenatal care visits were associated with higher odds of breastfeeding within an hour after birth. In their study, compared to women who had no ANC visits, those who had more than three visits had significantly higher odds of initiating breastfeeding within an hour after birth after adjusting for maternal socio-demographic characteristics (Neupane and Nwaru, 2014).

Adequacy of antenatal care is always not predictive of breastfeeding hence suggesting a strong influence of extraneous factors (Swigonski et al, 1995). For instance, Nielsen et al (1998) in their study showed that although number and timing of antenatal care visits was associated with offering colostrum to an infant these had no effect on the initiation of breastfeeding. However, only women who reported having information about breastfeeding

were more likely to initiate breastfeeding early after birth (OR 1.81, 95% CI 1.34 – 2.43) (Nielsen et al, 1998).

2.2.3. Antenatal education and counseling

A number of studies that have been successful in addressing and evaluating the content of antenatal breastfeeding counseling have identified some remarkable outcomes. Kristin et al (1990) examined the implications of prenatal counseling on breastfeeding rates among black urban low-income women in the United States of America. In their study, three groups were created, the first group received group counseling on breastfeeding myths, problems and benefits as part of their prenatal routine. The second group had individual counseling sessions with a pediatrician or a nurse practitioner with similar counseling topics as the first group and lastly the third group received routine prenatal care with no added counseling sessions. Women in the individual and group counseling classes showed significant high rates of breastfeeding as compared to the control subjects. Reasoning from their study suggests that more emphasis need to be placed on the content of antenatal care sessions and not just the timing of and frequency of attendance.

Complementing the work of Kristin et al (1990), a review exploring the interventions for promoting the initiation of breastfeeding in seven trials involving 1,388 women identified breastfeeding education as a significant predictor in increasing initiation rates as compared to routine care (Dyson et al, 2005). Another study exploring newborn care practices and factors associated with these in rural Uttar Pradesh in India found that breastfeeding counseling and the access to skilled birth attendants were significantly associated with the early initiation of breastfeeding (Baqui et al, 2007). In Ghana, prenatal lactation counseling produced a 90% exclusive breastfeeding rate at six months postpartum (Aidam et al, 2005).

Although there is a need for more studies with the power to evaluate the effectiveness of breastfeeding education, reports from a Cochrane review of over 30 studies imply that any form of antenatal breastfeeding education, despite the strategy, has some important payoffs on initiation and duration rates with no exceptional significant difference between the methods in terms of implications on breastfeeding (Lumbiganon et al, 2012). Moreover, a

randomized controlled trial addressing the impact of simple antenatal educational interventions on breastfeeding practice in the National University Hospital, Singapore concluded that simple antenatal education and counseling could significantly improve breastfeeding practices up to three months after delivery. Significant odds ratios on exclusive breastfeeding and predominant breastfeeding (with water) were obtained when comparing mothers who received both educational material and counseling at three months (OR 2.6, 95% CI 1.2-5.4) postpartum with mothers who received routine antenatal care only. Authors further suggested that health care workers should have at least one face to face counseling session on breastfeeding with expectant mothers before their delivery (Mattar et al, 2007).

Nevertheless there was a study from India that found no significant difference between a “counseled group” and a “not counseled group” with respect to correct breastfeeding technique and breastfeeding when babies are ill (Dhandapany et al, 2008).

2.3. Components of institutional delivery

The time of labor and the first 24 hours after delivery are critical times for both mothers and infants and require the presence of skilled professionals. The World Health Organization’s “Making Pregnancy Safer Initiative” is aimed at strengthening maternal health services to improve maternal and infant health and survival and thus the need for skilled health care at birth is central to this initiative (WHO, 2004). According to A Joint WHO/UNFPA/UNICEF/World Bank Statement on Reduction of Maternal Mortality (1999) “The term ‘skilled attendant’ refers exclusively to people with midwifery skills (for example midwives, doctors and nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage or refer obstetric complications”. In many African regions, inadequate number of health care providers is an outstanding challenge for many countries in ensuring that all women have access to professional health care skills at birth (WHO, 2004). Delivery in a health facility offers the opportunity for skilled assistance and immediate emergency obstetric care when needed. Furthermore, interventions such as early breastfeeding initiation and breastfeeding

counseling can be immediately implemented in the setting of a health institution (Chandramohan et al, 2013).

2.3.1. Determinants of institutional delivery

A number of studies have identified some factors that seriously constrain and determine the access of women to institutional delivery service. The most common predictor is identified to be antenatal care visits. A cross-sectional study investigating the factors associated with institutional delivery in the Bahir Dar city administration reported higher educational attainment (OR 4.7, 95% CI 1.3-16.7 primary and OR 3.5, 95% CI 1.1-10.7 secondary education) and first antenatal care visit in the first three months of gestation (OR 5.3, 95% CI 1.3-22.2) as independent factors associated with maternal institutional delivery utilization (Abeje et al, 2014). An unmatched case control study in Western Ethiopia identified education, place of residence and attendance of four or more antenatal care visits as important predictors of institutional delivery (Feyissa and Genemo, 2014). In rural India, further emphasizes on the role of antenatal care as one of the strongest predictors of institutional deliveries was demonstrated. Logistic regression analysis reports indicated increased odds of having an institutional delivery when a mother has received an antenatal visit independent of her socio-economic and demographic characteristic and her access to health services (Sugathan et al, 2001).

2.3.2. Institutional delivery and infant feeding practices

Fewer studies have examined the impact of place of delivery on the growth and nutritional status of growing infants. One study by Mehnaz et al (2010) investigated the significance of place of delivery on the health status and feeding practices of children. The study compared morbidity and prevalence of exclusive breastfeeding in infants with home and institutional deliveries. The authors reported in their study that despite the place of residence, home delivers were associated with low rates of exclusive breastfeeding as compared to institutional deliveries. Additionally, higher percentages of repetitive diarrhea, respiratory tract and ear infections were reported among home delivered infants. In Ethiopia, where the prevalence of prelacteal feeding is high, a cross-sectional study in the Raya Kobo District

found that mothers who delivered at home (OR 7.10, 95% CI 3.91 – 12.98) were seven times more likely to offer prelacteal feeds compared to those who had institutional deliveries (Legesse et al, 2014). Additionally, a similar phenomenon was found in Bangladesh when women with clinic deliveries showed lower odds of prelacteal feeding compared to home deliveries after adjusting for socio-demographic variables (Sundaram et al, 2013).

2.4. Components of breastfeeding initiation

An evidence based review of the 1989 WHO/UNICEF joint statement on the “Ten Successful Steps towards Breastfeeding” brought rise to the recommendation of early breastfeeding initiation (WHO, 1998). The benefits of early breastfeeding initiation have been well documented and studies indicate direct associations between early breastfeeding initiation and neonatal mortality and morbidity outcomes (Debes et al, 2013). According to the American Association of pediatrics, children are born with a suckling instinct which is strongest immediately after birth and are thus able to smell and reach out for the first milk secreted by the mammary glands called colostrum (Meek and Yu, 2011). Based on this rationale, the World Health Organization recommends “early breastfeeding initiation” which is defined as the provision of breast milk within one hour after birth to ensure the consumption of colostrum with all its nutritive and protective characteristics (WHO, 2014). A number of interventions have proven successful in ensuring breastfeeding initiation within the first hour of life. According to a Cochrane review of thirty four randomized controlled trials with 2177 participants, skin to skin contact between mother and baby at birth helps to reduce crying and aids the mother to breastfeed successfully (Moore et al, 2012). Allowing mothers and their babies to remain in the same space (rooming in) after delivery has additionally been shown to boost breastfeeding initiation rates (Tavoulari et al, 2015; Jaafar et al, 2012).

2.4.1. Determinants of early breastfeeding initiation

A number of studies have addressed the determinants and factors associated with early initiation of breastfeeding. Reports from Nigeria, Uganda, Germany and Scotland all

declare maternal higher educational attainment and institutional delivery as important predictors of early breastfeeding initiation alongside factors such as place of residence and antenatal care visits with caesarean delivery having the strongest negative association (Ogunlesi, 2010; Bbaale, 2014; Skafida, 2009; Kohlhuber et al, 2008; Esteves et al, 2014). Culture, religion and traditions are still important aspects of human societies and they play a key role in the adoption of life saving interventions and have been affirmed by studies. Sutan and Berkat (2014), in an unmatched case control study conducted in the Aceh Province of Indonesia investigated the association of cultural practices on neonatal survival and infant care practices. Inappropriate antenatal care (OR 2.29, 95% CI 1.34-3.91), late breastfeeding initiation (OR 2.03, 95% CI: 1.09-3.80), and discarding of colostrum (OR 3.53, 95% CI 1.93-6.43) were associated with various cultural practices in the regions (Sutan and Berkat, 2014).

Furthermore, interesting findings from a study conducted among Karen refugees on the Thai-Mayanmar border further supports the key role culture, beliefs and traditions play in health interventions such as breastfeeding. Women from this area reported strong convictions to breastfeed soon after their deliveries despite the possibility of skin-to-skin contact and they strongly believed that breastfeeding enhances infant survival and offers some benefits for the mother as well. Focused group discussions further revealed that influence from their cultural background and beliefs encouraged their improved acceptance of breastfeeding strategies. Mothers also expressed desire to breastfeed all their children for at least a year and those with older children related their experiences of breastfeeding for more than one year (White et al, 2012). According to Baqui et al (2007), various factors were significantly associated with early breastfeeding initiation such as maternal primary (OR 1.9, 95% CI 1.5-2.3) and secondary or higher educational attainment (OR 2.6, 95% CI 2.1-3.3), muslim religious affiliation (OR 1.8, 95% CI 1.5-2.2), antenatal breastfeeding counseling (OR 1.5, 95% CI 1.1-1.9) and presence of a skilled birth attendant (OR 1.8, 95% CI 1.4-2.2).

2.4.2. Benefits of early breastfeeding initiation

The benefits of early breastfeeding initiation on neonatal and infant mortality are clear and substantial. To illustrate, breastfeeding initiation was strongly recommended in a review as a key intervention in reducing neonatal mortality (Bhutta et al, 2010). In Ghana a study conducted further conceded that delayed breastfeeding initiation increases the risk of neonatal mortality. Overall study reports indicated a 2.4 fold increase in the risk of neonatal death with late initiation of breastfeeding (after one hour) and the magnitude of the risk remained similar even after excluding infants with abnormalities and various morbidities at the time of the study. Moreover, initiation of breastfeeding after 24 hours compared with earlier was associated with three-fold increase in mortality risk in neonates aged 2 to 28 days. (OR 3.23, 95% CI 1.07-9.82) (Edmond et al, 2008).

Additionally, a review assessing the association between timing of breastfeeding initiation and infant mortality outcomes demonstrated the importance of early initiation. A combined estimate of association indicated a protective association between early initiation of breastfeeding and all-cause neonatal mortality (RR 0.56, 95% CI 0.40-0.79) with a lower risk of death. Risks due to infection related mortality such as sepsis and septicemia produced similar magnitudes with the exception of deaths due to premature related issues and birth-asphyxia. With reference to morbidity related deaths, varying specifications of morbidity in various studies posed a challenge in pooling estimates. Nevertheless, some studies were identified that proposed a protective effect of early initiation of breastfeeding on morbidities such as diarrhea, hypothermia and weight loss (Debes et al, 2013).

2.5. Prelacteal feeding and exclusive breastfeeding

The World Health Organization recommends the exclusive breastfeeding of infants for six months without giving any food or drink not even water (WHO, 2014). Despite such evidence based guidelines, the practice of prelacteal feeding still persist in many areas in Africa and Asia. Prelacteal feeds are foods offered to newborns usually in the first few days before breastfeeding is established (Laroia and Sharma, 2006; Patel et al, 2013). As stated in the Ghana Demographic and Health survey report, Prelacteal feeds offered in various

regions of Ghana include other forms of milk, glucose solution, salt solution, fruit juice, infant formula, honey, and tea among many other infusions (GSS, 2009). The element of religion plays a key role in the adoption of prelacteal feeding and such foods may be administered in the context of a ritual (McKenna and Shankar, 2009). Insufficient milk supply and the strong belief that such foods are a necessary substitute for colostrum which should be discarded are also frequently given reasons (Al-Jassir, 2006; Akuse, 2002). Moreover, the needs to prevent the “evil eye” and to “clean the child’s stomach” were some reasons identified in Ethiopia (Legesse et al, 2014).

2.5.1. Determinants of prelacteal feeding

Insight into why people administer prelacteal feeds has been elaborated by some studies. For instance, among a number of hospital delivered infants in India, a study by Petal et al (2013) observed factors that were significantly associated with higher rates of prelacteal feeding. According to adjusted odds ratio reports, lower maternal education (OR 2.13, 95% CI 1.06-4.35), Muslim religion (OR 2.27, 95% CI 1.18-4.36) and cesarean delivery (OR 2.56, 95% CI 1.56-4.19) were strongly associated. A significant association between delayed breastfeeding initiation and prelacteal feeding was also reported in the study by Patel et al (2013). In the Maldives, a study on a cohort of 458 mothers showed cesarean delivery to be associated (OR 4.6, 95% CI 1.6-13.3) with prelacteal feeding of infants with formula in the first weeks of life (Rahem et al, 2014). Additionally, a study from Bangladesh investigating prelacteal feeding habits found maternal higher education, maternal age, prim gravidity and maternal socioeconomic status to have significant associations with prelacteal feeding in the first three days of life. Out of the 24,992 participants in the study 89.2% gave prelacteal feeds in the firsts three days of life, 70.6 % of those who did not offer early neonatal feeds reported exclusive breastfeeding their infants between 3days and 3months postpartum while 18.8% of infants that were given prelacteal feeds exclusively breastfed up to three months postpartum (Sundaram et al, 2013).

2.6. Continued breastfeeding and complementary feeding

WHO guiding principles for the complementary feeding of the breastfed child recommends continued, frequent and on-demand breastfeeding until 2 years of age and beyond (WHO, 2013) Breast milk with its high fat content compared with other complementary foods is a vital source of fatty acids and energy and can aid in the utilization of Pro-vitamin A carotenoids in growing infants. Moreover, during episodes of anorexia as a result of morbidity breast milk can be a good source of nutrients (Dewey et al, 2001).

2.6.1. Determinants and benefits of continued breastfeeding

Maternal age, smoking status and education were reported as important predictors of breastfeeding at 6 and 12 months (Merewood et al, 2007; Lande et al, 2004). Exclusive breastfeeding in the first few months, intention of the mother to breastfeed and sufficient duration of maternity leave were reported as factors that enhance long-term breastfeeding (Camurdan et al, 2008). One Chinese study by Liu et al, (2013) reported breastfeeding duration at various intervals among 681 participants, with high breastfeeding at initiation (95.9%) and decreased considerably at 6 months (69.6%), 12 months (29.7%) and 24 months (2.3%). Young maternal age, prelacteal feeding and employment were found to be the factors responsible for the reduction in breastfeeding (Liu et al, 2013). In the United States of America, two studies determined that women who practiced many baby friendly initiatives such as exclusive breastfeeding, early initiation among others were less likely to terminate breastfeeding before six weeks after birth (DiGirolamo et al, 2008, DiGirolamo et al, 2001). According to the requirements of the “baby friendly initiative”, health workers should use antenatal care sessions as a platform to educate and demonstrate to expectant mothers how to feed infants. Mothers can therefore receive information that may encourage breastfeeding in the short and long term.

In Crete Greece, 540 mother-child pairs were included in a study to determine the association between breastfeeding duration and improved cognitive, language and motor development using the third edition of the Bayley scales of infant toddler development. After adjusting for potential covariates, positive associations were reported on the scales of cognitive development, fine motor development, receptive communication and expressive

communication for children who were breastfed longer than 6 months (Leventakou et al, 2015). Supplementary information from a review showed the long term effects of breastfeeding by stating a strong evidence of a causal effect of breastfeeding on intelligence quotient (IQ) (WHO, 2013). Moreover, predominant breastfeeding for six months or longer has been shown to produce higher academic scores among ten year old children (Oddy et al, 2011).

2.7. Cesarean delivery and breastfeeding practices

Moore and de Costa (2003), in their book, defined a cesarean delivery as “a surgical birth in which the baby is removed from the mother through an incision in the mother’s abdomen and uterus”. An emergency cesarean delivery also known as a non-elective cesarean delivery is an urgent procedure done for unexpected reasons during pregnancy or labor to save the lives of both mother and baby. On the other hand, if specific known medical reasons are found, a planned or elective cesarean delivery is scheduled sometime near the baby’s due date before labor begins. Cesarean deliveries are performed for a number of well justified and evidence based reasons such as: failure to progress in labor, placenta previa, fetal distress, breech or transverse presentation, preventing HIV transmission among many others.

Evidence from a number of studies employing different epidemiological and statistical techniques clearly identifies the effects of cesarean delivery on breastfeeding initiation (Wang et al, 2006; Cakmak and Kuguolu, 2007; Rowe-Murray and Fisher, 2002; Prior et al, 2012). Among Mexican women, cesarean delivery was found to be a risk factor (OR 0.64, 95% CI 0.50- 0.82) for not initiating breastfeeding (Perez-Escamilla et al, 1996). Exploring implications of cesarean deliveries on continued breastfeeding have resulted in mixed outcomes. For instance, some studies in Taiwan and Brazil, reported lower odds of breastfeeding at 1 and 3 months after a cesarean delivery (Chien and Tai, 2007; Weiderpas et al, 1998) while others identified no relationship between type of delivery and breastfeeding duration (Kearney et al, 1990).

Despite the known implications and interferences of cesarean delivery on important infant feeding practices, there are still a number of actions that can be taken to minimize losses. Early skin-to-skin contact is one of such actions which could be done immediately in the operating room where possible or as soon as the mother is well enough to receive her baby. Not only does this intervention foster numerous benefits but most importantly it renders an overall positive effect on breastfeeding (Hung and Berg, 2011).

2.8. Conclusion of literature review

Sections highlighted in this review have focused on determinants and associations of maternal health care utilization on infant feeding practices with a review of evidence from previous studies. Although most of these studies vary in terms of research design, sample size, representativeness and overall context, they have displayed the relations between infant feeding practices and components of maternal health care utilization. Additionally, a variety of socio-demographic factors such as culture, religion and education have been shown to have implications for behavior change and adoption of life saving interventions. These associations, seen from different studies, indicate the need for combined improvement in all aspects of maternal health care utilization in order to achieve desired results. Moreover, gaps in research related to this study area specifically the quality of care still need to be investigated to ascertain a deeper understanding of the impact of components of maternal health care utilization.

3. STUDY AIMS

3.1. Overall Aim of the study

This study aimed to determine the association between components of maternal health care utilization and infant feeding practices such as breastfeeding initiation, prelacteal feeding and continued breastfeeding.

3.2. Specific Objectives of the study

- To determine the association between maternal health utilization and breastfeeding initiation.
- To study the association between maternal health utilization and prelacteal feeding.
- To explore the association between maternal health utilization and continued breastfeeding beyond six months.

3.3. Research hypothesis

- Adequate maternal health care utilization is associated with appropriate infant feeding practices.

4. MATERIALS AND METHODS

4.1. Data source

This study employed data from the Ghana Demographic and Health Survey (GDHS) 2008 which was carried out as the fifth round in a series of national level population and health surveys. It is a nationally representative cross-sectional data. Data collection took place over a 3-month period from early September to late November 2008. The survey was implemented in Ghana by the GSS (Ghana Statistical Service) and the GHS (Ghana Health Service). ICF international company provided technical support and organizations such as USAID (United States Agency for International Development), UNICEF (United Nations Children's Fund), GAC (Ghana Aids Commission), DANIDA (Danish International Development Agency), and UNFPA (United Nations Population Fund) as well as the government of Ghana provided funding.

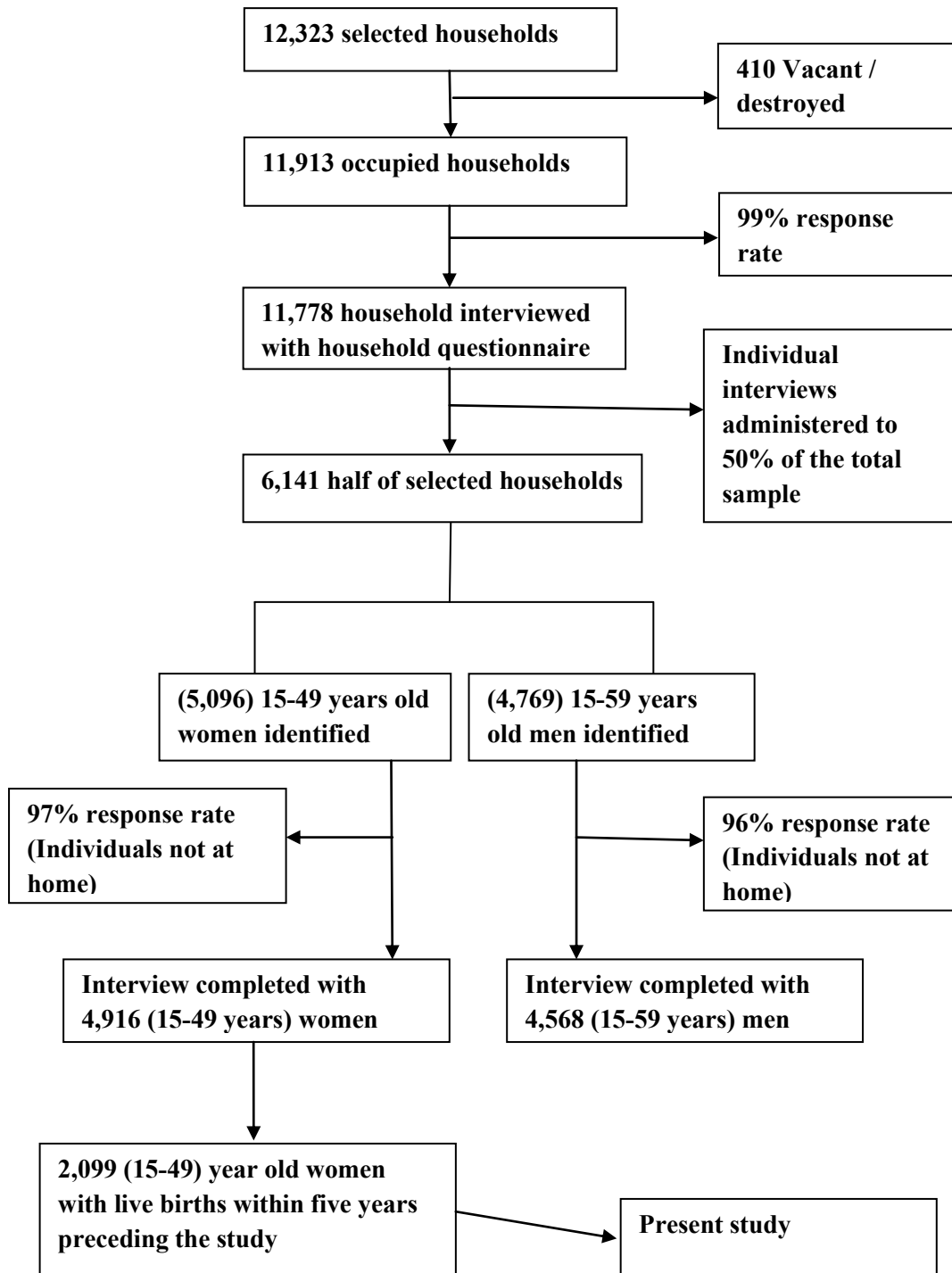
4.2. Study design and study subjects

The 2008 GDHS utilized a two-stage sample design. The initial stage involved selecting clusters from an updated master sampling frame constructed from the 2000 Ghana population and housing census. Using systematic sampling and probability proportional to size, a total of 412 clusters were selected from the master sampling frame. A complete household listing was conducted in all the selected clusters to provide a sampling frame for the second stage selection of households.

The second stage selection entailed the systematic sampling of 30 of the initial households listed in each cluster. This stage was performed to ensure adequate numbers of completed individual interviews to provide estimates for key indicators with acceptable precision. One of the selected clusters was exempted from data collection due to security reasons, resulting in a final sample of 12,323 households. 11,778 households were interviewed with the household questionnaire. In half of the household selected for the survey (6,141) eligible women age 15-49 and men age 15-59 years were interviewed with the Women's and Men's Questionnaires respectively. Overall 4,916 women and 4,568 men were interviewed. This

study is restricted to 2,099 women 15- 49 year old who gave live births within five years preceding the survey.

Fig 2: Selection of study subjects



4.3. Procedures of data collection

Three questionnaires were utilized in the 2008 GDHS: the household questionnaire, the Women's questionnaire and the Men's questionnaire. Original Demographic Health Survey (DHS) questionnaires were modified to reflect information on population, family planning and other health issues in Ghana. All three questionnaires were translated into three major Ghanaian languages: Akan, Ga and Ewe.

The Household questionnaire was employed to identify a list of all the usual members and visitors in selected households and to find women and men eligible for individual interviews. This questionnaire aided in collecting demographic information and household dwelling unit characteristics on study participants.

The Women's questionnaire was used to collect information from women about themselves and their children born in five years preceding the study (2003). Topics such as education, residential history, media exposure, reproductive history, knowledge and use of family planning methods, fertility preferences, antenatal and delivery care, breastfeeding and infant and young child feeding practices, vaccinations and childhood illnesses, marriage and sexual activity, woman's work and husband's background characteristics, childhood mortality, awareness and behavior about AIDS and other sexually transmitted infections (STIs), awareness of TB (Tuberculosis) and other health issues, and domestic violence were discussed. The Men's questionnaire provided information similar to the information derived from the women's questionnaire with the exception of reproductive history and questions related to maternal health and nutrition.

Fieldwork was carried out by 23 teams composed of a supervisor, an editor, two female interviewers, two male interviewers and a driver. Team members were selected on the basis of training, fluency in the Ghanaian languages and an assessment test. The entire data collection process was supervised and coordinated by senior staff from GSS.

Weights were calculated considering cluster, household and individual non-responses, so the representations were not distorted.

Ethical approval to conduct the survey was obtained from the Ghana Health Service Ethical Review Committee and permission to use the GDHS data was obtained from Measure DHS international.

4.4. Measurement of variables

Four variables related to maternal health care utilization were used as major determinants in this study:

1. Timing of antenatal care visit

This was derived from the question. “How many months pregnant were you when you first received antenatal care for this pregnancy? In this study, this variable was categorized as “Early” when it occurred during the first trimester (0-3 months) and “late” when the visit happened after four months during the second or third trimester. The “No care” group is also represented in this variable.

2. Number of antenatal visits

This was assessed from the question “How many times did you receive antenatal care during this pregnancy” for the purpose of this study this variable was categorized into 0-3, 4-6 and 7 plus visits. The first category 0-3 visits include no visits, one, two and three visits.

3. Place of delivery

This was determined by asking mothers where they gave birth. Home delivery; public sector: government hospital, government health post, other public sector; private sector: private hospital or clinic, family planning clinic, maternity home and other place of delivery were the options available for participants to choose from. In this study, two categories of the variable place of delivery were used. Institutional delivery entailed both public and private health facilities and non-institutional delivery included home and all other facilities.

4. Mode of delivery

The question “was (NAME) delivered by caesarean section?” was used to ascertain the mode of delivery and it was categorized into “Yes” and “No caesarean”

4.4.1. Outcome variables

1. Breastfeeding initiation

Mothers were asked “How long after birth did you put (NAME) to the breast?” In this study, the variable was categorized into “ ≤ 1 hour” and “ > 1 hour” after birth. The rationale for the categorization of this variable is according to WHO recommendations which states that mothers should initiate breastfeeding within one hour after birth (WHO, 2013; Debes et al, 2013). Early initiation of breastfeeding which is the provision of breast milk to infants within one hour after birth ensures that infants receive protective factors found in the first milk called colostrum.

2. Prelacteal feeding

To explore this variable, study participants were asked the following question: in the first three days after delivery was CHILD given anything to drink other than breast milk? In this study it was categorized as “Yes” given something and “No” given nothing.

3. Continued breastfeeding

This was categorized in this study as ≤ 6 months and > 6 months. The category ≤ 6 months covers information on no breastfeeding and all forms of breastfeeding for six months and below. Mothers were asked how many months they breastfed and the responses were recorded in months. The WHO recommendations provide grounds for the categorization of this variable. It highlights that mothers should continue breastfeeding after six months for up to two years and beyond while infants receive nutritionally adequate and safe complementary foods (WHO, 2013).

4.4.2. Socio-demographic variables

A review of a number of studies that examined factors that influence maternal health care utilization informed the selection of the above mentioned socio-demographic variables as covariates in this study.

The socio demographic variables considered in the study include age (15-24, 25-34 and 35-49 years), place of residence (urban and rural), Mother and partner's educational attainments (None, primary and secondary or higher), parity (one, two, three, four or more), religion (Christian, Muslim, African traditional and other), wealth index (poorest, poorer, middle, richer, richest) and marital status (never married, currently married and formerly married). To explore information in wealth, the wealth quintile index was developed. Information on household dwelling characteristics such as source of drinking water, sanitation and type of flooring material was collected. Additionally, data on household ownership of items such as a television set and a car or bicycle was also collected. With the aid of principal component analysis, a factor score was produced for each asset of each household and the resulting scores were summed up and ranked for each household. The sample was then divided into quintiles from the lowest (poorest) to the highest (richest).

4.5. Statistical analysis

The SPSS statistical software package version 20 was used for analysis. First of all the frequencies and percentages of all studied variables were reported. Pearson chi-square test was applied to study the relationship between predictor variables and study outcomes with statistical significance defined as a two-sided p-value and level of significance <0.05 . To assess the association between components of maternal health care utilization and outcomes, logistic regression analysis was used. Bivariate and multivariate models were fitted and three logistic regression models were generated. Model I was a bivariate analysis of predictor variables against breastfeeding initiation, prelacteal feeding and continued breastfeeding. In Model II all demographic and predictor variables were simultaneously adjusted in relation to the outcomes. In addition to all variables adjusted for in Model II, two outcome variables were adjusted for in Model III in relation to the exempted outcome variable. For all three Models, the resulting odds ratios (OR) and 95% confidence intervals (CI) were recorded.

The application of weighting in this study was done In SPSS (Statistical package for the social sciences) by using the weight command with the weight variable. In this study

sample weights was applied for descriptive statistical results and the sample weights was off for logistic regression analysis.

5. RESULTS

5.1. Socio-demographic characteristics of study participants

The distribution of socio-demographic characteristics of study participants is shown in table 1. Majority of women were within the age group of 25 to 34 years while the age group of 35 and above had 29% of the women. More than half of the study participants reside in the rural areas of Ghana. Parity status indicates that most women had 4 or more children with 22.3% of women being primiparous. Additionally, secondary or higher educational attainment constituted 44.8% while on the other hand, women with no education formed a third (30.8%) of the study population. More than two-third (71.7%) of the women in the study population belonged to various Christian religions, while 18% were affiliated to the Muslim religion. According to the Wealth Quintiles Index in the demographic and health survey data, the poorest wealth quintile had the most study participants and vice versa for the richest wealth quintile.

The mean number of months of breastfeeding was 16.9 months, indicating a year and five months. Also the mean number of ANC visits was 7.8. On average the timing (In months) of the first ANC visit was 3.83 months.

Table 1: Frequency and percentage of socio-demographic characteristics among Ghanaian women

Characteristics	Number	Percentage
Age (N=2099)		
15-24 years	505	24.0
25-34 years	982	46.8
35-49 years	612	29.1
Place of residence (N=2099)		
Urban	844	40.2
Rural	1255	59.8
Parity (N=2098)		
1	467	22.3
2	436	20.8
3	349	16.6
4 or more	846	40.3
Marital status (N=2099)		
Not married	262	12.5
Currently married	1837	87.5
Woman's Education (N=2099)		
No education	647	30.8
Primary	511	24.1
Secondary or higher	941	44.8
Religion (N=2098)		
Christian	1504	71.7
Muslim	378	18.0
African traditional	126	6.0
Other	90	4.3
Wealth Index (N=2099)		
Poorest	480	22.9
Poorer	461	22.0
Middle	400	19.1
Richer	436	20.8
Richest	322	15.3
Partner's education (N=1878)		
No education	483	25.7
Primary	159	8.5
Secondary or higher	1236	65.8

5.2. Antenatal care utilization

Although not all, majority of women received some form of antenatal care as shown in table 2. Timing of first antenatal care visit and number of antenatal care visits were used to ascertain antenatal care utilization. Only few (3.5%) women reported not receiving any form of antenatal care while 55.3% and 41.2% received their first antenatal care visits in the first three months (1st trimester) and after the first three months respectively. Considering the number of antenatal care visits, more women (43.9%) had 4 to 6 antenatal care visits according to WHO standards.

5.3. Place and mode of delivery

More than half (60.2%) of study participants delivered their babies in some form of private or government health facility. However, non-institutional delivery represented a significant percentage (39.8%). Only 7.2% of women had a cesarean section delivery while 92.8% had a normal vaginal delivery.

Table 2: Frequency and percentage of components of maternal health care utilization among Ghanaian women

Characteristics	Number	Percentage
Place of delivery (N=2098)		
Non institutional	835	39.8
Institutional	1263	60.2
Mode of Delivery (N=2097)		
No caesarean	1947	92.8
Yes caesarean	150	7.2
Timing of antenatal care visit (N=2086)		
No visit	72	3.5
Early (first 3 months/1 st trimester)	1154	55.3
Late	860	41.2
Number of antenatal visits (N=2050)		
0-3 visits	410	20
4-6 visits	900	43.9
7+ visits	740	36.1

5.4. Infant feeding practices

5.4.1. Breastfeeding initiation

Table 3 highlights the distribution of infant feeding practices. A little over half of women (52.5%) initiated breastfeeding within an hour after birth. As shown in table 4, place of residence was significantly associated with breastfeeding initiation within an hour of birth ($P=0.020$) with almost 58% of women of rural residence having initiated breastfeeding within 1 hour of after delivery. Moreover, religion ($P<0.001$) and Wealth Index ($P=0.004$) were found to have similar associations with breastfeeding initiation within an hour after birth. Participants place of delivery ($P<0.001$) and mode of delivery ($P<0.001$) also showed strong statistically significant associations with early breastfeeding initiation.

5.4.2. Prelacteal feeding

According to table 3 the practice of prelacteal feeding is rather uncommon in Ghana. Only 18.1% of participants gave prelacteal foods to their infants in the first three days after birth. Table 4 indicates that women's religious affiliations had significant associations ($P<0.001$) with prelacteal feeding as most of those who practiced prelacteal feeding were from Christian religion (75%). Additionally, the following showed similar significant associations with prelacteal feeding: place of delivery ($P<0.001$), timing of first antenatal care visit ($P<0.003$) and number of antenatal care visits ($P<0.035$). Women who exercised prelacteal feeding were mostly those who started prenatal care visit early (55%) and who had 4-6 ANC visits (40%).

5.4.3. Continued breastfeeding

Breastfeeding beyond six months seems to be a common practice among Ghanaian women with 77.7% of women responding positively to continued breastfeeding as shown in table 3. The results from table 4 show that there was a significant difference ($P<0.004$) between women's age and breastfeeding beyond 6 months. Almost half of the women who breastfeed beyond 6 months were of the age group 25-34 years.

Table 3: Frequency and percentage of infant feeding practices among Ghanaian women

Outcome Variables	Number	Percentage
Breast feeding initiation (N=2053)		
≤1 Hour	1078	52.5
>1 Hour	975	47.5
Prelacteal Feeding (N=2054)		
No	1682	81.9
Yes	372	18.1
Continued breastfeeding (N=2092)		
≤ 6months	466	22.3
>6 months	1626	77.7

Table 4: Association between socio-demographic characteristics and components of maternal health care utilization and infant feeding practices

Variables	Breastfeeding initiation (≤1 hour) N= 1078 (%)	<i>P</i> -value [†]	Prelacteal Feeding (Yes) N= 372 (%)	<i>P</i> -value [†]	Continued Breastfeeding (>6 months) N= 1626 (%)	<i>P</i> -value [†]
Age		0.313		0.795		0.004
15-24 years	266 (24.7)		94 (25.3)		367 (22.6)	
25-34 years	518 (48.1)		168 (45.3)		765 (47.1)	
35-49 years	294 (27.3)		109 (29.4)		493 (30.3)	
Place of residence		0.020		0.636		0.677
Urban	458 (42.5)		145 (39.0)		649 (39.9)	
Rural	620 (57.5)		227 (61.0)		977 (60.1)	
Parity		0.360		0.848		0.852
1	244 (22.6)		84 (22.5)		366 (22.5)	
2	230 (21.3)		73 (19.6)		332 (20.4)	
3	192 (17.8)		67 (18.0)		275 (16.9)	
4 or more	412 (38.2)		149 (39.9)		654 (40.2)	
Marital status		0.671		0.060		0.498
Not married	137 (12.7)		57 (15.3)		207 (12.7)	

Currently married	941 (87.3)		315 (84.7)		1418 (87.3)	
Woman's Education		0.647		0.147		0.331
No education	324 (30.1)		100 (26.9)		501 (30.8)	
Primary	265 (24.6)		99 (26.6)		384 (23.6)	
Secondary or higher	489 (45.4)		173 (46.5)		741 (45.6)	
Religion		0.001		0.001		0.182
Other	39(3.6)		20 (5.4)		64 (3.9)	
Muslim	197 (18.3)		39 (10.5)		282 (17.4)	
African traditional	44 (4.1)		32 (8.6)		102 (6.3)	
Christian	797(74.0)		280 (75.5)		1176 (72.4)	
Wealth Index		0.004		0.112		0.503
Poorest	243 (22.5)		87 (23.3)		373 (22.9)	
Poorer	206 (19.1)		80 (21.4)		368 (22.6)	
Middle	207 (19.2)		86 (23.1)		314 (19.3)	
Richer	243 (22.5)		62 (16.6)		331 (20.4)	
Richest	179 (16.6)		58 (15.5)		240 (14.8)	
Partner's education		0.580		0.292		0.318
No education	247 (25.6)		81 (24.3)		365 (25.0)	
Primary	75 (7.8)		22 (6.6)		121 (8.3)	
Secondary or higher	644 (66.7)		230 (69.1)		974 (66.7)	
Place of delivery		0.001		0.001		0.267
Non institutional	387 (35.9)		181 (48.5)		657 (40.4)	
Institutional	691 (64.1)		192 (51.5)		969 (59.6)	
Mode of Delivery		0.001		0.007		0.344
No caesarean	1050(97.4)		335 (89.8)		1514 (93.1)	
Yes caesarean	28 (2.6)		38 (10.2)		112 (6.9)	
Timing of antenatal care visit		0.453		0.003		0.103
No visit	33 (3.1)		24 (6.5)		57 (3.5)	
Late	435 (40.5)		143 (38.5)		646 (39.9)	
Early	606 (56.4)		204 (55.0)		915 (56.6)	
Number of antenatal visits		0.063		0.035		0.104
0-3 visits	118(17.8)		89 (24.7)		303 (19.0)	
4-6 visits	473 (44.8)		146 (40.6)		703 (44.3)	
7+ visits	395 (37.4)		125 (34.7)		582 (36.7)	

† The bold figure represents statistically significant values (<0.05)

5.5. Maternal health care utilization and infant feeding practices

5.5.1. Maternal health care utilization and breastfeeding initiation

Table 5 shows the association of maternal health care utilization with breastfeeding initiation. Model I presents the results of bivariate analysis. Compared to a normal vaginal delivery, a cesarean delivery was significantly associated with lower odds of initiating breastfeeding within an hour after birth (OR 0.19, 95% CI 0.13- 0.30). In the same vein, women with non-institutional delivery were less likely to initiate breastfeeding ≤ 1 hour after birth (OR 0.78, 95% CI 0.65 – 0.92). The timing of ANC and number of ANC visits were not significantly associated with breastfeeding initiation ≤ 1 hour after birth.

Association of maternal health care utilization with breastfeeding initiation was adjusted for socio-demographic variables in Model II of table 5. Non-institutional delivery (OR 0.74, 95% CI 0.58 – 0.93) as well as cesarean delivery (OR 0.16, 95% CI 0.10 – 0.25) were still significantly associated, with lower odds, of initiating breastfeeding within an hour after birth when controlled for all socio-demographic variables simultaneously. Among the socio-demographic factors, women with 2 parity status (compared to women with parity 1) were more likely to initiate breastfeeding ≤ 1 hour after birth (OR 1.44, 95% CI 1.04-1.99). Furthermore, women in the African traditional religion were less likely to initiate breastfeeding ≤ 1 hour after birth (OR 0.43, 95% CI 0.29 – 0.65). With respect to the wealth quintiles, women in the poorer (OR 0.50, 95% CI 0.33 – 0.77) and the middle (OR 0.65, 95% CI 0.43 – 0.97) wealth quintiles were also less likely to initiate breastfeeding with an hour after delivery.

Women who had non-institutional delivery and Cesarean delivery remained significantly associated (with lower odds) with breastfeeding initiation ≤ 1 hour after birth even after adding prelacteal feeding and continued breastfeeding together with all the socio-demographic variables in the final model (OR for non-institutional delivery 0.78, 95% CI 0.62-0.99, OR for Cesarean delivery 0.11, 95% CI 0.12-0.27). Compared to women who did not give prelacteal foods, those who gave prelacteal foods had lower odds of initiating breastfeeding within an hour of birth (OR 0.53, CI 95% 0.41 – 0.69).

Table 5: Odds ratios (OR) and their 95% confidence intervals (CI) for breastfeeding initiation ≤ 1 hour after birth due to various factors related to maternal health care utilization and adjusted for various socio-demographic factors

Characteristics	OR, 95% CI for Breastfeeding Initiation ≤ 1 hour after birth		
	Model I	Model II	Model III
Timing of antenatal care visit			
No visit	0.75 (0.48 – 1.18)	0.85 (0.50 – 1.45)	1.07 (0.61 – 1.87)
Late	0.94 (0.78 – 1.12)	1.03 (0.83 – 1.28)	1.02 (0.82 – 1.27)
Early (1 st trimester)	1.0	1.0	1.0
Number of antenatal visits			
0-3 visits	0.80 (0.62 – 1.01)	0.82 (0.58 – 1.14)	0.82 (0.59 – 1.16)
4-6 visits	1.10 (0.90 – 1.34)	1.10 (0.87 – 1.39)	1.09 (0.85 – 1.38)
7+ visits	1.0	1.0	1.0
Place of delivery			
Non institutional	0.78 (0.65 – 0.92)	0.74 (0.58 – 0.93)	0.78 (0.62 – 0.99)
Institutional	1.0	1.0	1.0
Mode of Delivery			
No caesarean	1.0	1.0	1.0
Caesarean	0.19 (0.13 – 0.30)	0.16 (0.10 – 0.25)	0.11 (0.12 – 0.27)
Socio-demographic variables			
Age			
15-24 years		1.0	1.0
25-34 years		1.01 (0.75 – 1.36)	1.0 (0.74 – 1.35)
35-49 years		0.84 (0.58 – 1.21)	0.84 (0.58 – 1.22)
Place of residence			
Urban		1.0	1.0
Rural		1.11 (0.81 – 1.47)	1.09 (0.82 – 1.44)
Parity			
1		1.0	1.0
2		1.44 (1.04 – 1.99)	1.40 (1.01 – 1.95)
3		1.28 (0.80 – 1.82)	1.28 (0.90 – 1.84)
4 or more		1.20 (0.83 – 1.73)	1.0 (0.83 – 1.73)
Marital status			
Not married		1.46 (0.95 – 2.24)	1.55 (1.0 – 2.39)
Currently married		1.0	1.0
Woman's Education			

No education	1.28 (0.95 – 1.73)	1.23 (0.91 – 1.67)
Primary	1.20 (0.91 – 1.57)	1.20 (0.91 – 1.57)
Secondary or higher	1.0	1.0
Religion		
Other	0.79 (0.51 – 1.23)	0.82 (0.53 – 1.28)
Muslim	0.87 (0.66 – 1.15)	0.83 (0.63 – 1.09)
African traditional	0.43 (0.29 – 0.65)	0.46 (0.30 – 0.70)
Christian	1.0	1.0
Wealth Index		
Poorest	0.77 (0.48 – 1.24)	0.76 (0.47 – 1.24)
Poorer	0.50 (0.33 – 0.77)	0.49 (0.32 – 0.76)
Middle	0.65 (0.43 – 0.97)	0.65 (0.44 – 0.98)
Richer	0.79 (0.55 – 1.15)	0.80 (0.54 – 1.14)
Richest	1.0	1.0
Partner's education		
No education	1.23 (0.91 – 1.63)	1.21 (0.91 – 1.63)
Primary	1.05 (0.73 – 1.53)	1.05 (0.72 – 1.52)
Secondary or higher	1.0	1.0
Prelacteal feeding		
No		1.0
Yes		0.53 (0.41 – 0.69)
Continued breastfeeding		
≤ 6 months		1.03 (0.81 – 1.30)
>6 months		1.0

Model I: Bivariate crude odds ratios

Model II: Simultaneously adjusted for age, place of residence, parity, marital status, woman's education, religion, wealth index, partner's education.

Model III: Simultaneously adjusted for all variables plus prelacteal feeding and continued breastfeeding

5.5.2. Maternal health care utilization and prelacteal feeding

Table 6 indicates the association of prelacteal feeding with maternal health care utilization related factors. Model I presents the results of bivariate analysis. A cesarean delivery was significantly associated with higher odds of offering prelacteal foods (OR 1.62, 95% CI 1.07 – 2.46). Women that had non-institutional delivery were more likely to give prelacteal foods as well (OR 1.70, 95% CI 1.35 – 2.13). Less than four ANC visits were significantly associated with prelacteal feeding (OR 1.45, 95% CI 1.06 – 1.96) in model I however, this association was lost after simultaneously adjusting for socio-demographic characteristics. There was no significant difference in the timing of ANC visits and prelacteal feeding.

Model II also shows that a non institutional delivery (OR 2.07, 95% CI 1.50 – 2.88) as well as cesarean delivery (OR 2.46, 95% CI 1.55 – 3.90) was still significantly associated with a higher likelihood of prelacteal feeding. Among the socio-demographic factors, unmarried women were more likely to offer prelacteal foods (OR 1.67, 95% CI 1.03 – 2.72). However, women affiliated to the Muslim religion had lower chances of prelacteal feeding (OR 0.50, 95% CI 0.32 – 0.77).

Women who had non-institutional delivery and cesarean delivery remained significantly associated (with higher odds) (OR for non institutional delivery 1.98, 95% CI 1.42-2.76, OR for Cesarean delivery 1.92, 95% CI 1.19-3.09) with prelacteal feeding even after adding breastfeeding initiation and continued breastfeeding together with all the socio-demographic variables in the final model. Compared to women that initiated breastfeeding early (within an hour after birth), those who initiated breastfeeding later had a higher probability of offering prelacteal foods (OR 1.92, 95% CI 0.57 – 1.11).

Table 6: Odds ratio (OR) and their 95% confidence intervals (CI) for prelacteal feeding within the first three days after birth due to various factors related to maternal health care utilization and adjusted for various socio-demographic factors

Characteristics	OR, 95% CI of Prelacteal feeding		
	Model I	Model II	Model III
Timing of antenatal care visit			
No visit	2.18 (1.32 – 3.61)	1.14 (0.60 – 2.17)	1.18 (0.62 – 2.25)
Late	1.01 (0.79 – 1.28)	0.87 (0.65 – 1.17)	0.88 (0.65 – 1.18)
Early (1 st trimester)	1.0	1.0	1.0
Number of antenatal visits			
0-3 visits	1.45 (1.06 – 1.96)	1.33 (0.86 – 2.07)	1.27 (0.81 – 1.98)
4-6 visits	0.89 (0.68 – 1.17)	0.90 (0.65 – 1.24)	0.90 (0.65 – 1.25)
7+ visits	1.0	1.0	1.0
Place of delivery			
Non institutional	1.70 (1.35 – 2.13)	2.07 (1.50 – 2.88)	1.98 (1.42 – 2.76)
Institutional	1.0	1.0	1.0
Mode of Delivery			
No caesarean	1.0	1.0	1.0
Caesarean	1.62 (1.07 – 2.46)	2.46 (1.55 – 3.90)	1.92 (1.19 – 3.09)
Socio-demographic variables			
Age			
15-24 years		1.0	1.0
25-34 years		0.90 (0.60 – 1.34)	0.87 (0.58 – 1.30)
35-49 years		1.06 (0.66 – 1.73)	0.98 (0.60 – 1.60)
Place of residence			
Urban		1.0	1.0
Rural		0.69 (0.47 – 1.0)	0.70(0.48 – 1.02)
Parity			
1		1.0	1.0
2		0.79 (0.51 – 1.22)	0.85 (0.55 – 1.31)
3		1.04 (0.65 – 1.66)	1.12 (0.68 – 1.76)
4 or more		1.01 (0.62 – 1.63)	1.07 (0.67 – 1.76)
Marital status			
Not married		1.67 (1.03 – 2.72)	1.76 (1.08 – 2.88)
Currently married		1.0	1.0
Woman's Education			
No education		0.71 (0.47 – 1.08)	0.73 (0.48 – 1.11)

Primary	1.03 (0.72 – 1.47)	1.06 (0.74 – 1.52)
Secondary or higher	1.0	1.0
Religion		
Other	1.45 (0.86 – 2.47)	1.44 (0.85 – 2.45)
Muslim	0.50 (0.32 – 0.77)	0.49 (0.32 – 0.77)
African traditional	1.47 (0.89 – 2.44)	1.35 (0.81 – 2.24)
Christian	1.0	1.0
Wealth Index		
Poorest	1.0 (0.54 – 1.86)	0.96 (0.51 – 1.80)
Poorer	0.88 (0.50 – 1.56)	0.78 (0.44 – 1.39)
Middle	1.15 (0.70 – 1.91)	1.09 (0.66 – 1.82)
Richer	0.80 (0.49 – 1.29)	0.77 (0.48 – 1.26)
Richest	1.0	1.0
Partner's education		
No education	0.81 (0.55 – 1.21)	0.83 (0.55 – 1.23)
Primary	0.80 (0.47 – 1.34)	0.80 (0.47 – 1.35)
Secondary or higher	1.0	1.0
Breastfeeding initiation		
>1 hour		1.92 (1.47 – 2.52)
≤1 hour		1.0
Continued breastfeeding		
≤ 6 months		0.80 (0.57 – 1.11)
>6 months		1.0

Model I: Bivariate crude odds ratios

Model II: Simultaneously adjusted for age, place of residence, parity, marital status, woman's education, religion, wealth index, partner's education.

Model III: Simultaneously adjusted for all variables plus breastfeeding initiation and continued breastfeeding.

5.5.3. Maternal health care utilization and continued breast feeding

The associations of continued breastfeeding with maternal health care utilization variables are shown in Table 7. Bivariate logistic regression analysis from model I shows that respondents who initiated antenatal care late after the first trimester had lower odds of breastfeeding beyond 6 months (OR 0.70, 95% CI 0.57 – 0.87). This association still remained significant in Model II (OR 0.76, 95% CI 0.59 – 0.98) after simultaneously adjusting for all socio-demographic characteristics and Model III (OR 0.77, 95% CI 0.59 – 0.99) when further adjustment was made for prelacteal feeding and breastfeeding initiation. Number of antenatal care visits, place of delivery and mode of delivery had no significant associations with breastfeeding beyond six months.

Among the socio-demographic variables, women of the age groups 25 to 34 (OR 1.85, 95% CI 1.31 – 2.61) and 35 to 49 (OR 2.66, 95% CI 1.72 – 4.12) had higher odds of breastfeeding beyond six months. A parity of 2 (OR 0.62, 95% CI 0.42 – 0.92), 3 (OR 0.57, 95% CI 0.37 – 0.88) and 4 (OR 0.47, 95% CI 0.30 – 0.74) was associated with a lower odds of breastfeeding beyond six months.

Table 7: Odds ratio (OR) and their 95% confidence intervals (CI) for continued breastfeeding due to various factors related to maternal health care utilization and adjusted for various socio-demographic factors

Characteristics	OR, 95% CI of Continued Breastfeeding (> 6 months)		
	Model I	Model II	Model III
Timing of antenatal care visit			
No visit	0.88 (0.52 – 1.52)	1.07 (0.55 – 2.07)	1.10 (0.55 – 2.21)
Late	0.70 (0.57 – 0.87)	0.76 (0.59 – 0.98)	0.77 (0.59 – 0.99)
Early (1 st trimester)	1.0	1.0	1.0
Number of antenatal visits			
0-3 visits	0.76 (0.58 – 1.00)	0.73 (0.50 – 1.07)	0.81 (0.55 – 1.21)
4-6 visits	0.94 (0.74 – 1.19)	0.93 (0.70 – 1.23)	0.99 (0.74 – 1.32)
7+ visits	1.0	1.0	1.0
Place of delivery			
Non institutional	1.16 (0.94 – 1.42)	1.27 (0.97 – 1.68)	1.17 (0.88 – 1.6)
Institutional	1.0	1.0	1.0
Mode of Delivery			
No caesarean	1.0	1.0	1.0
Caesarean	0.92 (0.62 – 1.38)	0.94 (0.60 – 1.48)	0.91 (0.61 – 1.62)
Socio-demographic variables			
Age			
15-24 years		1.0	1.0
25-34 years		1.67 (1.20 – 2.35)	1.85 (1.31 – 2.61)
35-49 years		2.24 (1.47 – 3.41)	2.66 (1.72 – 4.12)
Place of residence			
Urban		1.0	1.0
Rural		0.93 (0.67 – 1.27)	0.92 (0.66 – 1.28)
Parity			
1		1.0	1.0
2		0.69 (0.47 – 1.01)	0.62 (0.42 – 0.92)
3		0.63 (0.41 – 0.95)	0.57 (0.37 – 0.88)
4 or more		0.51 (0.33 – 0.78)	0.47 (0.30 – 0.74)
Marital status			
Not married		2.31 (1.24 – 4.30)	2.82 (1.39 – 5.70)
Currently married		1.0	1.0
Woman's Education			
No education		1.0 (0.71 – 1.41)	1.03 (0.72 – 1.47)

Primary	0.89 (0.65 – 1.21)	0.98 (0.70 – 1.34)
Secondary or higher	1.0	1.0
Religion		
Other	0.79 (0.48 – 1.30)	0.76 (0.46 – 1.28)
Muslim	0.79 (0.58 – 1.08)	0.80 (0.58 – 1.10)
African traditional	1.25 (0.76 – 2.07)	1.25 (0.74 – 2.12)
Christian	1.0	1.0
Wealth Index		
Poorest	1.77 (1.03 – 3.04)	1.67 (0.95 – 2.92)
Poorer	1.63 (1.01 – 2.66)	1.63 (0.97 – 2.71)
Middle	1.53 (0.98 – 2.39)	1.44 (0.90 – 2.29)
Richer	1.17 (0.78 – 1.74)	1.16 (0.76 – 1.77)
Richest	1.0	1.0
Partner's education		
No education	0.86 (0.62 – 1.21)	0.87 (0.62 – 1.23)
Primary	1.06 (0.70 – 1.62)	1.15 (0.74 – 1.80)
Secondary or higher	1.0	1.0
Breastfeeding initiation		
>1 hour		1.02 (0.81 – 1.30)
≤1 hour		1.0
Prelacteal feeding		
No		1.0
Yes		1.24 (0.89 – 1.74)

Model I: Bivariate crude odds ratios

Model II: Simultaneously adjusted for age, place of residence, parity, marital status, woman's education, religion, wealth index, partner's education.

Model III: Simultaneously adjusted for all variables plus breastfeeding initiation and prelacteal feeding.

6. DISCUSSION

In this study, 52.5% of women initiated breastfeeding within an hour after birth. Only few women (18.1%) offered prelacteal foods to their infants within three days after birth. Moreover, continued breastfeeding seems to be a widespread practice among Ghanaian women with 77.7% of women reporting breastfeeding beyond six months. Women who had a cesarean delivery and those who did not deliver in a health institution were more likely to offer prelacteal foods after birth. Additionally, mothers who had a cesarean delivery and a non-institutional delivery were less likely to initiate breastfeeding within an hour after birth. Women who attended antenatal care visits later (after the first trimester) were less likely to continue breastfeeding their infants beyond six months. Furthermore, various socio-demographic factors were also associated with infant feeding practices in this study. Women of the poor wealth quintiles and those in the African traditional religion had lower odds of initiating breastfeeding early. Muslim women were less likely to offer prelacteal foods. However, all unmarried women showed more probability of prelacteal feeding. Continued breastfeeding beyond six months was common among women above the age of 25 years and less common among women who had two or more children.

6.1. Maternal health care utilization and breastfeeding initiation

This study shows a strong positive association between delivery in a health institution and initiating breastfeeding within an hour after birth. These results complement a study that compared home and institutional deliveries and identified the latter to be linked with higher rates of exclusive breastfeeding and lower rates of diarrhea among other morbidities (Mehnaz et al, 2010). Moreover, a number of other studies have proved institutional delivery to be a crucial factor in the early adoption of breastfeeding (Ogunlesi, 2009; Bbaale, 2014; Skafida, 2009; Kohlhuber et al, 2008).

This study found no significant association between the timing of the first antenatal care visit and breastfeeding initiation within an hour after birth. Surprisingly, the number of antenatal care visits also showed no significant association with early breastfeeding initiation even after adjusting for all possible confounders. This study is supported by the

findings of many other earlier studies. Nielsen et al (1998) found that the number of antenatal visits was significantly associated with colostrum feeding and not breastfeeding initiation. In another study, adequate prenatal care was found to be associated with vaccination but not predictive of breastfeeding (Swignoski, 1995). It has also been reported that breastfeeding counseling rather than antenatal checkups is a predictor of early breastfeeding initiation. (Baqui et al, 2007). On the contrary, findings from a study in Nepal showed that more than three antenatal care visits were associated with higher odds of initiating breastfeeding within an hour after birth even after adjusting for socio-demographic characteristics (Neupane and Nawaru, 2014). Strict comparisons between these studies are somewhat difficult due to the varying ways employed to measure adequate antenatal care utilization. Studies that have examined adequacy of antenatal care with respect to content have shown that some form of breastfeeding counseling can have positive implications (Mattar et al, 2007; Dyson et al, 2005; Kristin et al, 1990). One such study from Ghana indicated a 90% exclusive breastfeeding initiation rate after antenatal care counseling was administered (Aidam et al, 2005). Therefore, a combination of frequency of visits and content of antenatal care counseling will help examine the actual payoffs of ANC utilization.

While antenatal care utilization may not have shown associations with breastfeeding initiation in this study, antenatal care utilization is known from previous research to be a vital determinant of institutional delivery. A study from Western Ethiopia identified the attendance of four or more antenatal care visits as an important predictor of institutional delivery (Feyissa and Genemo, 2014). Moreover, a study in rural India found increased odds of having an institutional delivery when a mother had received an antenatal care visit (Sugathan et al, 2001). Abeje et al (2014) also found that the first antenatal care visit in the first three months of gestation was an independent factor associated with maternal institutional delivery utilization. Reasoning from evidence highlighted above, antenatal care utilization could contribute to institutional care delivery which in turn relates into increased adoption of appropriate breastfeeding practices.

The results from this study completely support evidence of the association between cesarean delivery and the low probability of early breastfeeding initiation. A study among

Mexican women showed that cesarean delivery was a positive risk factor for not initiating breastfeeding (Perez-Escamilla et al, 1996). Further adding weight to these findings is a systematic review of about 48 studies with all indicating the association between cesarean delivery and low odds of early breastfeeding (Prior et al, 2012). Women with cesarean deliveries often need extra time to recover from the surgery before they are physically able to breastfeed their infants. In other instances, babies born via cesarean delivery may be lethargic due to prolonged exposure of mothers to anesthesia. Such infants will require extra time and encouragement to stay awake, latch on and begin sucking. In light of these findings and previous evidence, much more needs to be done especially in developing settings to fully adopt strategies that enhance breastfeeding after birth.

6.2. Maternal health care utilization and prelacteal feeding

The findings from this study indicate that cesarean delivery and non-institutional delivery are significantly associated with a higher likelihood of prelacteal feeding among Ghanaian women. This is in line with the results from a study in Bangladesh which showed that participants who had home deliveries compared to clinic deliveries were more likely to offer prelacteal foods in the first three days of life (Sundaram et al, 2013). Furthermore, Petal et al (2013) and Raheem et al (2014) both identified a cesarean delivery to be a significant risk factor for prelacteal feeding in the first weeks of life. Women who do not deliver in health institutions miss out on the professional support and encouragement needed to establish breastfeeding early especially after a cesarean delivery. After birth, labor and delivery teams usually help mothers to establish breastfeeding immediately and deal with painful complications such as engorgement that hinder appropriate feeding. In most health institutions in developing countries, the practice of separating cesarean delivered babies from their mothers to monitor them still persists and this is coupled with inadequate rooming facilities to keep mothers and babies in the same space. As a result, mothers are unable to breastfeed on demand and thus rely on prelacteal foods. Moreover, opportunities needed to initiate early breastfeeding such as skin to skin contact and rooming in are missed or delayed.

Breastfeeding initiation an hour after birth was significantly associated with prelacteal feeding and vice versa in this study. Results from a study of hospital delivered infants in India conformed to the findings of this study showing an association between breastfeeding initiation and prelacteal feeding (Petal et al, 2013). The evidence from the above study indicates the connections that lie within breastfeeding initiation and other actions such as cesarean delivery, institutional delivery, exclusive breastfeeding and prelacteal feeding. Implementing appropriate interventions (skin-to-skin contact and institutional delivery) aimed at enhancing breastfeeding initiation during pregnancy can produce desired results in exclusive breastfeeding rates and foster the abandoning of prelacteal feeding.

The number and timing of antenatal care visits were not associated with prelacteal feeding in this study. These findings, however, differ from a study in South India by Nielsen et al (1998) which showed that the first of several antenatal care visits in the first trimester has significant associations with colostrum feeding (Nielsen et al, 1998).

6.3. Maternal health care utilization and continued breastfeeding

In this study, antenatal care after the first trimester was found to be associated with lower odds of breastfeeding beyond six months. In line with these results, a study in the United States of America found that the implementation of baby friendly hospital initiatives such as exclusive breastfeeding, breastfeeding initiation within an hour after birth among others fostered breastfeeding beyond six weeks (DiGirolamo et al, 2008). DiGirolamo et al (2001) found that mothers who had no baby friendly practices, compared to mothers who had five baby friendly practices, were more likely to terminate breastfeeding before six weeks. Moreover, additional baby friendly practices decreased the odds of early termination of breastfeeding. These results indicate that antenatal care visits can enhance long term breastfeeding. At antenatal care visits, women are educated on appropriate feeding practices which are considered baby friendly. In some developing settings where resources are limited, group education sessions are organized for many expectant women. Thus women who attend antenatal care late (after the first trimester) may not receive vital information given at such sessions. Implications of the findings above emphasize the

importance of quality and content of antenatal education sessions and the contributions these can make to long term breastfeeding.

The place and mode of delivery showed no significant associations with continued breastfeeding after 6 months in this study. Many available studies that have addressed the duration breast feeding have varying cut off times in examining breastfeeding termination such as six months, six weeks, three months and one month. Furthermore, many other studies have focused on the duration of exclusive breastfeeding and not continued breastfeeding. Nonetheless, two studies from Taiwan and Brazil that examined cesarean delivery and continued breastfeeding at one and three months postpartum showed similar results to this study. In both studies, women who had cesarean deliveries had lower probabilities of breastfeeding beyond one month and three months postpartum (Chien and Tai, 2007; Widerpas et al, 1998). Women who have cesarean deliveries have been shown to be more likely to offer prelacteal foods and initiate breastfeeding later. In effect, such women are more likely to terminate breastfeeding early (Sundaram et al, 2013).

6.4. Socio-demographic characteristics and infant feeding practices

The results from this study suggest that socio-demographic factors have strong associations with infant feeding practices. Women's parity status, religious affiliation and marital status showed strong associations with feeding practices. Muslim women were less likely to offer prelacteal feeds while those with the African traditional religion were less likely to breastfeed within an hour after birth. In line with these results, Sutan and Berkat (2014) showed that culture and religion played a key role in infant feeding. In their study, culture and religious practices were strongly associated with late breastfeeding initiation and discarding of colostrum in Indonesia. Furthermore, women in the Muslim religion showed strong associations with higher odds of initiating breastfeeding early (Baqui et al, 2007). Maternal age of 25 years and above was associated with higher odds of continued breastfeeding beyond six months in this study. Similar reports were made by Liu et al (2013). In their study young maternal age was a significant factor responsible for reduction in the months of breastfeeding. Moreover, maternal age was found to be an important

predictor of breastfeeding at six and twelve months in other studies (Merewood et al, 2007; Lande et al, 2004). Maternal educational attainment has been shown by numerous studies to be associated with continued breastfeeding, prelacteal feeding and breastfeeding initiation (Merewood et al, 2007; Petal et al, 2013; Ogunlesi 2010). However, this study did not detect any positive or negative associations between maternal educational status and infant feeding practices.

6.5. Comparison of results with study hypothesis

The hypothesis established at the onset of this study was that maternal health care utilization was associated with infant feeding practices. Generally, after considering the results of this study in light of this hypothesis, it is evident that the hypothesis is partly supported. To elaborate, the following can be considered:

1. Antenatal care utilization and breastfeeding initiation: hypothesis not supported
2. Antenatal care utilization and prelacteal feeding : hypothesis not supported
3. Antenatal care utilization and continued breastfeeding: hypothesis supported
4. Place of delivery and breastfeeding initiation: hypothesis strongly supported
5. Place of delivery and prelacteal feeding: hypothesis strongly supported
6. Place of delivery and continued breastfeeding: hypothesis not supported
7. Mode of delivery and breastfeeding initiation: hypothesis strongly supported
8. Mode of delivery and prelacteal feeding: hypothesis strongly supported
9. Mode of delivery and continued breastfeeding: hypothesis not supported

6.6. Study Strengths and Limitations

This study utilized a national representative data set with a high response rate thus, enhancing the external validity of the findings. There are several limitations which should be considered when interpreting the findings of this study. Some limitations are described briefly below.

With respect to the measurement of antenatal care utilization, this present study examined the timing of initiation of care and number of antenatal care visits with no consideration of content or quality of care given. The Kotelchuck Adequacy of prenatal care utilization index as opposed to the Kessner index has been shown to be a more representative way of assessing antenatal care utilization (Kotelchuck 1994, Nwaru 2007). This index uses two elements: the timing of initiation of care and the number of antenatal care visits from when antenatal care began until delivery. Adequacy of initiation is classified as pregnancy months 1 and 2, months 3 and 4 months 5 and 6 and months 7 to 9. To ascertain the adequacy of received services, a ratio of the observed number of visits to the expected number of visits based on the American college of obstetricians and gynecologists is calculated and grouped into 4 categories namely: Inadequate (received less than 50% of expected visits), Intermediate (50%-79%), Adequate (80%-109%), and Adequate Plus (110% or more). A score of 80% or more on the index defines adequate prenatal care (Kotelchuck, 1994). Although the above mentioned index would have been an excellent method of assessing adequacy of prenatal care utilization, this study does not adopt the index due to the lack of information in the DHS data on important variables needed to complete the needed calculations and classifications.

Recall bias is an additional limitation in this study. Reports on components of maternal health care utilization such as the timing of first antenatal care and number of antenatal care visits were derived solely on the accuracy of the respondents recall. Thus, to some extent, this may have inhibited the ability of the study to measure what it set out to there by affecting the internal validity.

Moreover, the cross-sectional study design employed in this study gave only a description of the study population at the same time point. As with all such studies, exposure and outcome were measured simultaneously at a point in time, hence definite information about cause and effect relationship is impossible to ascertain.

7. CONCLUSIONS

Results from this study suggest that maternal place and mode of delivery were associated with the adoption of early breastfeeding initiation and prelacteal feeding. Moreover, the timing of antenatal care was also found to be an independent predictor of continued breastfeeding beyond six months. The study findings partly supported the study hypothesis. Collectively, these results indicate that the adoption and termination of infant feeding practices may be determined by maternal health care utilization during pregnancy. Although these findings do not expose the positive implications of antenatal care on infant feeding practices as some studies have shown, it adds up to the trend of mixed findings available. These differences indicate the need for further research with more rigorous methodology. Additionally, the content of prenatal care needs to be included in future studies. Antenatal care is one of the basic and first points of contact between expectant mothers and health care providers in many developing nations and it is the time when more health education is administered. Thus, it is imperative that all efforts are made to properly evaluate its implications on postpartum infant care.

Furthermore, it was found in this study that even at the point of delivery a lot can be done to ensure adequate postpartum infant feeding. The results on place and mode of delivery in this study and several other studies reviewed demonstrate this fact. Therefore, policy makers and all health care providers must mobilize efforts in order to reach all expectant mothers in rural and urban settings at the time of their delivery. The “ten steps to successful breastfeeding” is a vital package that can be implemented in all health facilities to ensure adequate breastfeeding. Antenatal care has been shown in some studies to be a predictor of place of delivery, thus antenatal care timing, number of visits as well as breastfeeding counseling should also be at the heart of maternal health care provision.

An added feature of this study is the association shown between some socio-demographic variables and infant feeding practices. These variables could be road blocks in the acceptance of life saving health interventions. It is recommended that all advocacy and behavior change oriented organizations consider factors such as culture, religion, age among others in all their actions.

Moreover, the demographic and health survey data provides vital information on developing nations that can aid in policy making and health system changes. Therefore, it is recommended that this data captures detailed information on antenatal care utilization, quality of care and content of antenatal care counseling sessions. This could help to properly evaluate the adequacy of antenatal care utilization.

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